ABSRACT

CARROLL, CHARLES MICHAEL. Rye, Triticale and Wheat Cover Crops for Continuous Cotton in Conservation Tillage. (Under co-direction of Deanna L. Osmond and Michael G. Wagger).

Utilization of small grain cover crops to reduce soil nitrogen (N) leaching losses is commonly accepted. However, in a continuous cotton production system where cotton harvest may be delayed until mid-November, the effectiveness of late planted small grains may be limited. To compensate for lower biomass production, agricultural producers of Eastern North Carolina applied 20-30 kg ha^{-1}of N in late winter with the assumption that greater biomass production and subsequent nutrient uptake resulted from application of N. If this assumption is not true, the added N has the potential to negatively impact the environment.

This study sought to compare the nutrient sequestering ability, biomass production and mineralization of rye (*Secale cereale* L.), triticale (*Tritosecale rimpaui* Wittm.), and wheat (*Triticum aestivum* L.) planted at 129, 258 and 387 seed plants m^{-2}, with and without 22.4 kg ha^{-1} of spring applied N, and the subsequent effect of these parameters on: 1) cotton nutrient uptake; 2) cotton lint yields and quality; 3) inorganic soil N and 4) soil bulk density. This study was conducted for two years in Craven County, NC, on an Aquic Hapludult located in Vanceboro, NC and an Arenic Paleudult located near Fort Barnwell, NC. The Vanceboro location represented higher Cation Exchange Capacity (CEC) soils with greater silt and clay content and greater water holding capacity. The Fort Barnwell location represented low CEC, sandy soils with low water holding capacity.

Initial soil NH_4 N and NO_3 N levels were determined from composite samples within each replication at each location in October 2003 from 0-20, 21-40, and 41-60 cm depths. Initial soil inorganic N levels were compared to subsequent fall sampling (October) for each subplot of the medium and high seeding rates of rye, triticale and no cover with and without spring applied N. Cover plant density was determined in December of each year; fertilization of 22.4 kg ha^{-1} of N on designated plots in early spring, and biomass weights determined in early April prior to cover crop termination. Five samples of each small grain cover crop were heated sealed into 2 mm mesh screen bags and placed on the soil surface of planted cotton fields. Retrieval of these cover resides samples was undertaken at 7, 14, 28, 56 and 112 days after placement. Cover residue samples were analyzed for nutrient content.

Cotton was planted by the second week of May. Cotton petiole and leaf samples were taken at first bloom and four weeks after bloom of each year. Cotton was hand harvested in early October from 4.2-4.5 m of two adjacent rows and lint weights calculated from field weights. Soil bulk density samples were taken the last year of the study at 0-7.5 cm and 7.5-15 cm depths in untrafficed plots with an Uhland hammer and cylinder.

Results generally showed that greater seeding rates increased biomass between the low and medium seeding rate but not between the medium and high seeding rates. With spring applied N, biomass weights were still low and variable, ranging from 1112-3685 kg ha^{-1}. No small grain cover crop utilized 100% of the spring applied N leaving a balance generally ranging from 11-14 kg ha^{-1} of N added to the soil system. While soil influences and climatic variations showed a great impact upon biomass production, biomass dry weights generally resulted in triticale > rye >wheat with residue mineralization of rye > wheat> triticale. No small grain cover crop impacted soil N, cotton yield, cotton lint quality or soil bulk density.

Rye, Triticale and Wheat Cover Crops for Continuous Cotton in Conservation Tillage

by

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BIOGRAPHY

Charles Michael (Mike) Carroll was born in Monroe, Louisiana in 1963. He moved from Monroe at the age of two to Bastrop, Louisiana, where he lived until graduation from Bastrop High School. Upon graduation of high school in 1981, he attended Louisiana Tech University, Ruston, Louisiana. As part of undergraduate studies, he served an internship in Eastern North Carolina as field scout of peanuts, cotton, soybeans, corn and tobacco with a private agricultural consulting company. Upon graduation in 1985, Mike continued working with the agricultural consultant company developing pest management plans, nutrient management plans and field scouting for these crops. Mike continued agricultural consulting as an independent business owner as well as jointly with an agricultural supplier offering soil sampling, scouting services, GPS/GIS soil sampling and variable rate applications. In 1998, Mike began work with North Carolina Cooperative Extension as an Agricultural Agent in Bladen County and moved to Craven County in 2002. Through his work, Mike has assisted agricultural producer comply with nutrient management and BMP's that benefit crop production and the environment. It was through these efforts that Mike's interest in cover crops and strip tillage initiated research and studies.

Mike was married in 1986 to Titina Lynn Cannon, a native of Ayden, North Carolina. Mike and Titina have two children, a daughter and a son. They currently live in New Bern, NC and Mike is employed with the North Carolina Cooperative Extension of Craven County.

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It is also necessary recognize the support of NC Cooperative Extension staff in Craven County as well as surrounding offices in Lenoir, Jones and Pamlico Counties. The staff of these offices accommodated work efforts to align with my field study tasks as well as assisted with hand harvest of cotton. With their assistance, this task took 2-3 days per site rather than weeks. Thank you!

I would also like to thank contributors to this project. Bill Smith of Resource Seeds, Incorporated, offered seed, the use of his planting equipment and his time planting these plots. Pennignton Seeds and Delta & Pineland also contributed seeds. Both farming operations, Heath Farms of Dover, NC and French Farms of Vanceboro, NC contributed field space, equipment and production practices as well as allowances in different management practices to accommodate our research needs. Dr. Keith Edmisten, NCSU Crop Science, arranged for the cotton lint to be ginned by Cotton Incorporated, Cary, NC. His technician, Jamie Lanier, coordinated this effort.

Lastly, and perhaps most importantly, I'd like to thank my wife and children for their support, sacrifices and understanding over these past years when the demands of this project were placed as a priority over other issues. We've all made sacrifices to complete the project. Word simply can't express my gratitude for your continued love, support, encouragement and understanding. Thank you!

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INTRODUCTION

The benefits of cover crops are optimized when: 1) the cover crop is established immediately after primary crop harvest, 2) favorable conditions exists for cover crop establishment, 3) climatic conditions do not enhance nutrient losses from leaching or sediment erosion, and 4) adequate soil nutrient reserves promote optimum cover crop development (Dabney et al., 2001). For producers using continuous cotton (*Gossypium hirsutum*, L) production systems in the North Carolina Coastal Plain, these assumptions are not always valid. Cotton nutrient uptake slows or ceases with increasing plant maturity (Schwab and Burmester, 2000). For this region, this normally occurs between late August and early September. Thus, as much as 25% of the crop is yet to be harvested by mid-November (North Carolina Agricultural Statistics, 2005). The decrease in crop nutrient uptake coupled with continued mineralization has been shown by Staver and Brinsfield (1990) to increase soil inorganic N levels. These increased soil N levels may increase leaching losses (Staver and Brinsfield, 1990; Weil et al., 1990) during this period since average rainfall of September through November is 30.7 cm (North Carolina State Climate Office, 2009). Furthermore, the fate of late planted small grains often results in reduced biomass due to winter onset (Bauer and Reeves, 1990). Consequently, the benefits of late planted cover crops to reduce N leaching losses or add carbon inputs from biomass production may not be realized.

Of particular interest is the need to evaluate these cover types, seeding rates and fertilization recommendations to determine potential environmental and agronomic impacts in agricultural watersheds declared as nutrient sensitive waters. The Neuse River Basin was declared a nutrient sensitive watershed in 1997 and regulatory actions (NCGS 143-214.1) were taken to reduce non-point source N contamination. Under these regulations, agricultural producers were mandated to reduce N to receiving water by 30%. If late planted small grain cover crops receiving a low rate of spring applied N respond by increasing biomass production and total cover crop N-uptake by an amount equal or greater than the amount of spring applied N, this may improve soil quality and reduce soil-NO_3 levels. The soil organic carbon additions should improve soil-water relationships and decrease nutrient loading to receiving waters (Causarano et al., 2006). Conversely, if late planted cover crops have limited biomass, then carbon additions to soil will be minimal. Furthermore, if the spring applied N is not utilized by the cover crop to develop biomass, this practice would add additional N inputs that potentially could increase N loads to receiving water or be lost to the environment (Staver and Brinsfield, 1990; Daniels, et al., 1999; Sainju, et al., 2002).

In addition to N, it has become evident that phosphorus (P) off-site movement is also a contributing factor for degraded surface and groundwater (Sharpley, et al., 2003; Yu et al., 2006; Wright, 2009). Under conservation tillage systems, P applications are either banded or broadcast without incorporation leading to stratification of soil-P within the upper soil profile. Phosphorous adsorbed to soil particles are subject to loss via soil erosion, thus increasing off-site movement. Cover crops that provide a persistent soil surface residue to reduce erosion is desirable (Sharpley, 2000; Sharpley et al., 2003).

Rye (*Secale cereale, L)* has been widely used as a cover crop because of its rapid development and ability to grow well in N limiting environments. Triticale may have a greater utilization for bioremediation of P since the root and growth rate of triticale is similar to that of its rye parent but triticale often assumes the greater nutrient uptake of its wheat parent. (Paponov et al., 1999, Gashaw and Mugwira, 1981). This is further supported by study of Kim, et al. (2001), reporting that developments in breeding may surpass rye, especially intermediate or facultative varieties.

Inherent N uptake of small grain cover crops is an important consideration for use as a cover crop. Nitrogen concentration reported by Muir and Bow (2009) in a forage study ranged from 2.2-3.7%, 2.6-3.8% and 2.5-3.5% for rye, triticale, and wheat, respectively. Paponov (1999) reported greatest N uptake by rye at low N levels compared to wheat and triticale but equal uptake from rye and triticale at non-limiting N when grown in solution culture. Growth rate, shoot N concentration and root N concentrations during this study showed rye > triticale > wheat. Bauer and Reeves (1999) studied wheat, rye and black oats with plantings in October, November and December on a Coastal Plain soil of South Carolina. In this study, biomass N uptake of rye for October, November and December planting dates declined from 42.4 to 32.6 to 30.3 kg ha^{-1}, for each planting date respectively. In a similar comparison, wheat biomass N uptake declined from 24.7 to 16.7 to 6.5 kg ha^{-1}, respectively. This demonstrates the decreased potential for biomass production and subsequent nutrient uptake of late planted small grain cover crops. Brown (2006) reported a cumulative P uptake of 66 kg ha^{-1} for triticale in a comparative study of wheat, triticale and barley seeding rates as forage. Muir and Bow (2009) reported rye, triticale and wheat P uptake of 5.4, 5.9 and 5.6 g P kg^{-1} of biomass, respectively. In this study, total P uptake for rye, ryegrass and triticale exceeded 38 kg ha^{-1}. In a study on double cropped forage systems, Brown (2007) reported cumulative P removal from the soils for triticale ranging from 58-66 kg ha^{-1} and 39-54 kg ha^{-1} for wheat. Muir and Bow (2009) report P concentration of triticale biomass as a forage ranging from 4.2-5.0 g P kg^{-1}, rye biomass P concentration from 3.5-5.4 g P kg^{-1} and wheat from 4.7-5.6 g P kg^{-1}. VanderHorst et al. (1998) observed greater P uptake for triticale compared to rye and wheat.

Variations of nutrient uptake of these small grains depend greatly upon the genotype, stage of termination and management variances affecting biomass production (Mugwira et al., 1981; Kim et al., 2001; Biligil et al., 2009). Climatic conditions add additional variance likely to be amplified by late planting resulting in reduced biomass and subsequent total biomass nutrient uptake.

The USDA Natural Resources Conservation Service (NRCS) encourages the utilization of cover crops to promote soil organic matter additions, reduce erosion, increase water conservation, sequester nutrients and minimize soil compaction (NRSC Field Office Technical Guide, 2010). To encourage greater adaption of cover crops, NC NRCS Conservation Practice Standard Code 340 provides funding and guidelines for small grain cover crops based on the ability of the crop to sequester nutrients, increase soil residue that subsequently protects against erosion, increases water infiltration rates and preserves soil moisture. Planting deadlines for these programs are set according to region based upon favorable climatic conditions for seedling emergence and early small grain development. No fertilization is allowed to the cover crops. Cover termination deadlines are set as late as possible to provide greater biomass development. A minimum of 80% cover is required at the time of planting the primary crop. Currently funds are greatest for rye with decreasing funding amounts for triticale, wheat and barley. Guidelines set a planting deadline of November 30th, seeding rates between 125-188 kg ha^{-1} and a termination date no sooner than April 1st (NRCS Practice Standard, Cover Crop Code 340, 2010).

Establishing an optimum seeding rate is essential for establishing small grain cover crops and may be especially critical for late planted small grain covers. In a forage evaluation, Muir et al. (2009), found that optimum seeding rates of 100 kg ha^{-1} were required to obtain dry matter yield for rye, triticale and wheat ranging from 2,771-10,567, 3,152-5,531 and 1,579-5,247 kg ha^{-1} respectively. Variations within each cover type were due to climatic factors. In a comparison of wheat and triticale, Larter et al. (1971) demonstrated optimum seeding rate of 100 kg ha^{-1} for triticale. Brown (2006) reports an optimum seeding rate of 168 kg ha^{-1} for maximum forage production when seeding rates of 112, 168 and 224 kg ha^{-1} were tested. Optimum planting of all three cover types, as evaluated by Bishnoi (1980), indicate a seeding rate for triticale of 75 and 100 kg ha^{-1} for grain and forage, respectively. Wheat and rye planted at these rates produced significantly greater forage. Blaser et al. (2006) evaluated wheat and triticale intercropped with clover at seeding rates 100-400 seeds m^{-2} and reported maximum forage production between 350-400 seeds m^{-2}, varying due to climatic factors, soil type and planting dates. With the exception of forage production, these studies suggest optimum seeding rate in the range of 100-160 kg ha^{-1}. Generally, increasing seeding rates for timely planted small grains does not appear to greatly influence grain yield components (Later et al., 1971; Puri et al., 1985; Fowler, 1982; Otteson, et al., 2007).

The primary objectives of this study were to compare the nutrient sequestering ability, biomass production, and mineralization of three late-planted small grains , cereal rye, triticale (*Tritosecale rimpaui* Wittm.) and wheat (*Triticum aestivum* L.) to evaluate the influence on inorganic soil-N, soil bulk density, cotton nutrient uptake, cotton lint yields and cotton lint quality.

LITERATURE REVIEW

Seeding and Biomass Development

Rye has long been identified as a preferred small grain cover crop due to its rapid fall growth rate, deep root system, ability to sequester N and wide C:N ratio of above ground biomass to provide persistent soil residue cover. Rye germinates easily and has a wide range of acceptable planting dates. While wheat shares the rapid fall growth for tiller development, it becomes dormant upon onset of cooler temperatures, has less above ground biomass than rye and a more plastic root system. Triticale, as a cross between these two genotypes, generally exhibits traits from both parents.

Winter and spring types of small grain exist, with the former more tolerant of colder climates. However, breeding of triticale and wheat includes an intermediate or facultative type that exhibits rapid fall development, rapid growth upon spring onset, but more tolerance of cold winter weather. Even so, concern arises from late planting of small grains as a cover. Fowler (1982) reported decreased shoot biomass with each subsequent delay in planting from August through October in the Great Plains. In this study, rye biomass was greater than wheat. However, survival was related to specific cultivar characteristics and phenological stage upon winter onset rather than planting date. Later planting of small grains has also been shown to influence physiology, seedling survival, decreased tiller development, delay heading, and reduce water uptake or reduce rooting depth (Larter et al., 1971; Bouquet et al., 2004; Ottman and Pope, 2000). Such physiological changes in small grain development will influence the small grain cover's ability to produce adequate and persistent biomass that may potentially improve soil qualities. Delayed planting will also reduce the total amount of nutrient uptake since total nutrient uptake is related to total biomass production (White et al., 1991; Schawarte et al., 2005).

Evidence of small grain's ability to adapt to later planting has been documented when weather conditions and nutrients do not limit late planted small grains (Fowler et al., 1982; Puri et al. 1985; Paponov et al., 1999; Bouquet, 2004). However, studies also show that N uptake varies by planting date, seeding rate, genotype, cultivar, climatic factors, N source and timing, and initial soil-N level (Subedi et al., 2007; Schwarte et al., 2005;

Giambalvo et al., 2010). As such, interactions of these factors and genotype differences are anticipated to influence biomass development among the seeding rates of this study.

Small Grain Cover Decomposition

The rate of decomposition and subsequent N release from cover crops vary by chemical composition, climatic factors, soil properties and microbial interactions. Timing of net N mineralization of the cover crop biomass to coincide with N demand of the subsequent crop is desirable. Norman (1990) studied the rate of ^{15}N release from various residues and observed that as little as 3% of the N in the rice straw and as much as 37% of the N in wheat straw was recovered in subsequent rice crops. Ranells and Wagger (1997) showed that only 4% of the N in rye is recovered by subsequent corn crops compared to 21% of the N in crimson clover. Quermada and Cabrera (1995), in a study of stems and leaves, reported that residue with lower C:N ratio and low lignin content decompose faster than those with higher C:N and higher lignin content. Trinsoutrot et al. (2000) portioned rape, alfalfa, pea, soybean, small grains and maize by root, stem leaf, wall pod, and whole plant, demonstrating that biochemical qualities influence C and N transformation. These studies indicate that 50-70% of decomposition rates of crop residues can be explained by the C:N ratio but additional factors such as polyphenol, lignin and soil N level strongly influence decomposition rates (Fox et al., 1990). Other factors such as soil type (Fritschi et al., 2005), microbial community and residue particle size (Angers and Recous, 1997) may influence decomposition. With higher C:N ratios of small grains reported in the literature, the expected rate of N recovery would decrease due to the slow decomposition rate. Slow residue decomposition may enhance cotton yields if mineralization occurs at or near cotton bloom, which is during cotton peak N demand (Bergtold et al., 2005). Conversely, residue with high C:N ratios have been reported to immobilize N (Wagger, 1989; Reeves, 1994; Reiter et al., 2008), which may potentially reduce cotton yield.

Cotton Response to Small Grain Cover

Cotton yield increases have been reported as a result of the cover residue's ability to regulate soil temperature, decrease soil evaporation and increase water infiltration (Unger and Parker, 1976; Teasdale and Mohler, 1993; Arriaga et al., 2005; Clark et al., 2005). Conversely, in N limited systems, additions of high C:N residue may result in N immobilization and subsequently decrease primary crop yield since both crop and soil microbes compete for the limited N and water supply (Malpassi et al., 2000; Jackson, 2000; Reiter et al., 2008). Specifically for cotton, both positive and negative yield responses have been reported for rye cover crops (Bauer and Reeves, 1999; Schwab et al., 2002, Raper et al., 2000; Bauer and Roof, 2004; Boquet et al., 2004; Vasilakoglou et al., 2006).

Nayakekorala et al. (1990) in a study of cotton root growth and P uptake showed that most of the P uptake was derived from the upper 30 cm of soil. Phosphorous-flux varied with growth stage and root depth penetration. Thus, if these cover crops are able to sequester soil P from deeper within the soil profile and subsequently mineralize the P deposited within the upper 30 cm soil profile, cotton should better utilize P.

While the soil residue from cover crops may provide a desirable conservation of soil moisture and moderation of temperature, cover residue alleopathic effects have been shown to reduce root growth of cotton in the order of wheat > triticale > rye (Price et al., 2008). However, in a study utilizing wheat residue for grass weed suppression by Vasilakoglour et al. (2006), no alleopathic effect was reported. According to this study, the alleopathic effect was small or compensated by improved growth of the cotton, most likely due to improved soil moisture. Other effects of residue on cotton physiology have been shown by Bouqet et al. (2004), include increasing plant height, number of plant nodes, boll weight, boll number, blooming period and lint percentage. Cotton lint quality improvement are reported but appear to vary according to seasonal variations, cover crop, management decisions and inherent cultivar characteristics of the variety chosen (Daniels et al., 1999; Pettigrew 2004; Bouqet 2004).

Inorganic Soil Nitrogen (NH_4 and NO_3)

It is important to reduce soil NO_3 levels in groundwater and recurring waters. Weil et al. (1990) showed that fertilization practices can increase soil NO_3 levels and groundwater concentration in Coastal Plain soils by 10-20 ml L^{-1}. Generally, groundwater and soil NO_3 concentrations increased August through March when crop uptake is low or nonexistent and evapotranspiration is low. Nitrate concentrations showed increased values from August through March and decreased values from March through June when crops are grown. In studies with labeled ^{15}N on wheat N fertilization practices, Ottman and Pope (2000) showed that exceeding recommended N applications increased biomass production but not grain yield. Recovery of most of the ^{15}N was within the upper 1.0 m of the soil surface and was influenced by timing of fertilization but not N application rate. Mean residual soil NO_3 N was 0.37 N kg m^{-2} for each 0.3 m depth increase up to 2.4 m.

Small grain cover crops are widely used to sequester soil N. Schomberg et al. (2004) reported a range of 73-158 kg ha^{-1} of N assimilated in rye aboveground biomass with reductions of NO_3 N (0-0.9 m depth) ranging from 4 to 40 kg ha^{-1}. Net N mineralization of cover residues contributed 30-50 kg ha^{-1} of N to the following cotton crop. Daniels et al. (1999) reported an average of 74 kg ha^{-1} and 56 kg ha^{-1} of N from rye and wheat cover crops, respectively, but did not include estimations for mineralization. While this provides a positive environmental benefit, the use of small grain cover crops do not consistently provide an agronomic benefit to the primary crop. Bundy and Andraski (2005) reported a mean of 19 kg ha^{-1} of N assimilated by rye cover crops but no significant difference in corn or sweet potato yields. Bauer and Busscher (1996) reported no significant differences in cotton yields between rye cover crop and fallow production systems. Reeves et al. (1993) reported N immobilization following limiting cotton production with small grain cover crops.

The primary objectives of this study were to compare the nutrient sequestering ability, biomass production and mineralization of rye, triticale (*Tritosecale rimpaui* Wittm.), and wheat (*Triticum aestivum* L.) planted at three seeding rates (18, 37, and 55 seeds m^{-1} of row) with and without 22.4 kg ha^{-1} of spring applied N, and the subsequent effect of these parameters on 1) cotton nutrient uptake; 2) cotton lint yields and quality; 3) inorganic soil-N and, 4) soil bulk density. This study was conducted for two years in Craven County, North

Carolina (NC), on an Aquic Hapludult located in Vanceboro, NC and an Arenic Paleudult located near Fort Barnwell, NC. Both locations produced cotton under conservation tillage management in continuous cotton for the study duration.

MATERIALS AND METHODS

Experimental Design

Two locations were selected with cooperating growers of Craven County in both 2004 and 2005. The first site was located near Fort Barnwell, NC (ftbarn) on an Arenic Paleudult (Autryville series). The site had been in continuous cotton production for eight years with the last six involving a strip-till, ripping tillage system performed with a Precision Ag Tillage unit which provided a shank for deep subsoiling and a rolling basket that incorporates a small seedbed approximately 33 x 2 cm. Cotton row spacing for this unit is 91 cm (36”). This site was designated as conservation tillage (CT) since the shallow tillage left approximately 60% of the residue intact after planting and represented typical low CEC, sandy soils with low water holding capacity and tendency for soil compaction.

The second site was located near Vanceboro, NC (vboro) on an Aquic Hapludult (Altivista series). Cotton production at this site was planted directly into existing cover crop residues without any tillage into 96 cm (38”) rows. Crop sequence at this site historically included three years of cotton followed by either soybeans or tobacco. This site represents higher CEC soils of this area with greater silt and clay content, water holding capacity and lesser degree of soil compaction.

Experimental plot design was a randomized 4 x 3 x 2 factorial split-split plot, with the primary block approximately 9.1 x 18.3 m as cover type: [no cover (NC), cereal rye (R) triticale (T), and wheat (W)] replicated four times at each site. The first split plot (approximately 3.0 x 6.1 m) allowed for three seeding rates of each small grain of 18, 37 and 55 seeds m^{-1} row. These rates represent the recommended small grain seeding rates grown for grain, one third of this rate and two-thirds of this rate (designated as 3, 2, and 1 respectively). The second split allowed for comparison of zero or 22.4 kg ha^{-1} of spring-applied N (designated as "N" on the cover type codes).

Prior to establishment of the cover crop, composited soil samples were obtained from each site and submitted to the Agronomic Division of the NC Department of Agriculture (Appendix B). Lime was applied at the Fort Barnwell site in the fall of 2003. No lime was required at the Vanceboro location. Other than the specified N treatments, no fertilizer was applied specifically for the cover crops. A shallow disking prior to planting the cover crops eliminated any existing weeds. Thus, no additional weed control or fertilization was included to establish the small grain cover crop plots.

The small grain cover crops were planted into 19 cm wide rows with a Hagie grain drill approximately 152 cm wide on November 11, 2003 and November 12, 2004 at Fort Barnwell; and on November 12, 2003 and November 13, 2004 at the Vanceboro site. Pre-weighed seed packets, arranged in a serpentine manner according to tractor travel, were manually dropped into the hopper to accommodate differing seeding rates and cover types.

Limitations in planting equipment impacted decisions of the study. A planter with the ability to consistently and uniformly plant low seeding rates for small grains under no till conditions for small plots was not available. Larger plots were considered but the high variability of soil types found within this region leads to greater potential variation and error. Consequently, small plots with uniform soil types were given a priority with the sacrifice of including a shallow disking (10 cm) at a 45^0 angle to the primary cotton crop rows prior to planting the cover crop. Additionally, the tractor width was slightly greater than the grain drill width. Tractor paths driven close enough to avoid seeding gaps would potentially compact part of previously seeded plots and impact subsequent crop growth or soil density. Tractor paths following the previous tire tracks would leave a space of approximately 50 cm unplanted. It was decided that the latter would not impact the study parameters but would leave unsightly streaks of no cover. Consequently, and more for appearance than data, these tractor tire tracks were hand planted with the appropriate seeding rate and small grain cover the day after establishment of the plot.

Nitrogen fertilizer was hand applied to subplots between February 26-28 in 2004 and February 28-March 2 in 2005 using calcium nitrate (15.5-0-0) at 604 g per plot, which equates to 22.4 kg ha^{-1}. Termination of the cover crop was targeted at 14 days prior to planting of cotton (April 21st – April 24th) with an application of glyphosate at 0.71 L ha^{-1}. Due to rain, cover crop termination was delayed until April 27th at Vanceboro and April 29th at Fort Barnwell in 2005.

Approximately 100 kg ha^{-1} of potassium (0-0-60) was applied prior to planting cotton in early to late March. At Fort Barnwell, cotton was planted on May 3, 2004 and May 5, 2005 and at Vanceboro on May 4, 2004 and May 10, 2005. Delta and Pineland 451 (RR/Bt) was planted at both sites with an eight row John Deere Maxi-Merge vacuum planter at 13 seeds m^{-1} of row. Planting included approximately 22.4 kg ha^{-1} of N and P banded in a 5 x 8 cm placement beside the seed and 4.4 kg ha^{-1} of aldicarb in the seed furrow.

No herbicide was used prior to or at cotton planting. Glyphosate applications were made at approximately the 1st leaf (May 14-17) and 7-10 days later (May 25-28). In 2004, severe thrip infestation exceeded the threshold very early. Thus, 0.22 kg ha^{-1} of acephate was included with the glyphosate application in May at both sites. Mid-season weed control included glyphosate + prometryn applications of directed sprays mounted on hooded sprayers in early June (June 7-10). Additional N was applied at a rate of approximately 62 kg ha^{-1} by knifing 25N- 3%S-0.4%B UAN solution approximately 15 cm from the cotton row June 22-25, approximately 2-3 weeks prior to first bloom. This practice follows target N rates for cotton without spring applied N to the cover crops but exceeds recommended N rates by 29% for plots receiving spring N.

In 2004, plant growth regulator application of 585 ml ha^{-1} of mepiquat chloride was applied on June 15 at Vanceboro and June 18 at Fort Barnwell. A second application of mepiquat chloride at 730 ml ha^{-1} was applied on July 6 at the Vanceboro location and July 9 at the Fort Barnwell location. Frequent rainfall and heat unit accumulation favored cotton growth, resulting in an earlier first bloom date. Cotton at both sites was at full bloom the first week of July. Conversely, plant growth in 2005 was slightly less due to lower rainfall in May and June, combined with lower heat unit accumulation. Thus, the first application of mepiquat chloride was applied on June 23 at Fort Barnwell and on June 19 at Vanceboro at a rate of 585 ml ha^{-1}. A second application of 730 ml ha^{-1} mepiquat chloride was applied July 6 at Fort Barnwell and July 9 at Vanceboro. An insecticide application of 146 ml ha^{-1} of lamda-cyhalothrin was applied for control of cotton bollworm on August 8 at Vanceboro location and August 12 at Fort Barnwell. Cotton was defoliated in both years between the dates of September 23 – 25 with application of 0.95 L ha^{-1} of cyclanilde and ethepon products tank mixed with 0.23 kg ha^{-1} of thidiazuron.

Cover Crop Plant Density, Biomass and Residue Cover

Cover crop plant density was estimated on December 3 & 4 in 2004 and December 2 & 3 of 2005 by randomly placing a 0.25 m^2 frame into plots and counting the number of live plants within this frame. Cover biomass was determined by cutting the aboveground portion of each small grain cover crop within a randomly placed 0.25 m^2 frame prior to growth termination (April 18, 2004 and April 22, 2005). Samples were oven dried at 60^{o}C for 48 hours and immediately weighed (Appendix B).

Estimates for surface soil residue cover provided by these small grain covers were calculated by using the line-transect method with markers 0.3 m apart. The transect was

7.5 m long, spanning the center two rows of planted cotton in each plot. Estimations were made on May 19 & May 21 in 2004 and on June 1-3, 2005 (Appendix B).

Cover Crop Nutrient Uptake and Decomposition

Whole plant samples of each small grain cover crop were harvested from the medium seeding rate to supply material for the decomposition study. Plant material was air dried for 72 hours and then divided into 7.5 g (±0.1 g) samples to simulate approximately 1400 kg ha^{-1} of residue. Each 7.5 g subsample was placed into a 30 x 30 cm mesh vinyl bag (2 mm mesh) and the open end heat sealed. Five subsamples were labeled with aluminum tags corresponding to retrieval dates of 1, 2, 4, 8 & 16 weeks after field placement. The residue bags were placed into plots on May 18, 2004 and retrieved on May 25, June 1, June 15, July 13 and August 21 of 2004. In 2005, bags were placed within plots on May 25 and retrieved on June 1, June 8, June 22, July 20 and September 7 of 2005. Bags were placed on the soil surface within the cotton rows and secured with metal flags after gentle removal of any existing soil debris. At the designated time of retrieval, residue bags were gently removed and shaken to remove any soil or debris. Any weeds found in the bags were likewise removed. The bags were then placed into freezer storage for later drying, grinding and tissue analysis. Upon retrieval from freezer storage, each cover residue sample was oven dried at 60^{o} C for 24 hours and immediately weighed (±0.01 g). Samples were ground and subsamples of 1.25 g were obtained for tissue analysis of N, P and C content using a Perkin-Elmer CHN elemental analyzer (ICP). For highly decomposed samples or residue containing excessive soil contamination, residue was placed into pre-weighed crucibles of deionized water. Floating material was collected with a 1 mm screen, air dried, oven dried, reweighed and combined with the remainder of the appropriate sample.

Soil Inorganic Nitrogen (NH_4 and NO_3)

Initial soil inorganic NO_3 and NH_4 levels were determined in October 2003 by taking two random cores within each replication of each site at depths of 0-20, 21-40, and 41-60 cm. The initial soil inorganic N levels were compared to subsequent fall sampling (October 2004 and November 2005) for each subplot of the medium and high seeding rates of rye, triticale and no cover with and without spring applied N. Shallow samples were also taken July 2005 for soil depths of 0-15 cm and 15-30 cm. All samples were air dried, ground to pass through a 2 mm sieve and stored in airtight plastic containers until extraction. Extractions were made with 1 M KCl (1:10) and frozen until time of analysis. Samples were analyzed for NO_3 N and NH_4 N by the Analytical Services Laboratory in the Soil Science Department at NC State University using a Lachat Instruments QuikChem brand 8000 Automated Ion Analyzer (Lachat method #10-107-04-1-A Lachat Instruments, Hach Company, Loveland, CO, USA).

Cotton Leaf Nutrient Concentration and Petiole Nitrogen

Cotton leaf and petiole N concentrations were determined by sampling 15 most recently mature leaves and petioles from each plot at each location on July 10 and Aug 3 in 2004 and on July 15 and August 10 in 2005. Petioles were removed from the leaf as soon as possible. Leaf and petiole analyses were performed by the North Carolina Department of Agriculture and Consumer Services, Plant, Waste & Tissue Analysis Division.

Cotton Harvest

Each subplot of cover type and seeding rate, with and without spring applied N, was hand harvested and weighed. A distance of 4.2 m and 4.5 m was used for the Vanceboro and Fort Barnwell site, respectively, by randomly placing pre-measured PVC pipe into the center two rows of each subplot. All cotton within this distance on both rows was hand harvested. Air- dry weights were recorded (±0.1 g) and can be found in Appendix B. Subsamples of approximately 300 g were removed for ginning with a Microgin through permission of Cotton Incorporated in Cary, NC. Net cotton lint weight was calculated by multiplying the field weight by an estimated lint percent of 0.43 (Appendix B).

Soil Bulk Density

Bulk density measurements were taken using a 7.5 cm cylindrical core with an Uhland hammer (Blake and Harge, 1986) at 0-7.5 cm and 7.5-15 cm depths. Sampling areas were selected randomly from untrafficed cotton row middles of the medium seeding rate for each cover type. Debris and loose soil were gently removed from the sampling site prior placement of the cylinder. For the 7.5-15 cm depth, a separate area within 1 m of the corresponding 0-7.5 cm depth was likewise selected and excavated with a hand trowel to a depth of 7.5 cm prior to taking a core sample.

Cotton Insect Management

Levels of the cotton aphid (*Aphis gossypii* Glover) approached economic threshold for treatment in 2004. Thus, aphid populations were evaluated to determine whether soil cover treatments affected aphid populations. Estimates were recorded as number of aphids per leaf. Data was gathered through a self-calibration method by first estimating the number of aphids on a leaf and then counting to determine the exact number. Adjustments were made until estimates closely matched exact numbers. From this point, estimation of the number of aphid per leaf was recorded by sampling five of the first fully expanded, mature leaves from each plot.

Schedule of Tasks and Events

The first year of this study began in 2003 with field preparation for planting of small grains as cover crops and ran into 2004 with planting of the primary crop. It is more useful to refer to the data and sequence of events by a single year. Thus, some discussion refers to the year the results were gathered rather than sequence of events. A summary of tasks is listed in Table 1 (Scheduled Events of the study), to demonstrate the sequence of events designated as 2004. For 2005, the tasks are identical but tasks begin in November 2004 and run through October of 2005.

Table 1. Scheduled events of the study.

Event	Planned Date of Events	Calendar Year
Disk field (1 pass)	November 9th-10th	2003
Plant small grain cover crops	November 11-14th	2003
Evaluate cover crop plant density	December 1-4th	2003
Fertilize small grain cover crops	February 28th - March 2	2004
Gather cover biomass samples	April 1st -9th	2004
Terminate cover crop	April 10-15th	2004
Plant cotton	May 1st -May 8th	2004
Evaluate cotton population	May 15th-May 20th	2004
Placement of residue bags for decomposition	May 15-May 20th	2004
Retrieval of residue bags for evaluation	1,2, 4, 8 & 16 weeks later	2004
Soil residue evaluations	2 weeks after planting	2004
Apply cotton N	June 14^{th} – Jun 20th	2004
Cotton leaf and petiole samples at bloom	July 1- July 10th	2004
Cotton leaf and petiole samples at late bloom	August 1st - August 7th	2004
Desiccation of cotton	Sept. 5th –Sept.15th	2004
Harvest of cotton	Sept. 30th –Oct. 10th	2004
Inorganic soil-N cores taken	Oct.1st – Oct. 15th	2004

Statistical Analyses

After checking for homogeneity of variances, the MIXED procedure was performed (SAS Institute, 2005) with an alpha level of 0.05 and Tukey-Kramer adjustments for multiple comparisons. For all analyses, final models were selected by review of an initial model that included all main effects and maximum interactions. Through process of elimination of insignificant main effects and interactions, a final model was selected with priority given for higher degree of freedom, significant effects and the variables evaluated. For select models, factors such as fertilization treatments or replication effects remained in the model even though these factors were not significant. This afforded an opportunity to evaluate the potential influence of these factors on the statistical model by comparison of the P-value without influences upon the degree of freedom. Lastly, visual observations of histograms, box plots, and probability plots reveals that collectively, data for small grain cover crops shows only slight deviations from normal. However, individual review of any randomly selected small grain cover seeding rate shows non-normal distribution. Analysis of transformed data (log and square root) did not provide greater statistically differentiation, although the fit statistics improved. Thus, data was analyzed without transformations. Initial analysis revealed significant interactions between years and locations, thus data is presented by location and year.

RESULTS

Climatic Conditions

Climatic information was obtained from the State Climate Office of North Carolina (NC CRONOS Database) from the Cunningham Research Station, Kinston, NC (Appendix B). This data is valid for both experimental sites since the plots are less than 10 km apart. Growing degree days, base 0^{O} C (GDD) were calculated beginning November 11 of each year using the formula [($temperature_{max}$ -$temperature_{min}$)/2]. In 2004, 148 GDD accumulated 10 days after planting (DAP) and by 30 DAP, 327 GDD accumulated. By April 10, near the date of cover crop termination of growth, 1301 GDD had accumulated. In 2005, GDD accumulations for 10 DAP, 30 DAP and April 10 was 102, 362 and 1382, respectively. The slightly above normal temperatures during cover crop early seedling development in 2004 resulted in more rapid small grain cover crop germination and seedling development than in 2005. However, from March through early April, during typical periods of rapid small grain growth, both years had near normal temperatures (Figure 1).

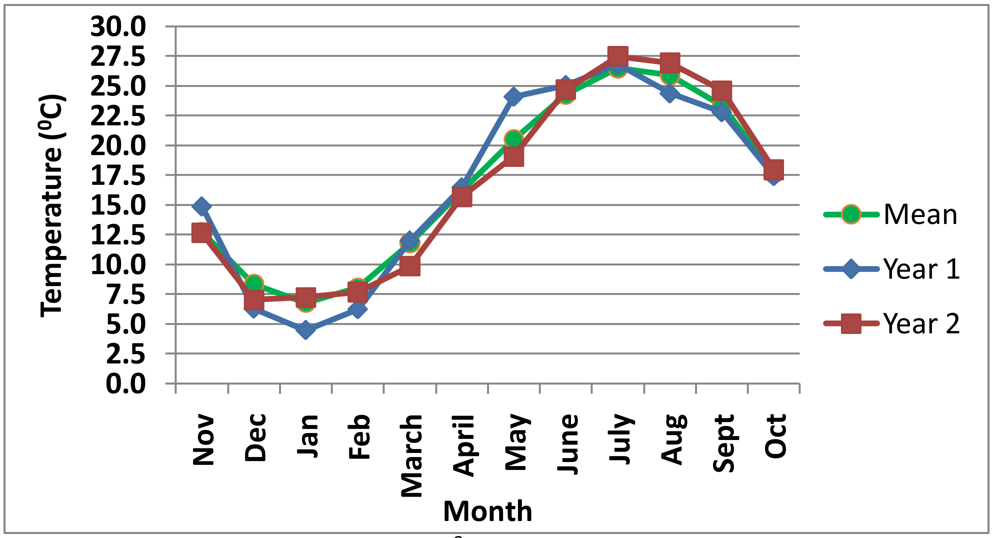


Figure 1. Mean monthly temperatures (C^0) obtained from State Climate Office of North Carolina (NC CRONOS Database) for the Cunningham Research Station, Kinston, North Carolina. (Year 1 = November 2003-October 2004; Year 2 = November 2004-October 2005)

Rainfall exceeded normal amounts for all months of this study (Figure2). Winter months received greater rainfall than normal but the excessive rainfall during summer months was due to tropical storms and hurricanes. In 2004, from early July through mid-September, Hurricane Alex, Tropical Storm Bonnie and Hurricanes Charley, Gaston, Ivan, and Jeanne either made direct impact upon eastern North Carolina or indirectly affected the areas with increased rainfall. The excessive winds from some of these storms damaged cotton roots, stems, bolls and lint. In 2005, remnants of Hurricane Cindy created excessive rains and the slow moving path of Hurricane Ophelia created over 20 days of continuous rainfall during a period of boll opening for cotton plants that severely reduced lint yields and quality.

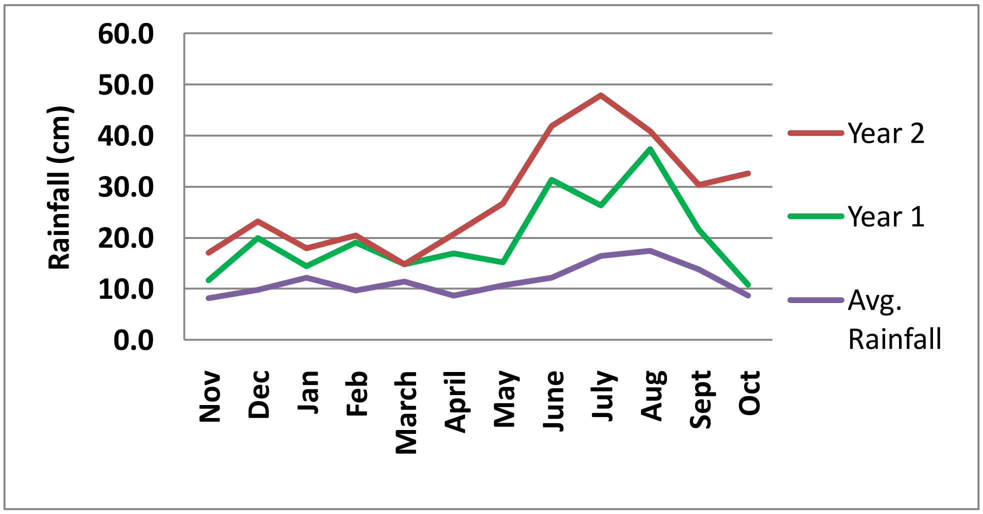


Figure 2. Annual rainfall obtained from State Climate Office of North Carolina (NC CRONOS Database) for the Cunningham Research Station, Kinston, North Carolina. (Year 1 = November 2003-October 2004; Year 2 = November 2004-October 2005)

While monthly rainfall explains some of the seasonal variations, the distribution of rainfall events more precisely explains some of the data. Rainfall accumulations of 2.2 cm fell within seven days of planting the small grain cover crops in 2004 and accumulations 30 DAP were approximately 4.0 cm. In contrast, rainfall fell within 2-3 DAP and continued sporadically for the next 12 days to accumulate 2.3 cm in 2005. This favored small grain cover crop development in 2004.

Cotton GDD (base 15.5 ^{0}C) were calculated by using the formula, ($temp_{max}$ + $temp_{min}$/2)-15.5. Growing degree day accumulation 30 DAP was 273 in 2004 but only 113 in 2005. By July 10, the typical cotton bloom date for this area, 672 GDD accumulated in

2004 compared to 503 GDD in 2005. This resulted in an earlier first bloom date in 2004 and later than normal bloom date in 2005. By September 1, GDD accumulation for 2004 of 1185 was only slightly higher than that in 2005 of 1123.

Cover Crop Plant Density

Fort Barnwell

At the Fort Barnwell location in 2004 and 2005, cover (C), seeding rate (S) and C x S, interactions were significant effects for small grain cover crop plant density (Tables 2 and 3).

Table 2. 2004 Fort Barnwell small grain mean cover crop plant density model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover(C)	2	126	32.58	<.0001*
Seeding Rate (S)	2	126	87.22	<.0001*
C*S	4	126	4.320	0.0026*
C* Block (B)	6	126	2.640	0.0383*

**Indicates significance at P< 0.05.*

Table 3. 2005 Fort Barnwell small grain cover crop mean plant density model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	126	43.61	<.0001*
Seeding Rate (S)	2	126	404.6	<.0001*
Block (B)	3	126	4.820	0.0033*
C*S	4	126	3.460	0.0102*
C*B	6	126	3.770	0.0017*

**Indicates significance at P< 0.05.*

Analysis of small grain cover crop plant densities across target seeding rates in 2004 shows that the mean plant densities of wheat (W) and rye (R) increased directly between the low (1), medium (2) and high (3) seeding rates but triticale (T) did not. Triticale plant density declined slightly between the medium and high seeding rates. As a result of differences in seedling survival among small grains, the mean plant densities of R1 (91 plants m^{-2}), T1 (99 plants m^{-2}) and W1 (119 plants m^{-2}) are statistically different but W1 is not statistically different from R2 (146 plants m^{-2}, T2 (136 plants m^2) and T3 (143 plant m^{-2}). Additionally, W2 (174 plants m^{-2}) is not significantly different from R2 (146 plants m^{-2}), T2 (136 plants m^{-2}), R3 (172 plants m^{-2}) and T3 (143 plants m^{-2}) (Figure 3). At the high seeding rate, the plant density of W3 (219 plants m^{-2}) is significantly greater than all treatments. Plant densities of R3 and T3 are not significantly different from each other.

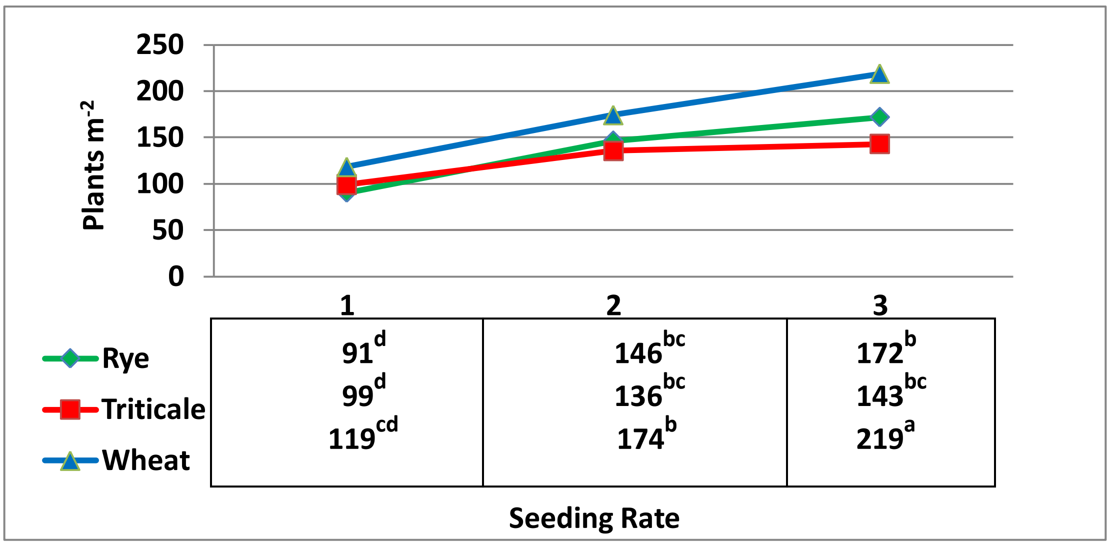
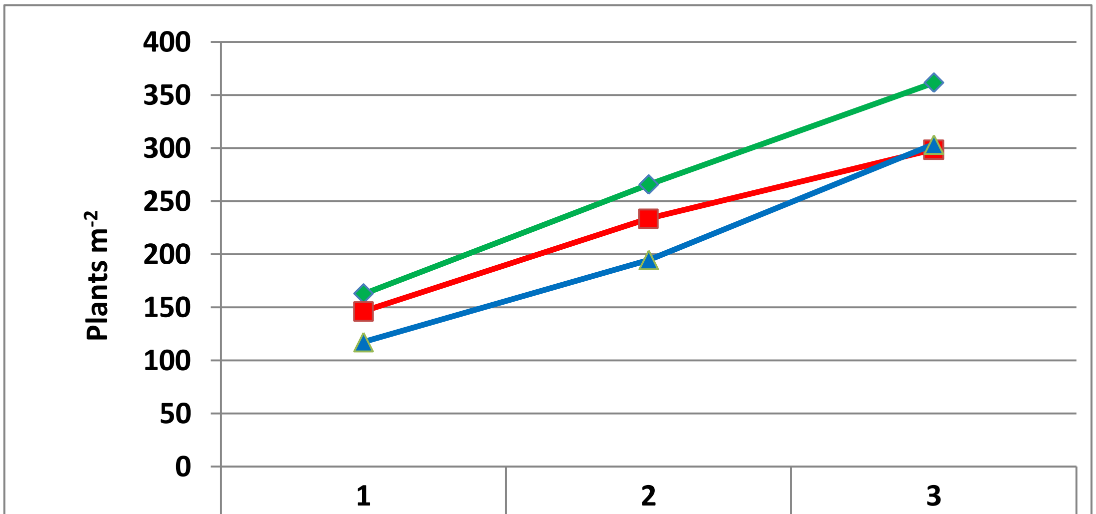


Figure 3. 2004 Fort Barnwell small grain cover crop mean plant densities at target seeding rates of 129 seeds m^{-2} (1), 258 seeds m^{-2} (2), and 387 seeds m^{-2} (3) as collected on December 3, 2003. (Means with different letters are statistically different at P<0.05).

Analysis of small grain cover crops plant densities by seeding rates in 2005 shows that small grain cover crops plant densities varied with seeding rates, but not equally. Rye plant density steadily increased between seeding rates with a 63% increase between the low and medium seeding rates and 37% between the medium and high seeding rates. Triticale plant density increased 60% between the low and medium seeding rate and 28%

between the medium and high seeding rate. Wheat plant density increased 67% between the low and medium seeding rate and 55% between the medium and high seeding rate. Thus, the increases in plant densities between the low and medium seeding rates for all small grains are similar. However, the plant density increases between the medium and high seeding rates shows plant densities of wheat > rye and triticale. (Figure 4).



	1	2	3
Rye	163[ef]	266[c]	362[a]
Triticale	146[fg]	234[d]	299[bc]
Wheat	117[g]	195[e]	304[b]

Figure 4. 2005 Fort Barnwell small grain cover crop mean plant densities at target seeding rates of 129 seeds m^{-2} (1), 258 seeds m^{-2} (2) and 387 seeds m^{-2} (3) as collected on December 2, 2004. (Means with different letters are statistically different at P<0.05).

Vanceboro

At the Vanceboro location in 2004 and 2005, cover crop plant density was significantly affected by cover type and seeding rate but not the interaction terms (Tables 4 and 5).

Table 4. 2004 Vanceboro small grain cover crop mean plant density model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	126	17.18	<.0001*
Seeding Rate (S)	2	126	76.84	<.0001*
Block (B)	3	126	44.08	<.0001*
C*S	4	126	0.860	0.4882
C*B	6	126	4.600	0.0003*

**Indicates significance at P<0.05.*

Table 5. 2005 Vanceboro small grain cover crop mean plant density model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	126	43.29	<.0001*
Seeding Rate (S)	2	126	299.6	<.0001*
C*Block (B)	9	126	5.510	<.0001*
C*S	4	126	0.950	0.4391

**Indicates significance at P<0.05.*

Cover crop seeding rates increased plant densities with a mean (cover crops combined) of 83, 118 and 152 plants m^{-2} in 2004 and 131, 197, and 286 plants m^{-2} in 2005 for the low, medium and high seeding rates, respectively. In 2004, wheat plant densites are greater than triticale and rye but in 2005, rye plant densities are greater than trticale and wheat. In both years, triticale plant densities were generally between those of rye and wheat (Figures 5 and 6).

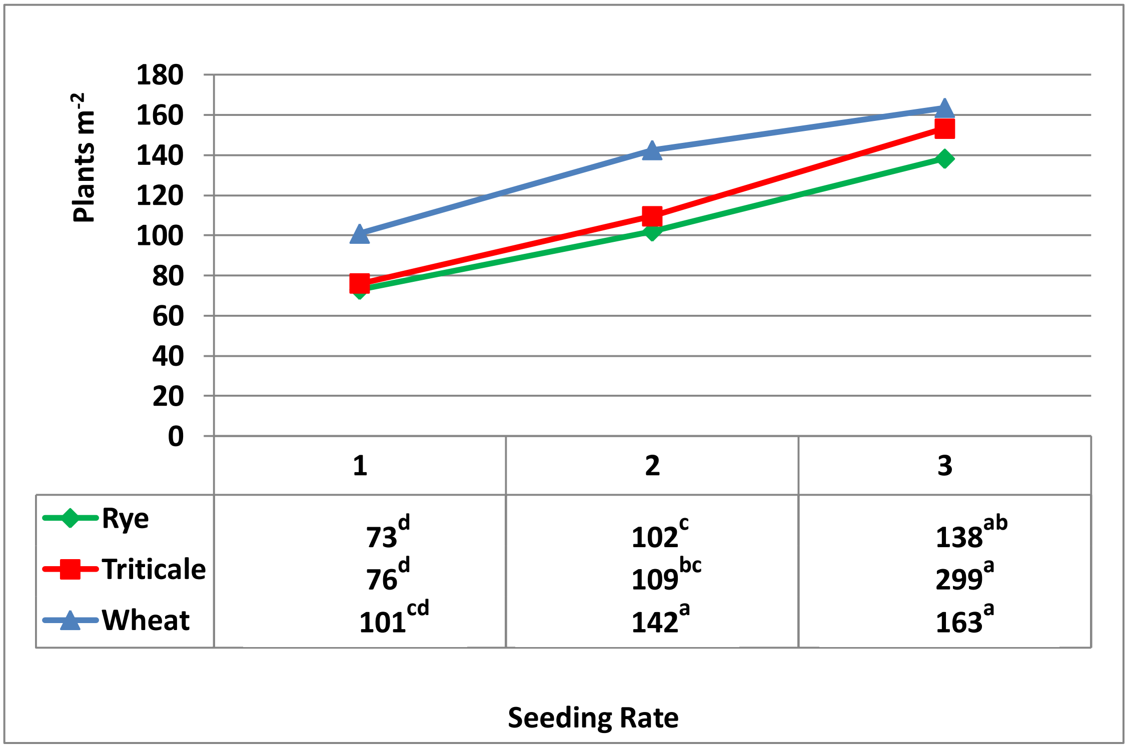


Figure 5. 2004 Vanceboro cover crop mean plant densities at seeding rates of 129 seeds m^{-2} (1), 258 seeds m^{-2} (2), and 387 seeds m^{-2} (3) as collected on December 4, 2004. (Means with different letters are statistically different at P<0.05).

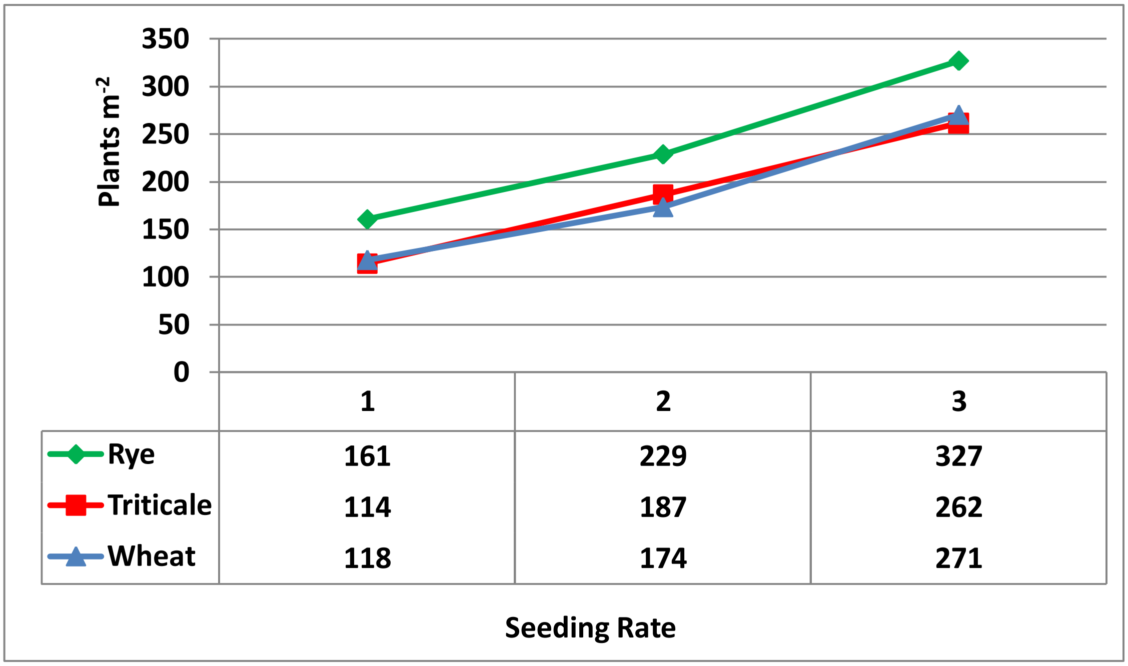


Figure 6. 2005 Vanceboro cover crop mean plant densities at seeding rates of 129 seeds m^{-2} (1), 258 seeds m^{-2} (2) and 387 seeds m^{-2} (3) as collected on December 2, 2005. (Means with different letters are statistically different at P<0.05).

Small Grain Cover Crop Plant Density Summary

Soil influences and climatic factor influences are evident in 2004, with higher plant densities at the Fort Barnwell location compared to the Vanceboro location. It is likely that during periods of frequent rainfall, the higher silt content at the Vanceboro location resulted in ponding surface water that reduced germination and seedling survival while the sandier soils at Fort Barnwell afforded better soil drainage of excess water that resulted in greater small grain survival. Conversely, with less frequent rainfall during 2005, plant densities within each small grain cover crop at both locations were similar.

Soil influences are also evident within small inclusions and soil landscape position at both sites. At Fort Barnwell, a small (less than 10%) inclusion within replication two of the

Pantego and Rains series contained a majority of the rye subplots. The Pantego and Rains series are poorly drained and have a higher CEC than the Autryville series. Additionally, small areas along replication one and two are have a slightly elevated landscape position (10 cm). As a consequence, rye plant densities were significantly lower within replication two compared to significantly greater triticale plant densities. While adding variance to statistical interpretation, it also demonstrates the strong influences of soils upon seedling germination and survival.

Similarly, the Vanceboro had small scattered areas of inclusions of the Craven series. The Craven series has greater clay content than the Autryville series and much of the rye within replication two contained these inclusions. Consequently, during periods of frequent rainfall, ponding water reduced small grain plant density. This again, adds variance to statistical analysis but demonstrates soil influences and climatic condition interactions upon small grain cover plant densities.

Additional soil influences are evident in 2005 at the Fort Barnwell location. The target seeding rates were reached only for rye and triticale at the low seeding rate suggesting that even with more favorable climatic conditions, the sandy soil at the Fort Barnwell locations limited germination and early small grain seedling growth. In contrast, all small grain covers reached target plant densities at the Vanceboro location, potentially due to greater soil water holding capacity during the brief dry period at planting.

Increases in plant density generally increased with increasing seeding rates between the low and medium seeding rate for all small grains but increases of plant density between the medium and high seeding rate were inconsistent. In 2004, wheat plant density varied directly with seeding rates at the Fort Barnwell location but not at Vanceboro. Rye and triticale did not vary directly with seeding rates at Fort Barnwell but did in Vanceboro. In 2005, rye and triticale increased plant density directly with seeding rate at both sites.

Plant densities seldom reached the targeted seeding rate. Plant densities of the low target rates are generally within 5-20% of the desired plant density. However, in 2005, plant densities increased slightly above the target seeding rates. The increase at the low seeding rate is potentially due to rapid tiller development of the small grains at low plant densities. The plant densities of the medium and high seeding rate were generally 20-50% below the targeted seeding rates.

Differences within small grains are also evident. Wheat plant densities were greater at both study locations in 2004 during frequent rainfall. In 2005, with less frequent rainfall, rye exhibited greater plant densities. Triticale, as a cross between rye and wheat appears to have inherited positive traits from both parents. Triticale densities followed closely to that of wheat during the more wet soil conditions and of rye in more normal climatic conditions.

Collectively, this data demonstrates that soil influences, climatic factors, inherent traits and interactions of these parameters have a strong influence upon plant density at any given seeding rate. Even so, soil influences and climatic factors appear to exert stronger influence on plant density than small grain traits.

Cover Crop Biomass Oven-Dry Weight

Fort Barnwell

In 2004, fertilization significantly influenced cover biomass dry weights but in 2005, fertilization and cover type were significant effects (Tables 6 and 7).

Table 6. 2004 Fort Barnwell cover crop biomass dry weight model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	45	0.99	0.3800
Seeding Rate (S)	2	45	0.94	0.3990
Fertilization (F)	1	45	40.9	<.0001*
Block (B)	3	45	1.66	0.1890
C*B	6	45	2.55	0.0333*
C*S	4	45	0.17	0.9541
C*F	2	45	2.01	0.1461
C*S*F	6	45	0.28	0.9424

**Indicates significance at P<0.05.*

Table 7. 2005 Fort. Barnwell cover crop biomass dry weight model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	45	4.760	0.0134*
Seeding Rate (S)	2	45	3.810	0.2960
Fertilization (F)	1	45	90.29	<.0001*
Block (B)	3	45	7.440	0.0004*
C*S	6	45	1.920	0.0985
C*F	2	45	1.590	0.2162
C*S*F	6	45	0.670	0.6718
C*B	6	45	4.920	0.0006*

**Indicates significance at P<0.05.*

When no spring N was applied, small grain biomass dry weights (combined seeding rates) were similar in 2004, with a mean of 805, 925 and 1015 kg ha^{-1} for rye, triticale and wheat, respectively. With the addition of spring applied N, biomass dry weights increased to 1622, 1833 and 1414 kg ha^{-1} representing an increase of 101%, 98% and 39% for rye, triticale and wheat, respectively (Figure 7).

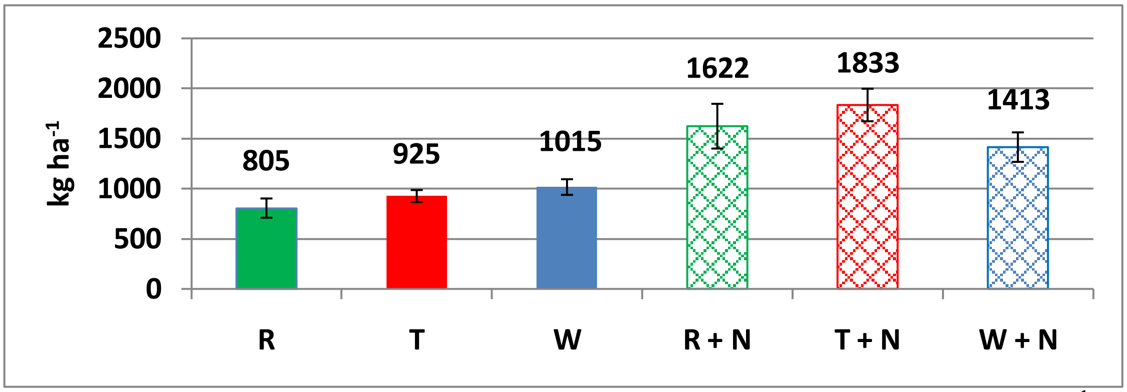


Figure 7. 2004 Fort Barnwell small grain cover crop mean biomass dry weights (kg ha^{-1}) as collected from whole plant, above ground samples (0.25 m^{-2}) on April 18, prior to cover crop termination. (Mean represents combined seeding rates. N = Broadcast application of 22.4 kg ha^{-1} of nitrogen on February 26 & 27).

Under the more favorable climatic conditions of 2005, biomas dry weights were still low. Biomass dry weights with no spring applied N (combined seeding rates) were similar with a mean of 674, 869 and 727 kg ha^{-1} for rye, triticale and wheat, respectively. The addition of spring N increased biomass dry weights to 1442, 1584 and 1212 kg ha^{-1} for rye, triticale and wheat, representing an increase of 114%, 82% and 68%, respectively (Figure 8).

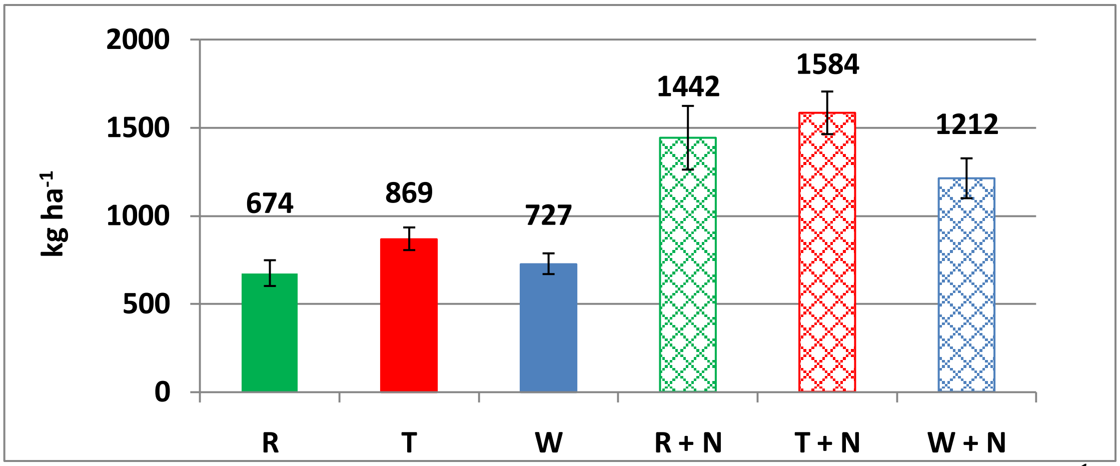


Figure 8. 2005 Fort Barnwell small grain cover crop mean biomass dry weights (kg ha^{-1}) as collected from whole plant above ground samples (0.25 m^{-2}) on April 22, prior to cover crop termination. (Mean represents combined seeding rates. N = Broadcast application of 22.4 kg ha^{-1} of nitrogen on February 28 & 29).

Vanceboro

At the Vanceboro location in 2004, significant influences on small grain cover biomass dry weight were cover (C) , fertilization (F) and C x F interactions but in 2005 only cover type and fertilization treatments were significant factors (Tables 8 and 9).

Table 8. 2004 Vanceboro cover crop biomass dry weight model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	45	18.12	<.0001*
Seeding Rate (S)	2	45	1.280	0.2877
Fertilization (F)	1	45	40.41	<.0001*
C*F	2	45	3.570	0.0364*
C*S	4	45	2.120	0.0944
C*Block (B)	9	45	3.950	0.0009*
C*S*F	6	45	1.310	0.2707

**Indicates significance at P<0.05.*

Table 9. 2005 Vanceboro cover crop biomass dry weight model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	45	20.36	<.0001*
Seeding Rate (S)	2	45	2.060	0.1398
Fertilization (F)	1	45	29.69	<.0001*
B*C	6	45	2.080	0.0747
C*F	2	45	2.520	0.0920
C*S	4	45	0.210	0.9294
C*S*F	6	45	1.020	0.4233

**Indicates significance at P<0.05.*

In 2004, when no spring N was applied, the range of biomass dry weights ranged from 985-1855, 1995-2350 and 1565-2125 kg ha^{-1} for rye, triticale and wheat, respectively. Biomass dry weight with the addition of spring N ranged from 2140-2355, 3095-3685 and, 1895-2915 kg ha^{-1} for rye, triticale and wheat, respectively. Analysis of small grain cover crop (seeding rates combined) and fertilization treatment interactions shows the mean biomass dry weights without spring applied N of triticale (2172 kg ha^{-1}) and wheat (1985 kg ha^{-1}) are not statistically different but triticale biomass dry weight was significantly greater than that of rye (1535 kg ha^{-1}) (Figure 9). The biomass dry weight of rye and wheat are not statistically different. Rye (2255 kg ha^{-1}) and wheat (2370 kg ha^{-1}) biomass dry weights with spring applied N were not statistically different from each other or triticale without spring applied N. Triticale with spring applied N (3483 kg ha^{-1}) was statistically greater than all other treatments. This implies greater biomass dry weight production from triticale with or without spring applied N compared to rye and wheat.

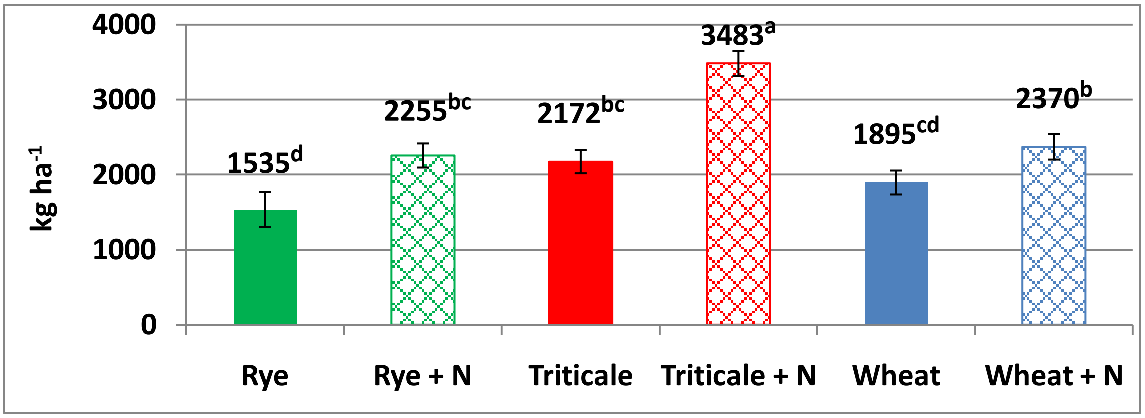


Figure 9. 2004 Vanceboro small grain cover crop mean biomass dry weights (combined seeding rates) (kg ha^{-1}) as collected from whole plant above ground samples (0.25 m^{-2}) on April 18, prior to cover crop termination. (N = Broadcast application of 22.4 kg ha^{-1} of nitrogen on February 27 & 28. 1=Target seeding rate of 129 seeds m^{-2}; 2=Target Seeding Rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}. Means with different letters are statistically different at P<0.05. Error bars represent standard error.)

In 2005, the mean biomass dry weight (seeding rates and fertilization treatments combined) of triticale (2672 kg ha^{-1}) was significantly greater than rye (1621 kg ha^{-1}) and wheat (1945 kg ha^{-1}) but rye and wheat biomass dry weights were not statistically different. The application of spring N significantly increased the mean biomass dry weight (treatments combined) 44% from 1703 kg ha^{-1} to 2456 kg ha^{-1}.

Cover Crop Biomass Oven-Dry Weight Summary

No late planted small grain cover crop in this study achieved similar biomass growth (5.6-8.5 Mg ha^{-1}) as reported in other studies of cover crops planted in a timely manner (Daniels J. B., et al. 1999; Staver and Brinsfield, 1990; Ranells and Wagger, 1997). Biomass weights of this study follow closely to those of Bauer and Reeves (1999) showing a biomass weight range of 1800-3250 kg ha^{-1} for small grains planted in November. Generally, triticale consistently produced greater biomass dry weights with or without spring applied N at both locations followed by wheat and then rye. At the Fort Barnwell location, triticale biomass dry weights (732 to 1962 kg ha^{-1}) were greater than those of rye (492 to 1782 kg ha^{-1}) and wheat (717 to 1112 kg ha^{-1}). At the Vanceboro location, triticale biomass weights (1920 to 3685 kg ha^{-1}) were greater than those of rye (985 to 2355 kg ha^{-1}) and wheat (1480 to 2915 kg ha^{-1}).

Plant density was not a significant influence on biomass dry weight but climatic factors, soil type and fertilization influenced biomass production. The influence of climatic conditions is evident by comparison of mean dry weights (combined seeding rates and fertilization treatments) of each year. In 2004 at the Fort Barnwell location, the mean cover crop biomass dry weights of 1213, 1379 and 1214 kg ha^{-1} for rye, triticale and wheat, respectively, are greater than cover crop biomass dry weights of 1058, 1227 and 970 kg ha^{-1} for rye, triticale and wheat, respectively in 2005. Similarly, at the Vanceboro location in 2004, cover crop biomass dry weights of 1895, 2828, and 2133 kg ha^{-1} for rye, triticale and wheat, respectively, are greater than those in 2005 of 1621, 2674 and 1945 for rye, triticale and wheat, respectively. This demonstrates that the more favorable growing conditions in 2004 resulted in greater biomass production for all small grain cover crops.

The addition of spring applied N increased biomass dry weights at both locations and years, but not equally. At the Fort Barnwell location, the application of spring N increased rye and triticale biomass dry weights similarly (82-114%). This range of increase in biomass dry weights from spring applied N is greater and more consistent than the response of the wheat cover crop (39-67%). At the Vanceboro location, greater initial small grain cover crop biomass dry weights resulted in smaller increases but greater separation of small grain cover types. The application of spring N increased rye biomass dry weights by 36-47%, triticale by 57-60% and wheat by 25-35%.

Soil influenced biomass dry weights of these small grain cover crops as demonstrated by differences in biomass production between the two sites. In 2004, the mean biomass dry weights of small grain cover crops with no spring applied N at the Vanceboro location are 56%, 104% and 76% greater than those at Fort Barnwell for rye, triticale and wheat, respectively. In 2005, the biomass dry weights with no spring applied N at Vanceboro location are 53%, 118% and 100%, greater than those at Fort Barnwell for rye, triticale and wheat respectively. Even with the addition of spring applied N, biomass production at the Fort Barnwell location is generally lower than those at the Vanceboro location without spring applied N. This further demonstrates the strong influence the higher CEC, greater water holding capacity, lower leaching potential and increased soil structure at the Vanceboro location on growth of these late planted small grains.

This data demonstrates that triticale has the greater ability to utilize spring applied N to increase biomass production than either rye or wheat. Kim et al. (2001) reported more plastic root systems due to improved breeding of triticale. It is feasible that triticale better utilized the spring N due to this factor.

Cover Crop Surface Residue

Fort Barnwell

In 2004 and 2005, cover type (C), fertilization (F) seeding rates (S) and interaction terms of these main effects significantly influenced cover crop residues (Tables 10 and 11).

Table 10. 2004 Fort Barnwell small grain cover crop surface residue model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Block (B)	3	96	46.95	<.0001*
Cover (C)	2	96	6.450	0.0024*
Fertilization (F)	1	96	158.8	<.0001*
Seeding Rates (S)	2	96	36.40	<.0001*
C*B	6	96	14.11	<.0001*
F*B	3	96	3.950	0.0106*
C*F	2	96	4.240	0.0171*
C*S	4	96	3.180	0.0167*
S*F	2	96	10.07	0.0001*
C*S*B	18	96	2.110	0.0107*
C*S*F	4	96	3.970	0.0050*

**Indicates significance at P<0.05*

Table 11. 2005 Fort Barnwell small grain cover crop surface residue model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Block (B)	3	114	5.410	0.0016*
Cover (C)	2	114	35.48	<.0001*
Fertilization (F)	1	114	295.6	<.0001*
Seeding Rate (S)	2	114	23.90	<.0001*
C*B	6	114	11.49	<.0001*
B*F	3	114	6.840	0.0003*
C*F	2	114	7.050	0.0013*
C*S	4	114	2.320	0.0607*
S*F	2	114	10.10	<.0001*
C*S*F	4	114	5.220	0.0007*

**Indicates significance at P<0.05.*

In 2004, analysis of small grain cover crop x seeding rate x fertilization treatment effects generally revealed that among cover crops without spring applied N, cover crop residues at the low seeding rate for all small grains were similar (31-34%). Cover crop surface residues of rye increased by 54% and triticale by 44% between the low and medium seeding rates but declined slightly or remained steady between the medium and high seeding rates. Conversely, wheat surface residues cover increased 19% between the low and medium seeding rate but increased 46% between the medium and high seeding rates. Among each small grain cover, the greatest surface residues covers were for rye (54%) at the medium and high seeding rates, 49% for triticale at the medium seeding rate and 54% for wheat at the high seeding rate (Figure 10).

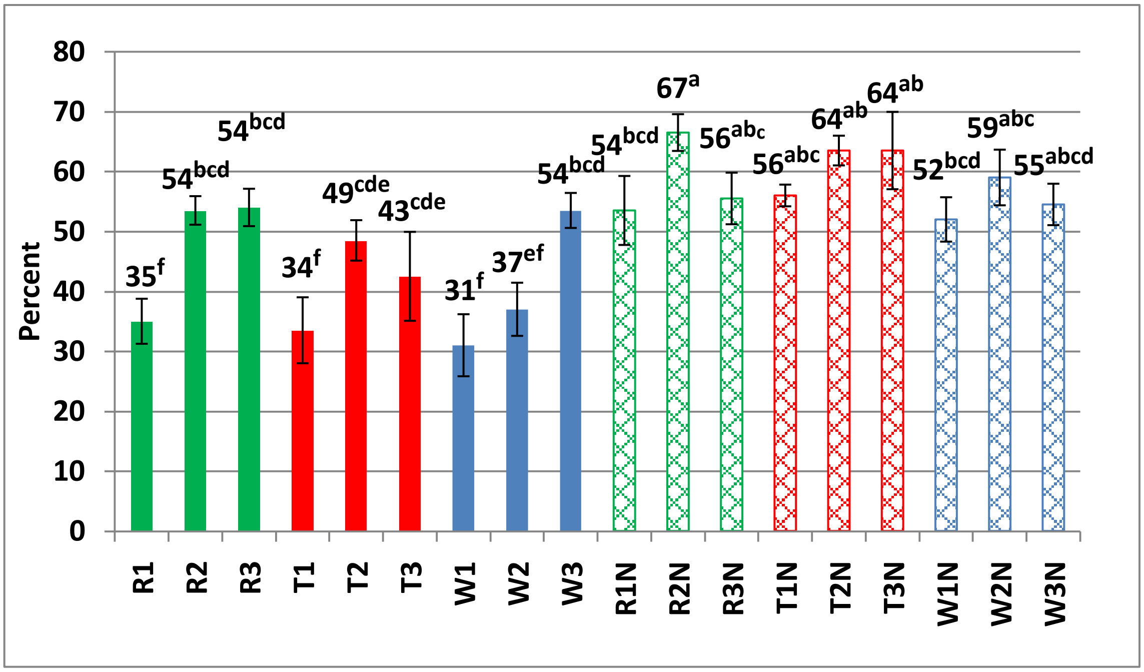


Figure 10. 2004 Fort Barnwell small grain cover crop surface residue (%) by seeding rate and fertilization treatment as measured by line transect method using two rows of each subplot on May 19. (R=Rye; T=Triticale and W= Wheat. 1= Target Seeding Rate of 129 seeds m^{-2}; 2= Target Seeding Rate of 258 seeds m^{-2} and 3= Target Seeding Rate of 387 seeds m^{-2}. Means with different letters are statistically different at $P<0.05$. Error bars represent standard error.)

The application of spring N increased rye surface residues cover by 54% at the low seeding rate and 24% at the medium seeding rate, but only increased 4% at the high seeding rate. Wheat exhibited a similar trend with surface residues increasing 68% at the low seeding rate, 59% at the medium seeding rate and only 2% at the high seeding rate. Triticale surface residues increased 65% at the low seeding rate, 31% at the medium seeding rate and 49% at the high seeding rate. Among each small grain cover with spring applied N, the greatest surface residues were rye (67%) and triticale (64%) at the medium and high seeding rates, respectively, and wheat (59%) at the medium seeding rate.

In 2005, analysis of cover crop surface residue x seeding rate x fertilization treatment interactions revealed that without spring applied N, cover surface increased modestly with seeding rates for rye or triticale but by a greater magnitude for wheat. Spring applied N to rye increased surface cover crop from R1 (42%), R2 (47%) and R3 (41%) to R1N (62%), R2N (77%) and R3N (80%), respectively. The surface residue cover of triticale without spring applied N of T1 (44%) did not greatly differ from that with spring applied N (46%). However, the application of spring N greatly increased triticale surface residues at the medium seeding rate from 43% to 68% and at the high seeding rate from 46% to 76%. Application of spring N greatly increased cover residues of wheat from W1 (30%), W2 (35%) and W3 (40%) to W1N (52%), W2N (52%) and W3N (59%). Among cover crops with spring applied N, rye and triticale increased surface residues with seeding rates. However, wheat did not increase between the low and medium seeding rate and the increase between the medium and high seeding rate is small (Figure 11).

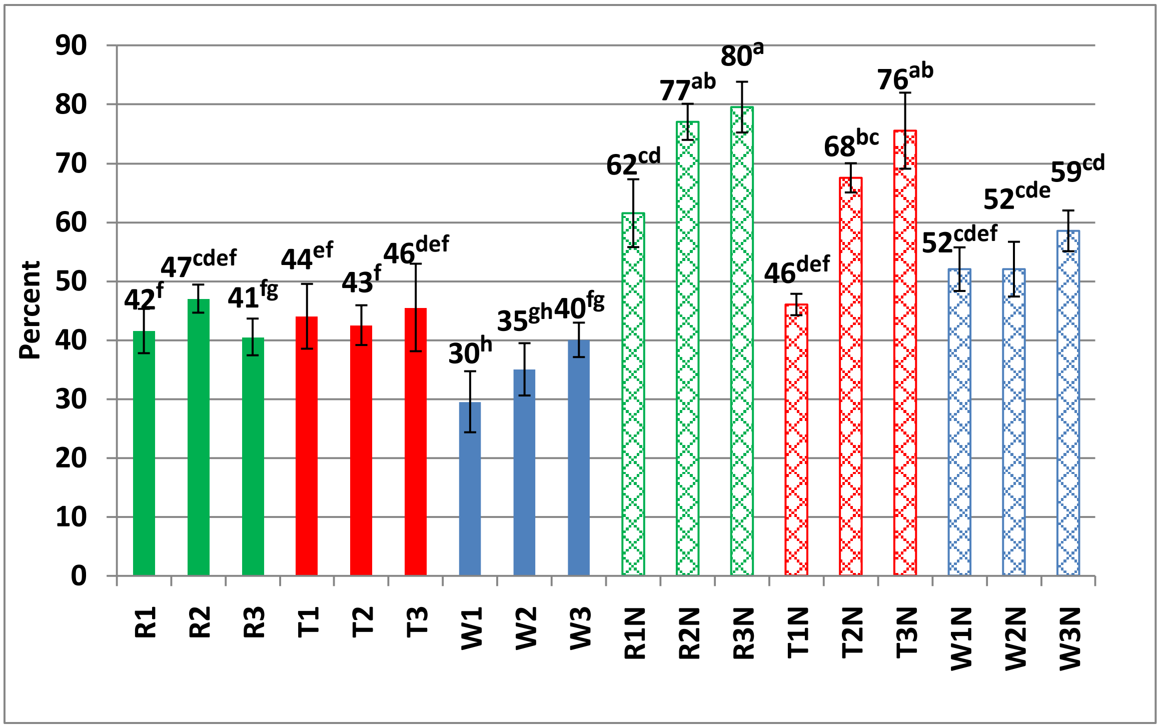


Figure 11. 2005 Fort Barnwell small grain cover crop surface residue (%), seeding rate and fertilization treatments interactions as measured by line transect method using two rows of each subplot on May 26. (Error bars represent standard error. R=Rye; T=Triticale and W= Wheat. 1= Target Seeding Rate of 129 seeds m^{-2}; 2= Target Seeding Rate of 258 seeds m^{-2} and 3= Target Seeding Rate of 387 seeds m^{-2}).

Vanceboro

At Vanceboro in 2004, cover (C), seeding rate (S), fertilization (F) and C x F x S were significant factors influencing surface residue but in 2005, only the main effects of cover, seeding rate and fertilization were significant factors (Tables 12 and 13).

Table 12. 2004 Vanceboro small grain cover crop surface residue model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Block (B)	3	90	9.590	<.0001*
Cover (C)	2	90	15.97	<.0001*
Seeding Rate (S)	2	90	30.27	<.0001*
Fertilization (F)	1	90	69.91	<.0001*
C*B	6	90	8.910	<.0001*
F*B	3	90	6.820	0.0003*
S*B	6	90	3.800	0.0020*
C*F*B	6	90	4.010	0.0013*
C*S*B	12	90	4.290	<.0001*
C*S	4	90	0.270	0.8996
C*S*F	6	90	3.050	0.0091*

**Indicates significance at P<0.05.*

Table 13. 2005 Vanceboro small grain cover crop surface residue model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	102	27.50	<.0001*
Seeding Rate (S)	2	102	35.62	<.0001*
Fertilization (F)	1	102	47.04	<.0001*
Block (B)	3	102	5.070	0.0026*
C*B	6	102	3.220	0.0061*
S*B	6	102	4.340	0.0006*
C*F*B	9	102	0.990	0.4503
C*S	4	102	1.060	0.3781
C*F	2	102	1.320	0.2729
C*S*F	6	102	1.890	0.0896

**Indicates significance at P<0.05.*

Analysis of cover x seeding rate x fertilization treatments interaction for 2004 shows the highest cover surface residues were found among all cover types planted at the highest seeding rate with spring applied N (69-73%). The lowest cover surface residues were triticale at the low seeding rate (44%) and wheat at the low seeding rate with spring applied

N (47%). When no spring N is applied, rye surface residues ranged from 53-61%. Rye cover surface residues increased 15% between the low and medium seeding rate but did not change between the medium and high seeding rates. Triticale and wheat cover surface residues were slightly lower than that of rye (44-59%) with modest increases with seeding rates. The addition of spring N increased rye cover surface residues 13-20% and triticale 17-39%. Wheat cover surface residues at the low seeding rate declined 4% but increased 23-33% at the medium and high seeding rates (Figure 12).

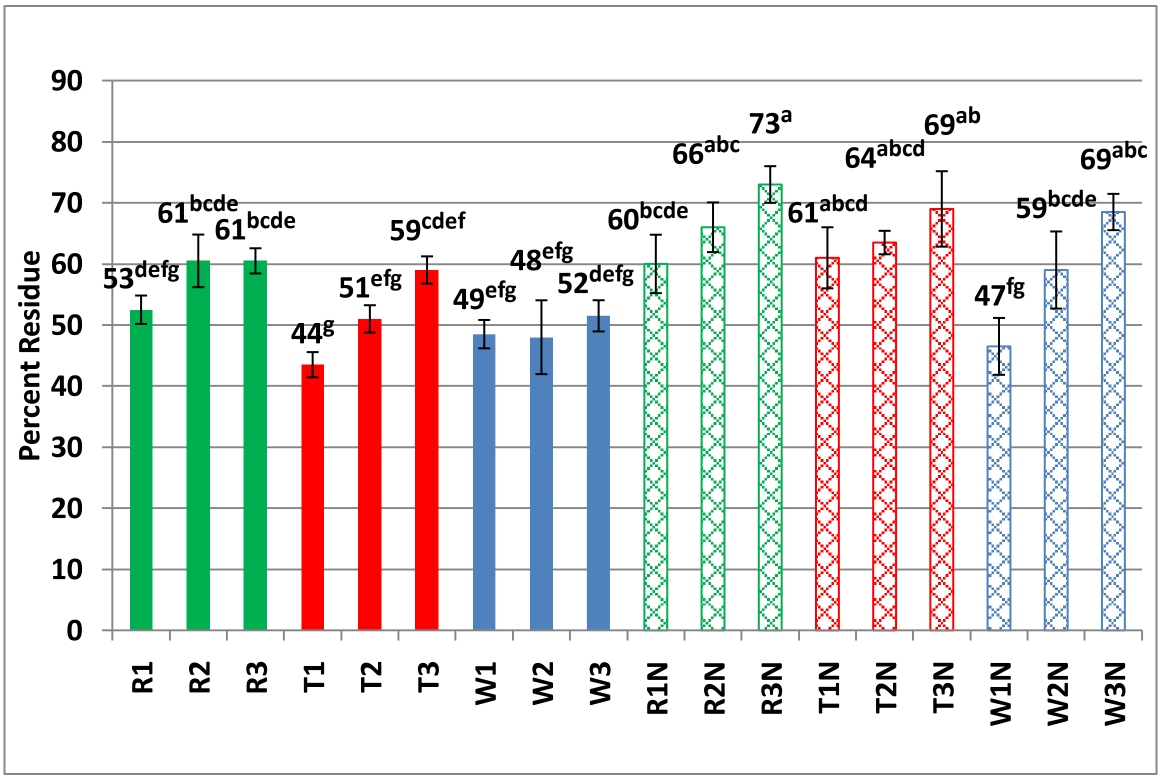
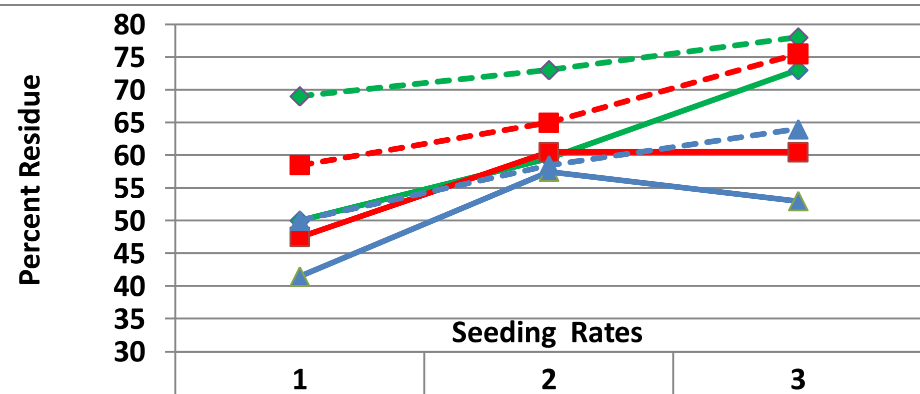


Figure 12. 2004 Vanceboro small grain cover crop surface residue, seeding rate and fertilization treatment interactions as measured by line transect method using two rows of each subplot on May 20. (R=Rye; T=Triticale and W= Wheat. 1= Target seeding rate of 129 seeds m^{-2}; 2= Target seeding rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}. Error bars represent Standard error.)

In 2005, comparison rye surface residue cover without spring applied N increased with seeding rates but triticale and wheat only increased between the low and medium seeding rates. The application of spring N increased surface cover residues (38%, 22% and 7% for rye; 23%, 7% and 25% for triticale; and, 19%, 2% and 21% for wheat at the low, medium and high seeding rates, respectively). Within cover crops, rye surface cover residue increased 13%, triticale increased 10% and wheat increased 18% between the low and medium seeding rates. Likewise, rye surface cover residue increased 7%, triticale 17% and wheat 9% between the medium and high seeding rates (Figure 13).



	1	2	3
Rye	50	60	73
Triticale	48	61	61
Wheat	42	58	53
Rye + N	69	73	78
Triticale + N	59	65	76
Wheat + N	50	59	64

Figure 13. 2005 Vanceboro small grain cover crop surface residue as influenced by seeding rate and fertilization treatment and measured by line transect method using two rows of each subplot on May 29.(R=Rye; T=Triticale and W= Wheat. 1= Target seeding rate of 129 seeds $m^{-2;}$ 2= Target seeding rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}).

Cover Crop Surface Residue Summary

As with biomass production, cover crop residues generally increased between the low and medium seeding rate but declined or remained relatively unchanged between the medium and high seeding rate when no spring N was applied. With the addition of spring N, all small grain cover crop residues increased with seeding rates.

Soil influences resulted in lower surface residue cover at the Fort Barnwell location. Cover crops without spring applied N had surface cover ranging from 30-54% compared to 42-73% at the Vanceboro location. With the application of spring applied N, surface residues of covers increased at both locations ranging from 45-80%. However the degree of increase was greater at the Fort Barnwell location.

Rye provided slightly greater surface residue covers at both locations and years. Triticale surface residue covers were up to 35% lower than rye but typically ranged within 2-12% of rye residues. Wheat surface residue cover was the lowest, on average, and frequently within 10-15% of triticale.

Cover Crop Biomass Nitrogen Content

Fort Barnwell

In 2004, cover type, fertilization and C x F interaction terms were significant effects for small grain cover crop N uptake. Only seeding rate and fertilization were significant effects for small grain cover crop biomass N content in 2005 (Tables 14 and 15).

Table 14. 2004 Fort Barnwell small grain cover crop biomass nitrogen content model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	45	18.12	<.0001*
Seeding Rate (S)	2	45	1.280	0.2877
Fertilization (F)	1	45	40.41	<.0001*
Block (B)	3	45	2.790	0.0514
B*C	6	45	4.540	0.0011*
C*F	2	45	3.570	0.0364*
C*S	4	45	2.120	0.0944
C*S*F	6	45	1.310	0.2707

**Indicates significance at P<0.05.*

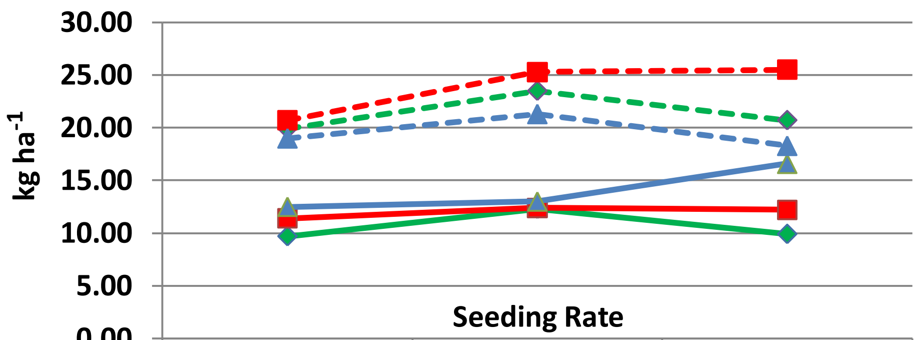
Table 15. 2005 Fort Barnwell small grain cover crop biomass nitrogen content model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	45	2.79	0.0724
Seeding Rate (S)	2	45	3.73	0.0317*
Fertilization (F)	1	45	90.1	<.0001*
Block (B)	3	45	7.52	0.0003*
C*B	6	45	4.93	0.0006*
C*S	4	45	0.93	0.4573
C*S*F	8	45	0.81	0.5936

**Indicates significance at P<0.05.*

In 2004, analysis of small grain cover crops without spring applied N indicated that the biomass N contents at the low and medium seeding rates are similar (9.7- 12.2 kg ha^{-1}), but between the medium and high seeding rates, wheat biomass N content increased 28%, rye N content decreased 20% and triticale decreased 2%. The addition of spring N increased biomass N content of rye by 105%, 91% and 109%; triticale by 82%, 104% and 109%; and, wheat by 52%, 64% and 10% for the low, medium and high seeding rates, respectively.

With the application of spring N, rye and wheat increased biomass N contents between the low and medium seeding rate by 12-18% but declined 12-14% between the medium and high seeding rates. Triticale biomass N contents increased 22% between the low and medium seeding rate but only increased 1% between the medium and high seeding rates. No small grain cover crop utilized 100% of the spring applied N leaving a balance of N in the soil system ranging from 9.1-12.2 kg ha^{-1} (Figure 14).



	1	2	3
Rye (R)	9.70	12.3	9.91
Triticale (T)	11.4	12.4	12.2
Wheat (W)	12.5	13.0	16.6
R + N	19.9	23.5	20.7
T + N	20.7	25.3	25.5
W + N	19.0	21.3	18.3

Figure 14. 2004 Fort Barnwell small grain cover crop nitrogen uptake (kg ha^{-1}) as estimated from total biomass x nitrogen concentration measured from whole plant samples taken on April 18 prior to cover crop termination. (N= broadcast application of 22.4 kg ha^{-1} nitrogen on February 28. R=Rye; T=Triticale and W= Wheat. 1= Target seeding rate of 129 seeds m^{-2}; 2= Target seeding rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}).

The application of spring applied N increased biomass N content but not equally among all small grain cover crops (Figure 15). The biomass N contents of rye and triticale with spring applied N (21 kg ha^{-1} and 24 kg ha^{-1}, respectively) are significantly greater than the biomass N contents of rye and triticale without spring applied N (11 and 12 kg ha^{-1}, respectively). However, biomass N content of wheat (14 kg ha^{-1}) did not differ significantly from the biomass N content of wheat with spring applied N (20 kg ha^{-1}).

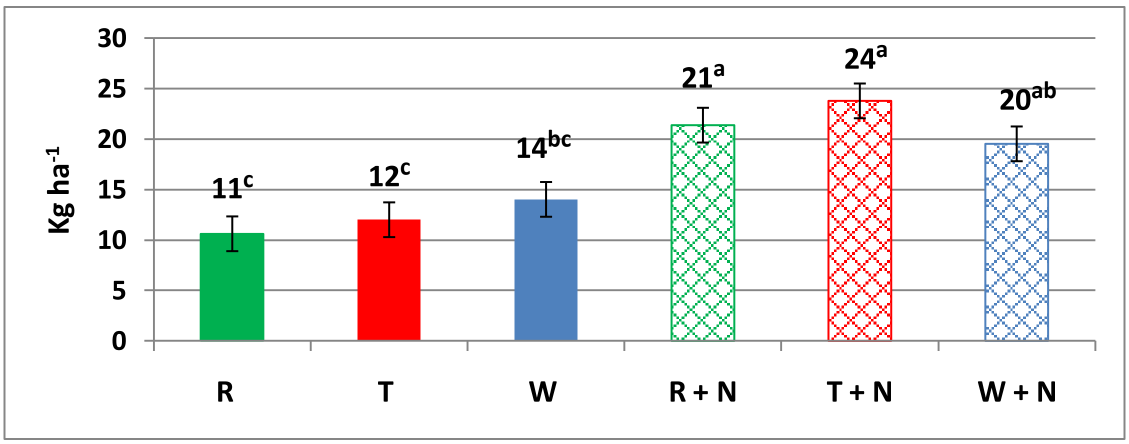
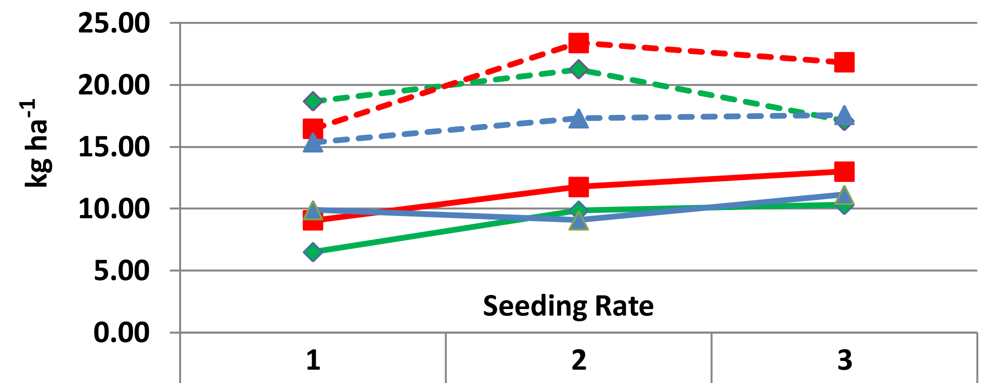


Figure 15. 2004 Fort Barnwell small grain cover crop total biomass nitrogen uptake (kg ha^{-1}), with and without nitrogen fertilization, as estimated from biomass dry weight x nutrient concentration taken from whole plant samples on April 18, prior to cover crop termination. (Means with different letters are statistically different at $P<0.05$. R=Rye; T=Triticale and W= Wheat. N= Broadcast application of 22.4 kg ha^{-1} on February 26 & 27).

In 2005, rye biomass N contents without spring applied N ranged from 6.5-10.3 kg ha^{-1}. Rye biomass N content increased 52% between the low and medium seeding rates and 5% between the medium and high seeding rates. Triticale biomass N contents ranged from 9.1-13.0 kg ha^{-1}. Triticale biomass N content increased 30% between the low and medium seeding rates and 10% between the medium and high seeding rates. Wheat biomass N contents ranged from 9.1-11.2 kg ha^{-1}. Wheat biomass N content decreased 8%

between the low and medium seeding rates but increased 23% between the medium and high seeding rates. With spring applied N, rye biomass N contents ranged from 17.1-21.3 kg ha^{-1}, representing an increase of 66-187%. Rye biomass N content increased 14% between the low and medium seeding rate and declined 20% between the medium and high seeding rates. Triticale biomass N contents ranged from 16.4-23.4 kg ha^{-1}, representing an increase of 68-98%. Triticale biomass N content increased 43% between the low and medium seeding rate but declined 7% between the medium and high seeding rates. Wheat biomass N contents ranged from 15.4-17.6 kg ha^{-1}, representing an increase of 55-90%. Wheat biomass N content increased 12% between the low and medium seeding rate and declined 2% between the medium and high seeding rate (Figure 16).



	1	2	3
Rye (R)	6.50	9.85	10.3
Triticale (T)	9.05	11.8	13.0
Wheat (W)	9.91	9.08	11.2
R + N	18.7	21.3	17.1
T + N	16.4	23.4	21.8
W + N	15.4	17.3	17.6

Figure 16. 2005 Fort Barnwell small grain cover crop nitrogen uptake (kg ha^{-1}) as estimated from total biomass x nitrogen concentration measured from whole plant samples taken on April 22, prior to cover crop termination. (N= Broadcast application of 22.4 kg ha^{-1} actual N on February 26 & 27. R=Rye; T=Triticale and W= Wheat. 1= Target seeding rate of 129seeds m$^{-2;}$ 2= Target seeding rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}.)

Vanceboro

In 2004 and 2005, fertilization was the only significant factor influencing small grain cover crop biomass N contents (Tables 16 and 17).

Table 16. 2004 Vanceboro small grain cover crop biomass nitrogen content model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	51	1.27	0.2896
Seeding Rate (S)	2	51	1.59	0.2132
Fertilization (F)	1	51	34.6	<.0001*
Block (B)	3	51	2.73	0.0535
C*B	6	51	4.83	0.0006*
C*S	4	51	1.82	0.1386
C*F	2	51	1.75	0.1837

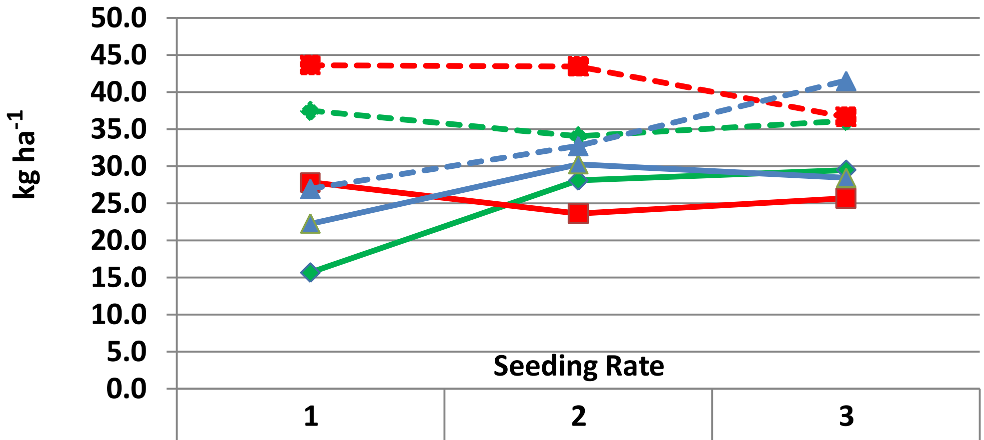
**Indicates significance at P<0.05.*

Table 17. 2005 Vanceboro small grain cover crop biomass nitrogen content model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	51	3.12	0.0525
Seeding Rate (S)	2	51	2.12	0.1299
Fertilization (F)	1	51	26.2	<.0001*
Block (B)	3	51	0.99	0.4064
C*B	6	51	2.34	0.0451*
C*S	4	51	0.26	0.9027
C*F	2	51	1.06	0.3542

**Indicates significance at P<0.05.*

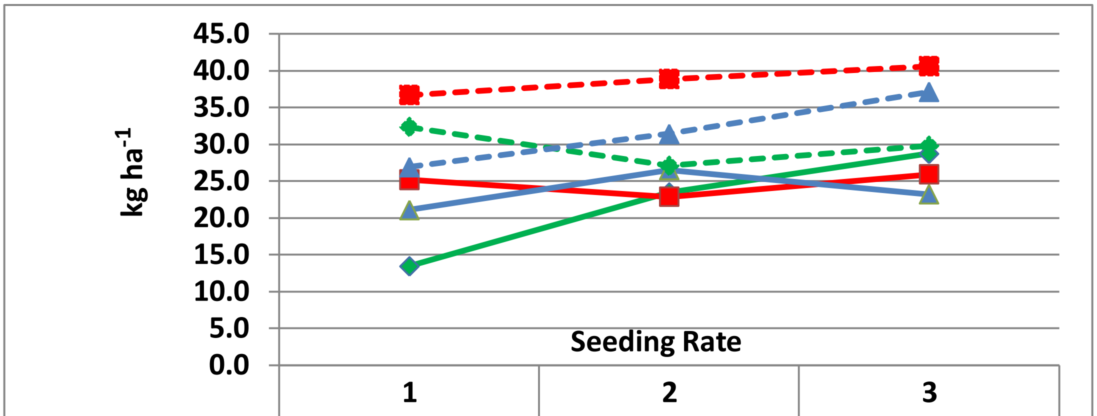
In 2004, without spring N, rye biomass N contents ranged from 15.7-29.5 kg ha^{-1}; triticale from 23.6-27.8; and, wheat from 22.3-30.3 kg ha^{-1}. The application of spring N increased rye biomass N contents by 21-139%; triticale 43-84% and wheat by 8-46% (Figure 17).



	1	2	3
Rye	15.7	28.1	29.5
Triticale	27.8	23.6	25.7
Wheat	22.3	30.3	28.4
R + N	37.5	34.1	36.1
T + N	43.7	43.5	36.7
W + N	27.0	32.8	41.5

Figure 17. 2004 Vanceboro small grain cover crop nitrogen uptake (kg ha^{-1}) as estimated from total biomass x nitrogen concentration measured from whole plant samples taken on April 18 prior to cover crop termination. (N= Broadcast application of 22.4 kg ha^{-1} actual N on February 26 & 27. R=Rye; T=Triticale and W= Wheat. 1= Target seeding rate of 129 seeds m$^{-2;}$ 2= Target seeding rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}.)

In 2005, biomass N contents without spring applied N for rye ranged from 13.4-28.7 kg ha^{-1}; triticale from 22.9-25.9 kg ha^{-1}, and wheat from 21.1-26.5 kg ha^{-1}. The application of spring N increased biomass N content of rye by 4-141%; triticale by 46-70%, and wheat by 19-60% (Figure 18).



	1	2	3
Rye	13.4	23.5	28.7
Triticale	25.2	22.9	25.9
Wheat	21.1	26.5	23.2
R + N	32.3	27.1	29.8
T + N	36.7	38.9	40.6
W + N	26.9	31.4	37.1

Figure 18. 2005 Vanceboro small grain cover crop nitrogen uptake as estimated from total biomass x nitrogen concentration measured from whole plant samples taken on April 22, prior cover crop termination. (N= Broadcast application of 22.4 kg ha-1 actual N on February 28, 2004. R=Rye; T=Triticale and W= Wheat. 1= Target seeding rate of 129 seeds m^{-2}; 2= Target seeding rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}).

Cover Crop Biomass Nitrogen Content Summary

The cover crop biomass N content without spring applied N range (6.5-25.5 N kg ha^{-1}) at the Fort Barnwell location was lower than at Vanceboro location (13.4-30.0 kg ha^{-1}). At both locations, spring applied N increased biomass N contents. At the Fort Barnwell location, cover crop biomass N contents ranged from 15.4-25.5 kg ha^{-1} and at the Vanceboro location ranged from 26.9-43.5 kg ha^{-1}. Variations in cover crop biomass N contents at the Fort Barnwell location reflect the negative influences of the sandier soils an biomass production. Additional variance resulted due to climatic variation between years. Triticale and rye consistently provided higher biomass N contents and wheat performed inconsistently.

By subtracting the small grain biomass N contents without spring applied N from the small grain biomass N contents with spring N applied, a simple N balance indicates that no cover crop accounted for the entire amount of spring applied N fertilizer (data not shown). Thus, N was added to the soil system which may be utilized by the subsequent crop or lost to the environment through leaching or dentrification. The best treatments of rye at the low seeding rate, triticale at the low and medium seeding rate and wheat at the high seeding rate left 2, 4, and 9 kg ha^{-1} of N, respectively, in the soil system. The greatest amount of N added to the soil system was found in wheat at the medium seeding rate and rye at high seeding rates leaving 20 and 21 kg ha^{-1} of N, respectively, in the soil system. Generally, most small grain cover treatments resulted in 11-15 kg ha^{-1} of N contributed to the soil system, regardless of cover type or seeding rate.

Cover Crop Biomass Phosphorous Content

Fort Barnwell

In 2004, fertilization significantly affected small grain cover crop biomass P contents, while in 2005, cover type, seeding rate and fertilization were significant factors (Tables 18 and 19).

Table 18. 2004 Fort Barnwell small grain cover crop biomass phosphorous content model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	45	3.140	0.0529
Seeding Rate (S)	2	45	0.970	0.3886
Fertilization (F)	1	45	42.03	<.0001*
Block (B)	3	45	1.720	0.1772
C*B	6	45	2.440	0.0397*
C*S	4	45	0.170	0.9542
C*F	2	45	2.220	0.1203
C*S*F	6	45	0.310	0.9310

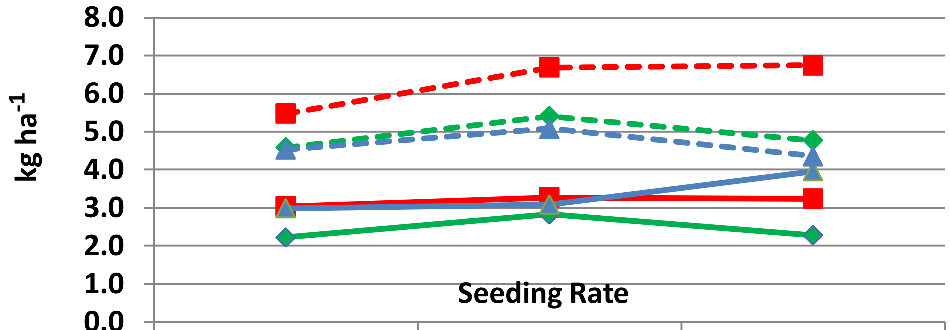
**Indicates significance at P<0.05.*

Table 19. 2005 Fort Barnwell small grain cover crop biomass phosphorous content model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	45	9.400	0.0004*
Seeding Rate (S)	2	45	4.080	0.0236*
Fertilization (F)	1	45	92.84	<.0001*
Block (B)	3	45	7.540	0.0003*
C*B	6	45	4.690	0.0009*
C*S	4	45	1.110	0.3628
C*F	2	45	1.470	0.2400
C*S*F	6	45	0.670	0.6726

**Indicates significance at P<0.05.*

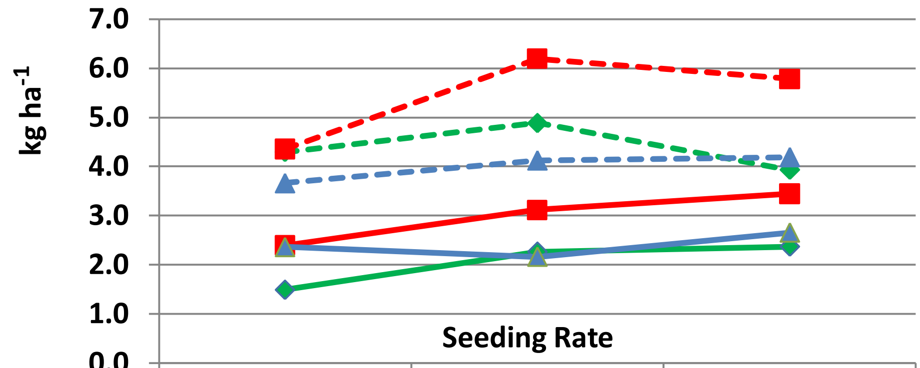
In 2004, cover biomass P contents of all small grains without spring applied N ranged from 2.2-4.0 kg ha^{-1}. The application of spring N increased small grain biomass P contents of rye by 109%, 93% and 108%; triticale by 83%, 103% and 109%; and, wheat by 50%, 65% and 38%. Among small grain covers with spring applied N, biomass P contents were in the order of triticale > rye > wheat (Figure 19).



	1	2	3
Rye	2.2	2.8	2.3
Triticale	3.0	3.3	3.2
Wheat	3.0	3.1	4.0
R + N	4.6	5.4	4.8
T + N	5.5	6.7	6.7
W + N	4.5	5.1	4.4

Figure 19. 2004 Fort Barnwell small grain cover crop phosphorous content as estimated from total biomass x phosphorous concentration measured from whole plant samples taken on April 18, prior cover crop termination. (N= Broadcast application of 22.4 kg ha^{-1} nitrogen on February 28, 2004. R=Rye; T=Triticale and W= Wheat. 1= Target seeding rate of 129 seeds m^{-2}; 2= Target seeding rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}).

In 2005, cover crop biomass P contents without spring applied N were similar (1.5-3.4 kg ha^{-1}). Triticale P contents increased directly with seeding rates but rye and wheat did not. The addition of spring N increased rye P contents by 187%, 113% and 63%; triticale by 83%, 100% and 70%; and, wheat by 54%, 86% and 56% at the low, medium and high seeding rates, respectively. Comparison of small grain cover crops with spring applied N shows that the biomass P contents were in the order of triticale > rye > wheat (Figure 20).



	1	2	3
Rye	1.5	2.3	2.4
Triticale	2.4	3.1	3.4
Wheat	2.4	2.2	2.7
R + N	4.3	4.9	3.9
T + N	4.4	6.2	5.8
W + N	3.7	4.1	4.2

Figure 20. 2005 Fort Barnwell small grain cover crop phosphorous content as estimated from total biomass x phosphorous concentration measured from whole plant samples taken on April 22, prior cover crop termination. (N= Broadcast application of 22.4 kg ha^{-1} nitrogen on March 2. R=Rye; T=Triticale and W= Wheat. 1= Target seeding rate of 129 seeds m^{-2}; 2= Target seeding rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}).

Vanceboro

In 2004 and 2005, cover type (C), fertilization treatment (F) and C x F interactions significantly affected small grain cover biomass P contents (Tables 20 and 21).

Table 20. 2004 Vanceboro small grain cover crop biomass phosphorous content model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	45	24.24	<.0001*
Seeding Rate (S)	2	45	1.100	0.3409
Fertilization (F)	1	45	41.85	<.0001*
C*Block (B)	9	45	3.800	0.0012*
C*S	4	45	2.020	0.1080
C*F	2	45	4.290	0.0198*
C*S*F	6	45	1.350	0.2568

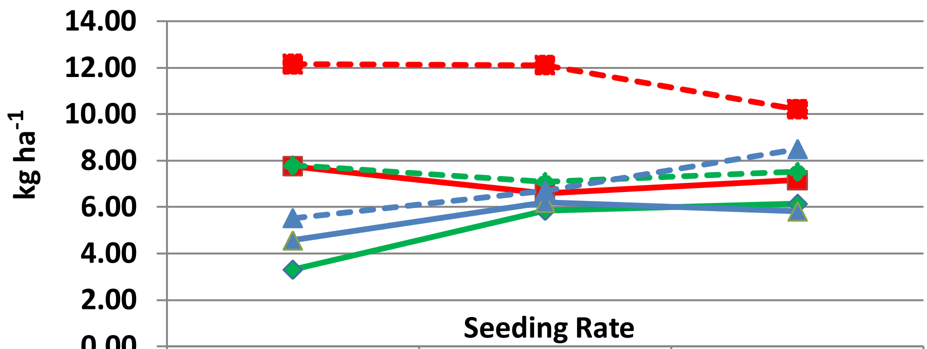
**Indicates significance at P<0.05.*

Table 21: 2005 Vanceboro small grain cover crop biomass phosphorous content model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	51	23.29	<.0001*
Seeding Rates (S)	2	51	1.060	0.3543
Fertilization (F)	1	51	40.21	<.0001*
Block (B)	3	51	2.700	0.0554
C*S	4	51	1.940	0.1181
C*F	2	51	4.120	0.0220*
C*B	6	51	4.130	0.0019*

**Indicates significance at P<0.05.*

In 2004, without spring applied N, rye biomass P contents ranged from 3.3-6.1 kg ha^{-1}; triticale from 6.6-7.8 kg ha^{-1}; and, wheat from 4.6-6.2 kg ha^{-1}. When spring N was applied, rye biomass P contents ranged from 4.6-6.2 kg ha^{-1}; triticale from 7.1-7.8 kg ha^{-1}; and, wheat from 10.2-12.2 kg ha^{-1} (Figure 21).



	1	2	3
Rye	3.30	5.85	6.14
Triticale	7.76	6.58	7.16
Wheat	4.57	6.20	5.82
R + N	7.80	7.09	7.52
T + N	12.2	12.1	10.2
W + N	5.53	6.71	8.51

Figure 21. 2004 Vanceboro small grain cover crop phosphorous content as estimated from total biomass x phosphorous concentration measured from whole plant samples taken on April 18, prior cover crop termination. (N= Broadcast application of 22.4 kg ha^{-1} nitrogen on February 28, 2004. R=Rye; T=Triticale and W= Wheat. 1= Target seeding rate of 129 seeds m^{-2}; 2= Target seeding rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}).

Without spring applied N, cover crop biomass P contents were not significantly different (5.1-7.2 kg ha^{-1}). When N was applied, biomass P contents of rye (7.5 kg ha^{-1}) and triticale (11.5 kg ha^{-1}) significantly increased but wheat (6.9 kg ha^{-1}) did not (Figure 22).

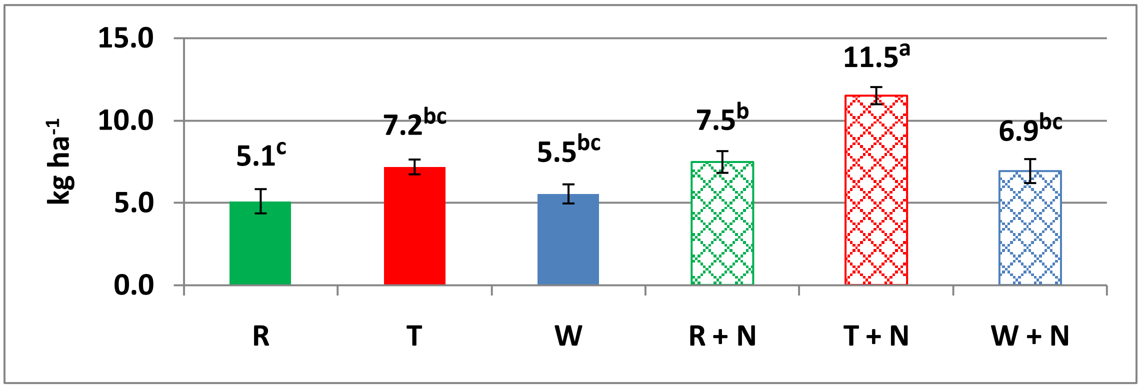
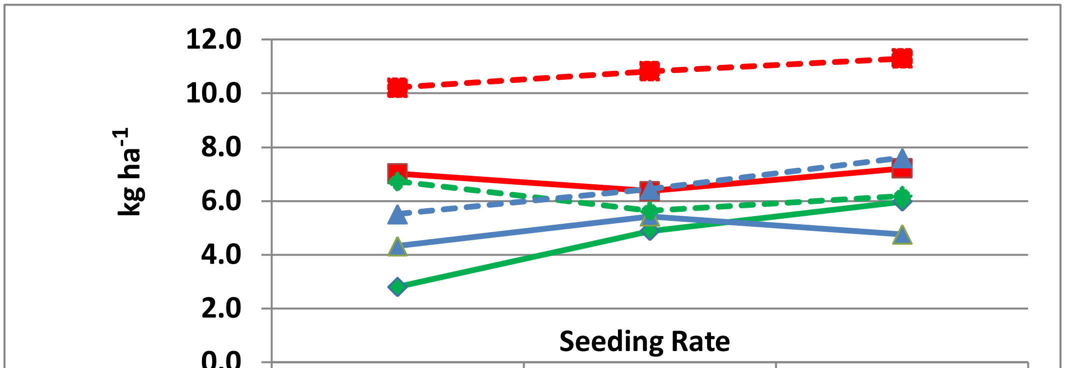


Figure 22. 2004 Vanceboro small grain cover crop phosphorous content and fertilization treatment interactions as estimated from biomass dry weight taken from total biomass x phosphorous concentration measured from whole plant samples taken on April 18, prior cover crop termination. (Means with different letters are statistically different at P<0.05. R=Rye; T=Triticale and W= Wheat. N= Broadcast application of nitrogen at 22.4 kg ha^{-1} on February 28).

In 2005, without spring applied N, rye biomass P contents ranged from 2.8-6.0 kg ha^{-1}; triticale from 6.4-7.2kg ha^{-1}, and wheat from 4.3-5.4 kg ha^{-1}. When spring N was applied, rye biomass P contents ranged from 5.6-6.7 kg ha^{-1}; triticale from 10.2-11.3 kg ha^{-1}, and wheat from 5.5-7.6 kg ha^{-1} (Figure 23).



	1	2	3
Rye	2.8	4.9	6.0
Triticale	7.0	6.4	7.2
Wheat	4.3	5.4	4.8
R + N	6.7	5.6	6.2
T + N	10.2	10.8	11.3
W + N	5.5	6.4	7.6

Figure 23. 2005 Vanceboro small grain cover crop phosphorous content as estimated from total biomass x phosphorous concentration measured from whole plant samples taken on April 22, prior to cover crop termination. (N= Broadcast application of nitrogen at 22.4 kg ha^{-1} on March 1. R=Rye; T=Triticale and W= Wheat. 1= Target seeding rate of 129 seeds m^{-2}; 2= Target seeding rate of 258 seeds m^{-2} and 3=Target seeding rate of 387 seeds m^{-2}).

Analysis of the cover crop and fertilization interactions shows that the biomass P content of triticale with spring applied N (10.8 kg ha^{-1}) was significantly greater than all other treatments. Biomass P contents of rye (4.6 kg ha^{-1}), triticale (6.9 kg ha^{-1}), wheat (4.8 kg ha^{-1}), rye with spring applied N (6.2 kg ha^{-1}) and wheat with spring applied N (6.5 kg ha^{-1}) were not statistically different (Figure 24).

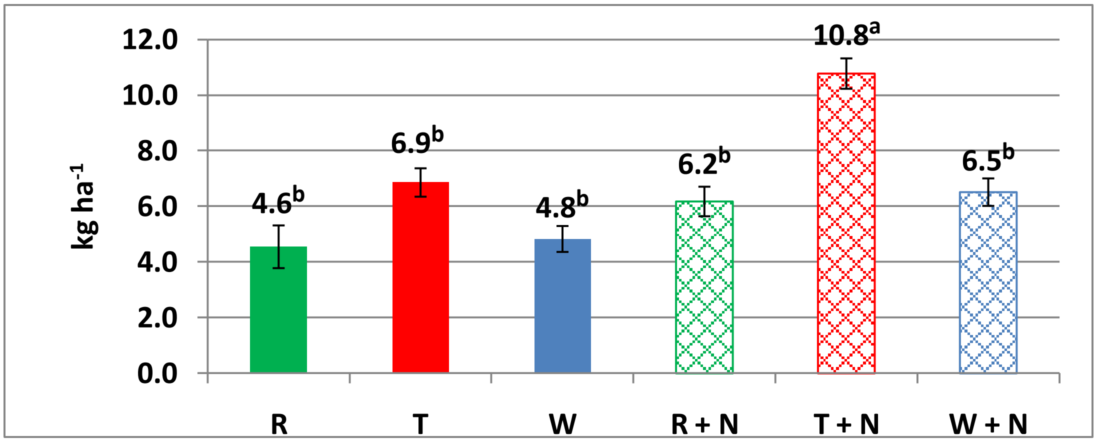


Figure 24. 2005 Vanceboro small grain cover crop phosphorous content and fertilization treatment interactions as estimated from biomass dry weight taken from whole plant samples on April 22, prior to cover crop termination. (Means with different letters are statistically different at $P<0.05$. R=Rye; T=Triticale and W= Wheat. N= Broadcast application of nitrogen at 22.4 kg ha^{-1} on February March 1).

Cover Crop Biomass Phosphorous Content Summary

Small grain cover crop biomass P contents increased with increasing biomass production. Generally, biomass P contents were in the order of triticale > wheat > rye. Biomass P contents of small grains at the Fort Barnwell location were lower than those at the Vanceboro location. At the Vanceboro location, biomass P contents of small grains with no spring N applied ranged from 2.8-7.8 kg ha^{-1} while those at Fort Barnwell ranged from 1.5-3.4 kg ha^{-1}. At the Fort Barnwell location, biomass P contents of rye increased from a range of 1.5-2.8 kg ha^{-1} to 3.9-5.4 kg ha^{-1} with the application of spring N. Triticale biomass P contents increased from a range of 2.4-3.4 kg ha^{-1} with the application of spring N. Wheat biomass P content increased from a range of 2.4-4.0 kg ha^{-1} to 3.7-5.1 kg ha^{-1} with the application of spring N. At the Vanceboro location, biomass P contents of rye increased from a range of 2.8-6.1 kg ha^{-1} to 6.2-7.8 kg ha^{-1} with the application of spring applied N. Triticale biomass P contents increased from a range of 6.4-7.8 kg ha^{-1} with the application of spring applied N. Wheat biomass P contents increased from a range of 4.3-6.2kg ha^{-1} to 5.5-8.5 kg ha^{-1}.

Cover Crop Residue Oven-Dry Weight and Nutrient Content by Retrieval Dates

Fort Barnwell Cover Residue Oven-Dry Weights by Retrieval Dates

Small grain cover type (C) and retrieval date (R) were significant factors in small grain cover crop residue retrieval weights in 2004. In 2005, these main effects as well as interaction terms significantly influenced cover crop residue retrieval weights (Tables 22 and 23).

Table 22. 2004 Fort Barnwell cover crop retrieval oven-dry weights model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	40	39.93	<.0001*
Block (B)	3	40	1.770	0.1681
Retrieval (R)	4	40	503.5	<.0001*
C*R	8	40	1.800	0.1063

**Indicates significance at P<0.05.*

Table 23. 2005 Fort Barnwell cover crop retrieval oven-dry weights model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	40	18.47	<.0001*
Block (B)	3	40	0.220	0.8809
Retrieval (R)	4	40	143.0	<.0001*
C*R	8	40	3.930	0.0015*

**Indicates significance at P<0.05.*

In 2004, the mean cover residue weights are significantly different with triticale (4.3 g 0.05 m^{-2}) > wheat (3.9 g 0.05 m^{-2}) > rye (3.5 g 0.05 m^{-2}). Small grain cover crop residue weight significantly decreased between retrieval dates with mean oven-dry weights of 6.1, 5.6, 3.8 and 2.1 g 0.05 m^{-2} for retrievals 1, 2, 3 and 4, respectively. No significant cover residue weight loss occurred between retrieval 4 and retrieval 5 (1.9 g 0.05 m^{-2}).

In 2005, there was no significant difference in cover residue weights on day 7 but triticale cover residue weights were significantly greater than rye and wheat on all other retrieval dates. Rye and wheat cover residue weights were not statistically different on any retrieval date. (Table 24).

*Table 24. 2005 Fort Barnwell small grain cover crop residue oven-dry weights (*g 0.05 m^{-2}*) by retrieval dates from cover crop residue bags initially placed within corresponding cover crops within the rows of cotton plots on May 25.*

Cover Crop	Retrieval (Days)				
	7	**14**	**28**	**56**	**112**
Rye	5.7^{a*}	4.4^{b*}	3.8^{c*}	2.3^{d*}	1.9^{d*}
Triticale	5.6^{a*}	5.2^{a*}	4.0^{b*}	$4.1^{b‡}$	2.8^{c*}
Wheat	5.7^{a*}	4.9^{b*}	4.2^{c*}	3.1^{d*}	2.5^{d*}

(Means with different letters are statistically different at P<0.05. Means with different letters indicate significance within each small grain cover crop between retrieval dates. Means with different symbols indicate significant differences of small grain cover crops within each retrieval date)

Fort Barnwell Cover Residue Nitrogen Concentration by Retrieval Dates

In 2004 and 2005, cover, retrieval and cover x retrieval interactions were significant effects of nitrogen contents of cover residues (Tables 25 and 26).

Table 25. 2004 Fort Barnwell small grain cover crop residue nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	48	47.42	<.0001*
Retrieval (RTV)	5	48	133.3	<.0001*
C*RTV	10	48	3.770	0.0009*

**Indicates significance at P<0.05.*

Table 26. 2005 Fort Barnwell small grain cover crop residue nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	51	5.450	0.0072*
Retrieval (RTV)	5	51	26.47	<.0001*
C*RTV	10	51	2.220	0.0309*

**Indicates significance at P<0.05.*

In 2004, nitrogen concentration of small grain cover residues were not significantly different between placement and retrieval two (14 days) with a range of 1.31-1.62% demonstrating that only small amounts of nitrogen was released to the soil system during early decomposition. On retrieval 3 (day 28), rye and wheat N concentrations (2.47% and 2.38%, respectively) significantly increased demonstrating an increase in the decomposition of residues. Triticale N concentration (1.52%) on day 28 is not significantly different from earlier retrieval dates suggesting slower decomposition rate and N release. From retrieval 3 (day 28) through retrieval 5 (day 112), the triticale N concentrations of 1.52-2.48% are significantly less than that of rye (2.47-3.0%) or wheat (2.38-3.06%) demonstrating greater decomposition rates and subsequent N release for rye and wheat (Table 27).

Table 27. 2004 Fort Barnwell small grain cover crop residue nitrogen concentration (%) by retrieval dates from cover crop residue bags initially placed into corresponding cover crops within the rows of cotton plots on May 18, 2004.

Cover Crop	Retrieval (days)					
	0	**7**	**14**	**28**	**56**	**112**
Rye	1.47[a*]	1.48[a*]	1.50[a*]	2.47[b*]	2.90[c*]	2.99[c*]
Triticale	1.42[a*]	1.31[a*]	1.26[a‡]	1.52[a‡]	2.22[b‡]	2.48[b‡]
Wheat	1.62[a*]	1.56[a*]	1.59[a*]	2.38[b*]	2.48[c*]	3.06[c*]

(Means are statistically different at P<0.05. Means with different letters indicate significant difference within each small grain cover crop between retrieval dates. Means with different symbols indicate significant differences of small grain cover crops within each retrieval dates).

In 2005, decomposition and subsequent N release of small grain cover residues was similar for all small grain cover crops between placement and day 14 with N concentrations ranging from 1.05-1.41%. At day 28, N concentrations of all small grain cover crop residues are not significantly different but significantly increased with a range of 2.01-2.30% demonstrating a more rapid decomposition rate. From day 56 through day 112, rye residue N concentrations (3.01-3.68%) are significantly greater than that of triticale (1.93-2.05%) and wheat (2.87-2.89%) demonstrating a more rapid decomposition rate for rye cover residue. On day 112 of the study, the small grain cover crop residue N concentrations of rye, triticale and wheat are statistically different with means of 3.68%, 2.05% and 2.87%, respectively (Table 28).

Table 28. 2005 Fort Barnwell small grain cover crop residue nitrogen concentration (%) by retrieval dates from cover crop residue bags initially placed into corresponding small grain cover crops within the row of cotton plots on May 25, 2005.

Cover Crop	**Retrieval (days)**					
	0	**7**	**14**	**28**	**56**	**112**
Rye	1.17^{a*}	1.23^{a*}	1.41^{a*}	2.01^{b*}	3.01^{c*}	3.68^{c*}
Triticale	1.18^{a*}	1.05^{a*}	1.17^{a*}	2.30^{b*}	$1.93^{b‡}$	$2.05^{b‡}$
Wheat	1.14^{a*}	1.19^{a*}	1.40^{a*}	2.19^{b*}	2.89^{b*}	$2.87^{b‡‡}$

(Means are statistically different at P<0.05. Means with different letters indicate significant difference within each small grain cover crop between retrieval dates. Means with different symbols indicate significant differences of small grain cover crops within each retrieval date)

Fort Barnwell Cover Residue C:N Ratios by Retrieval Dates

In 2004, cover (C), retrieval date (RTV) and C x RTV were significant effects of the cover residue C:N ratios but in 2005 only cover and retrieval date were significant effects (Table 29 and 30). In 2004, cover residue C:N ratios from time of placement through day 14 range from 26-33 and are not statistically different suggesting a slow rate of mineralization or even potential N immobilization. On day 28, the wheat C:N ratio (27) is significantly less than the C:N of rye (29) and triticale (30) indicating a slightly greater rate of wheat mineralization. By day 56, the C:N ratio of rye (15) and wheat(16) are not significantly different but are significantly less than that of triticale (20). By day 112, the C:N ratio of triticale (18) is significantly greater than wheat (15) but is not significantly different from rye (15). Rye is not significantly different than wheat. In 2005, cover residue C:N ratios were higher with a range of 30-41 for the first 14 days of the study suggesting that N immobilization may have occurred. By day 28, the C:N ratios of all small grain cover residues were below 20 suggesting rapid N mineralization (Table 31).

Table 29. 2004 Fort Barnwell cover residue C:N ratios by retrieval date model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	39	61.87	<.0001*
Retrieval Date (RTV)	4	39	125.8	<.0001*
C*RTV	8	39	3.550	0.0035*
Block (B)	3	39	0.260	0.8518
C*B	6	39	1.860	0.1128

**Indicates significance at P<0.05.*

Table 30. 2005 Fort Barnwell cover residue C:N ratios by retrieval date model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	39	12.62	<.0001*
Retrieval Date (RTV)	4	39	95.55	<.0001*
Block (B)	3	39	0.510	0.6753
C*RTV	8	39	1.080	0.3941
C*B	6	39	3.320	0.0091*

**Indicates significance at P<0.05.*

Table 31. Fort Barnwell small grain cover crop C:N residues estimated from cover residues from residue bags initially placed into corresponding small grain cover crops within the rows of cotton plots on May 18, 2004 and May 25, 2005 and retrieved 1, 2, 4, 8 and 16 weeks after placement.

Retrieval Day	Cover	2004 Mean C:N Ratio	2005 Mean C:N Ratio
0	Rye	29[a]	36
0	Triticale	30[a]	36
0	Wheat	26[a]	36
7	Rye	29[a]	34
7	Triticale	33[a]	41
7	Wheat	27[a]	35
14	Rye	27[a]	30
14	Triticale	33[a]	36
14	Wheat	25[b]	30
28	Rye	18[b]	22
28	Triticale	30[a]	25
28	Wheat	19[b]	21
56	Rye	15[ab]	17
56	Triticale	20[a]	21
56	Wheat	16[b]	20
112	Rye	15[ab]	16
112	Triticale	18[a]	19
112	Wheat	15b	17

(Means with different letters within each retrieval date are significantly different at P<0.05)

Fort Barnwell Cover Residue Phosphorus Concentrations by Retrieval Dates

In 2004, cover type, retrieval date and cover x retrieval interactions were significant effects of the cover residue P concentrations but in 2005 only retrieval date was significant (Tables 32 and 33).

Table 32. 2004 Fort Barnwell small grain cover crop residue phosphorous concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	51	16.30	<.0001*
Retrieval (RTV)	5	51	146.8	<.0001*
C*RTV	10	51	5.080	<.0001*

**Indicates significance at P<0.05.*

Table 33. 2005 Fort Barnwell small grain cover crop residue phosphorous concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	51	1.580	0.2160
Retrieval (RTV)	5	51	137.0	<.0001*
C*RTV	10	51	1.590	0.1368

**Indicates significance at P<0.05.*

In 2004 the biomass P concentrations of small grain cover crop residues were not statistically different from the time of placement through day 14. On day 28 the biomass P concentrations of triticale residues (0.234%) were significantly lower than that of rye (0.363%) and wheat (0.326%) indicating an increase in P mineralization rate by day 28 but a slightly slower P mineralization for triticale. Rye and wheat residue P concentrations on day 28 are not statistically different. Rye and wheat exhibited similar rates of P mineralization from day 28 through day 58 but triticale P mineralization was slightly greater. However, on day 112, all the biomass P concentrations for small grain cover crop residues are statistically different with rye (0.363%) > wheat (0.326%) > triticale (0.234%).

The more rapid P mineralization rate of triticale is also demonstrated by comparison of biomass P concentrations within each small grain residue by retrieval dates. Rye and wheat residue P concentrations ranged from 0.285-0.363% from the time of placement until day 28 and are not statistically different. On day 56, P concentration of rye (0.363%) and wheat (0.170%) significantly decreased but did not significantly decrease between day 56 and day 112. In contrast, other than the lack of significance between day 7 and day 14, triticale residue P concentrations significantly decreased between each retrieval date (Table 34).

Table 34. 2004 Fort Barnwell small grain cover crop residue phosphorous concentration (%) as measured from remaining residues within residue bag samples initially placed into corresponding small grain cover crops within the rows of cotton plots on May 18.

	Retrieval (days)					
Cover Crop	**0**	**7**	**14**	**28**	**56**	**112**
Rye	0.301[a*]	0.298[a*]	0.311[a*]	0.363[a*]	0.199[b*]	0.233[b*]
Triticale	0.328[a*]	0.292[b*]	0.271[b*]	0.234[c‡]	0.170[d*]	0.129[e‡]
Wheat	0.318[a*]	0.285[a*]	0.296[a*]	0.326[a*]	0.204[b*]	0.168[b‡]

(Means are statistically different at P<0.05. Means with different letters indicate significant differences within each small grain cover crop between retrieval dates. Means with different symbols within each retrieval date indicates significant differences between the small grain cover crops within each retrieval date)

In 2005 the mean cover residue P concentrations of rye, triticale and wheat (0.200, 0.187 and 0.196%, respectively) are not significantly different. Rapid mineralization of P occurred between placement (0.335%) and day 7 (0.245%) but not between day 7 and day 14 (0.257%). Residue P concentrations significantly declined between day 14 and day 28 (0.131%) and day 28 and day 56 (0.098%) but not between day 56 and day 112 (0.097%) indicating rapid P mineralization through day 56 but no measurable P mineralization on day 112.

The difference in small grain cover residue P concentrations was small with a range of 4.3-5.2 kg ha^{-1} with greater values for triticale than either rye or wheat (Table 35). Rapid decomposition of biomass of all small grain cover residues resulted in approximately 50% of the total P uptake released into the soil system by day 28 of the study for all small grain cover crops. However, phosphorous mineralization continued rapidly until day 56 of the study. P mineralization decreased to an undetectable level between day 56 and day 112 of the study.

Fort Barnwell Small Grain Cover Residue Mineralization Summary

Extrapolation of the small grain cover crop biomass dry weight of each retrieval date to represent biomass dry weight (kg) per hectare reveals that while seasonal climatic variation resulted in a faster decomposition rate in 2004, all small grain cover residues decomposed at similar rates from the time of placement through day 14. Thereafter, triticale provided a more persistent soil residue cover. Approximately 50-55% of the triticale biomass remained near day 60 compared to range of 25-45% for rye and wheat. However, by day 112 of the study, the difference between small grain cover residue dry weights of triticale and wheat are similar (Data in Table 35). This demonstrates that approximately half of the wheat and rye cover residues mineralized 30-40 days after cover crop termination to coincide with increasing cotton nutrient demands of early season cotton square development. The slightly slower rate of mineralization of triticale residues coincides with cotton early season cotton square development to early bloom period. By the end of the cotton growing season, there was little difference between cover residue oven-dry weights. Thus, cover residue mineralization may enhance cotton yields if nutrients are utilized by the cotton plant. Conversely, if nutrient demands of cotton are met through fertilization applications, there is no affect of cover residue mineralization.

Multiplication of the biomass dry weight by the N concentration reveals that total N content of biomass ranged from 17-22 kg ha^{-1}. In 2004, the rate of N mineralization for all small grains was similar from time of placement through day 56. Assuming that a C:N ratio between 20 and 30 will result in net N immobilization, all small grains may lead to N immobilization during the first 28 days of decomposition. On day 56 there is a slight separation of small grain cover crop residue mineralization rates with approximately 50% of the rye and wheat residue mineralized but only 38% of the triticale mineralized. This trend remained through day 112 of the study. In 2005, rye and triticale exhibited similar N mineralization rates from time of placement through day 28 with wheat slightly slower. However, values of N content increased on day 28 of the study. Investigation revealed that the grower inadvertently treated the plot with nitrogen during an herbicide application which subsequently increased N levels of the cover crop residue. Consequently, N content values beyond this point reflect N content values greater than the original N content and were not used in evaluation (Data found in Table 35, Figure 25 and Figure 26).

Phosphorous uptake of the small grains varied from 4.3-5.2 kg ha^{-1}. Mineralization of P occurred rapidly with 44% of the rye, 58% of the triticale and 47% of the wheat mineralized by day 28 of the study in 2004 and 72% of the rye, 81% of the triticale and 73% of the wheat mineralized by day 28 in 2005. This relates to P mineralization rate for the first 28 days of 0.07 kg ha^{-1} per day for rye and wheat and 0.01 kg ha^{-1} per day for triticale in 2004. The more rapid rate of decomposition in 2005 resulted in greater P mineralization with 0.11 kg ha^{-1} for rye, 0.15 kg ha^{-1} for triticale and 0.13 kg ha^{-1} for wheat. By day 56, P mineralization slowed considerably and remained as such through day 112 of the study to a rate of 0.002-0.005 kg ha^{-1} for all small grain cover residues in both years of the study (Table 35 and Figure 27). This demonstrates a greater difference in P mineralization rate resulted from climatic variation between years rather than among small grain covers. However, during early stages of decomposition, small grain cover residues remaining through day 28 generally was in the order of triticale > wheat > rye.

Table 35. Fort Barnwell small grain cover crop residue nutrient contents as determined from remaining cover crop residues within residue bag samples initially placed into corresponding small grain cover crops within the rows of cotton plots on May 18, 2004 and May 25, 2005.

Cover Crop	Retrieval (Days)	2004				2005			
		Cover Crop Biomass Weight	N Content	P Content	C:N Ratio	Cover Crop Biomass Weight	N Content	P Content	C:N Ratio
		------------- kg ha^{-1}------------				------------- kg ha^{-1}-----------			
Rye	0	1418	21	4.3	29	1418	17	4.3	36
	7	1271	19	3.8	29	1273	16	3.2	34
	14	1167	18	3.6	27	967	14	2.7	30
	28	740	18	2.4	15	847	17	1.2	22
	56	336	10	0.5	9	513	16	0.6	17
	112	358	11	0.6	8	427	16	0.4	16
Triticale	0	1453	21	4.8	30	1453	17	5.2	36
	7	1404	18	4.1	33	1253	13	3.0	41
	14	1373	17	3.7	33	1151	13	2.7	36
	28	940	14	2.0	24	887	20	1.0	25
	56	576	13	0.8	13	909	18	0.7	21
	112	522	13	0.5	8	620	13	0.6	19
Wheat	0	1451	24	4.6	26	1451	17	4.9	36
	7	1387	22	4.0	27	1278	15	3.1	35
	14	1211	19	3.6	26	1082	15	2.8	30
	28	853	20	2.4	14	929	20	1.3	21
	56	513	13	0.7	8	682	20	0.7	20
	112	351	11	0.4	7	564	16	0.5	17

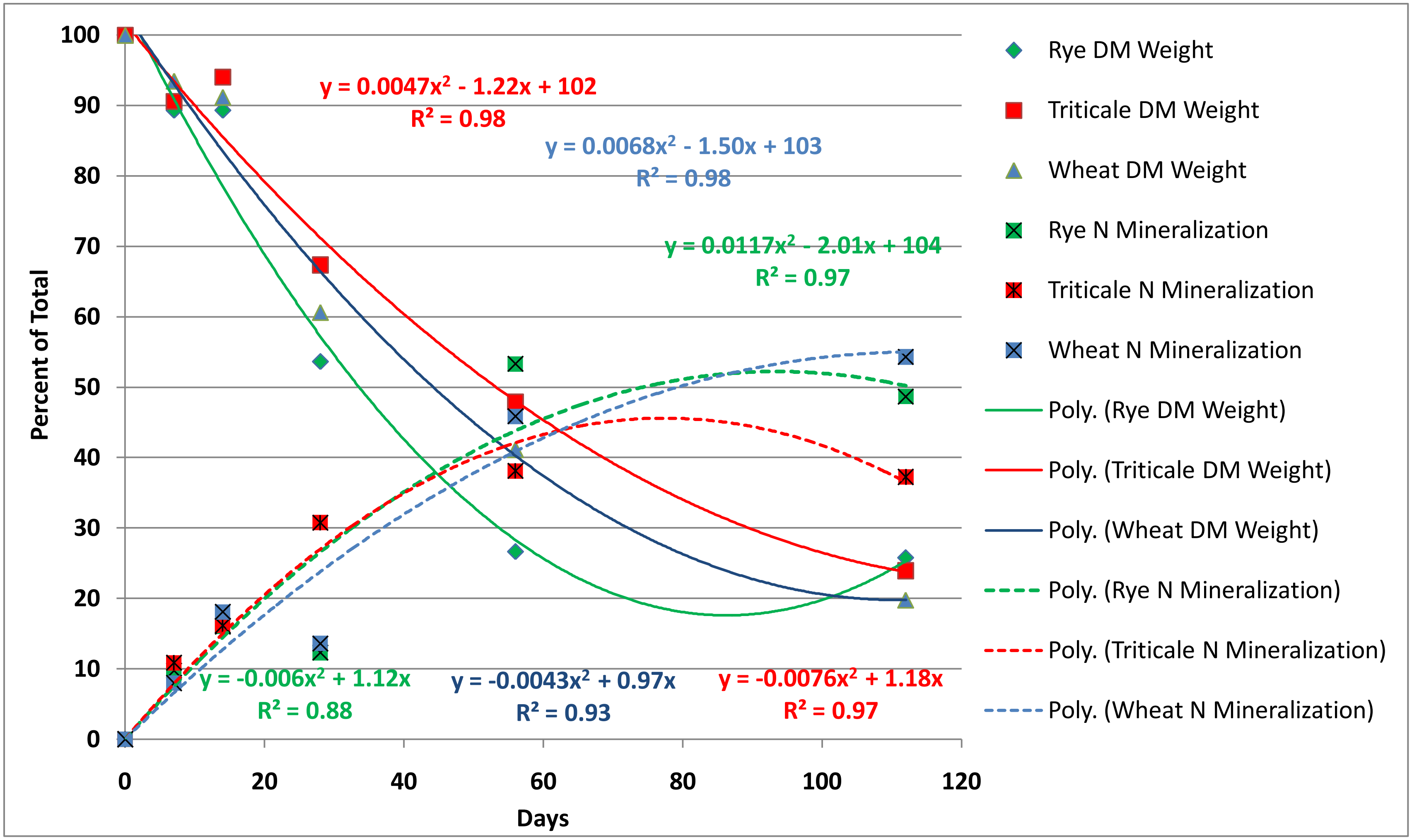


Figure 25. 2004 Fort Barnwell small grain cover residue dry weight and nitrogen mineralization by retrieval dates as estimated from percent of original totals. (Polynomial equation, R^2 values and best-fit trend lines calculated by Microsoft Excel™. Equations for residue dry weight are located on top of graph and nitrogen mineralization equations on bottom).

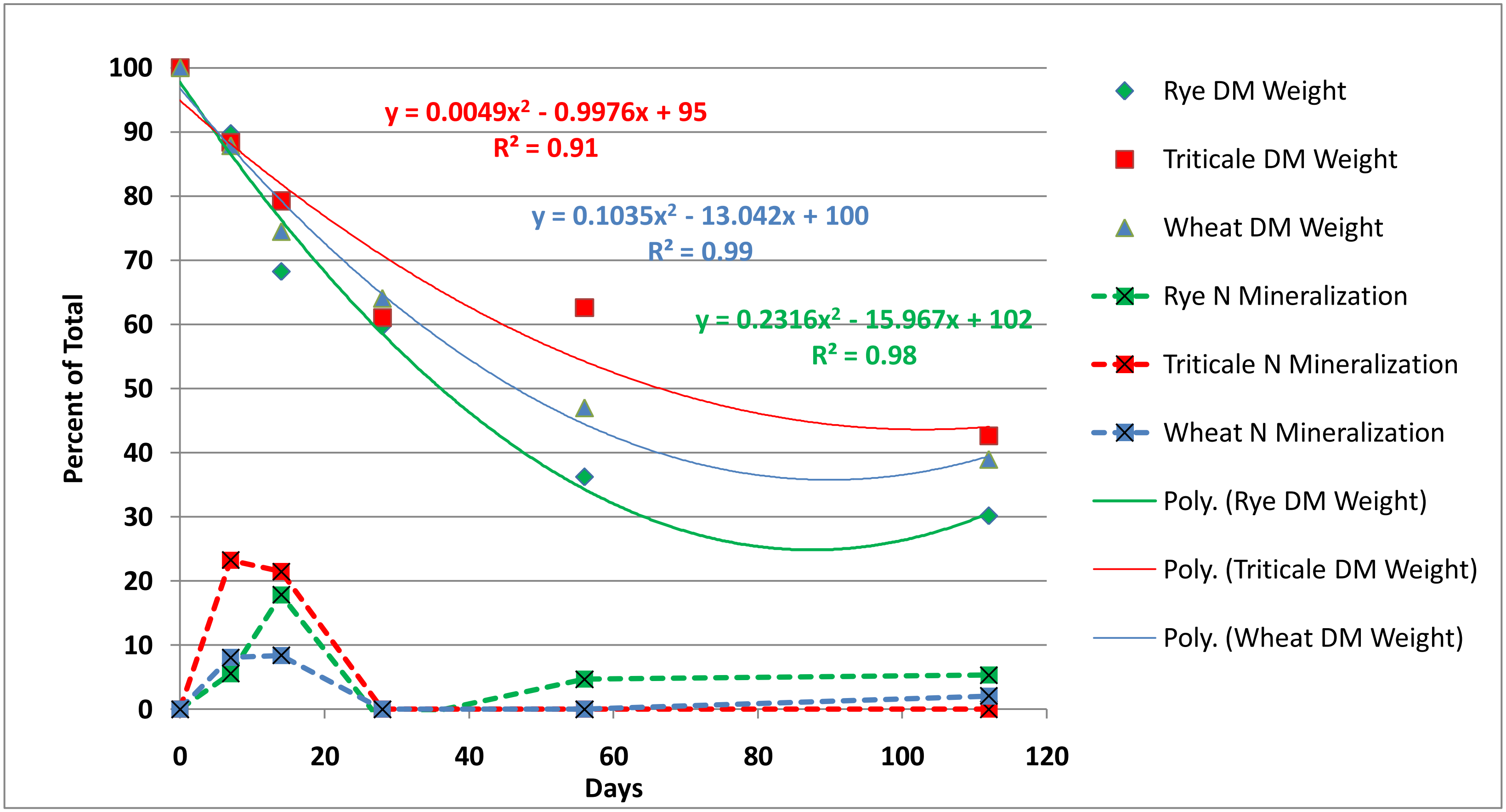


Figure 26. 2005 Fort Barnwell small grain cover residue dry weight decomposition and nitrogen mineralization by retrieval dates as estimated from percent of original totals. (Nitrogen content values exceeding 100% of original content due to inadvertent nitrogen application were set to zero. Polynomial equation, R^2 values and best-fit trend lines calculated by Microsoft Excel™).

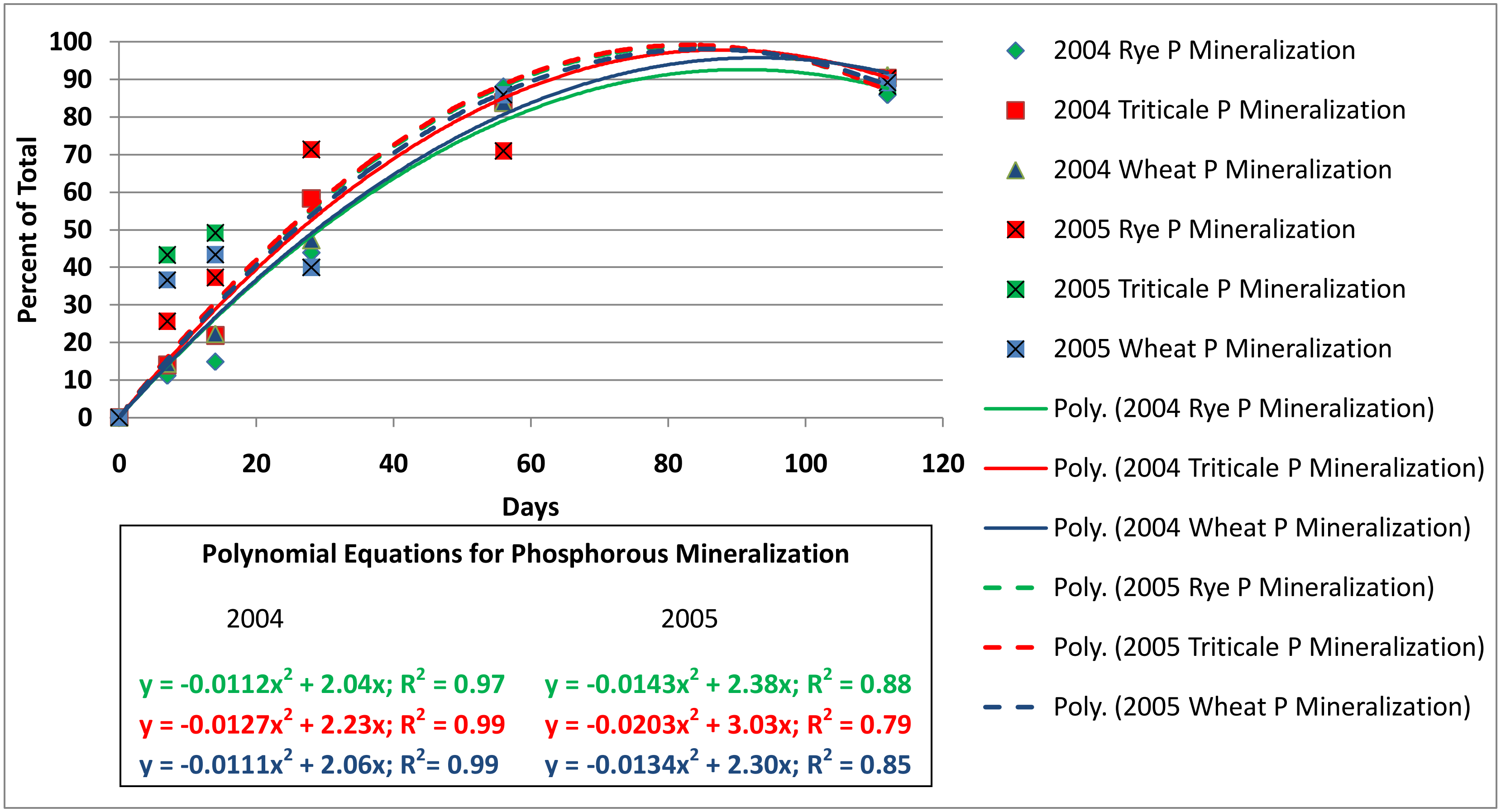


Figure 27. Fort Barnwell small grain cover residue phosphorous mineralization rate as presented by percent of original phosphorous content based upon phosphorous concentration and oven-dry weights of residue by residue bag retrieval dates. (Polynomial equations and R^2 values were calculated by Microsoft Excel™. N= 22.4 kg ha^{-1} of spring applied nitrogen on March 1 in 2004 and March 2, 2005. DM = oven dry weights of cover residues).

Vanceboro Cover Residue Oven-Dry Weight by Retrieval Dates

In 2004, cover type (C), retrieval dates (RTV) and C x RTV were significant effects of small grain cover crop residue retrieval oven-dry weights and in 2005 cover type and retrieval dates but not the interaction terms were significant (Tables 36 and 37).

Table 36. 2004 Vanceboro cover residue retrieval oven-dry weight model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	36	12.17	<.0001*
Block (B)	3	36	1.190	0.3273
Retrieval (RTV)	4	36	322.2	<.0001*
C*B	6	36	1.200	0.3157
C*RTV	8	36	3.210	0.0074*

**Indicates significance at P<0.05.*

Table 37. 2005 Vanceboro cover crop residue retrieval oven-dry weight model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	36	24.30	<.0001*
Block (B)	3	36	1.000	0.4053
Retrieval (RTV)	4	36	183.5	<.0001*
C*B	6	36	1.700	0.1495
C*RTV	8	36	1.380	0.2368

**Indicates significance at P<0.05.*

In 2004, small grain cover residue oven-dry weights were not statistically different from the time of placement through retrieval 3 (day 28). However, on retrieval 4 (day 56), the cover residue oven-dry weights of triticale (3.1 g 0.05 m^{-2}) and wheat (2.7 g 0.05 m^{-2}) are not statistically different but are significantly greater than rye (1.7 g 0.05 m^{-2}) indicating a greater decomposition rate for rye. Mean oven-dry weights of all small grain residues on day 56 were not statistically different from residue oven-dry weights on day 112 indicating dramatic decrease in decomposition between days 56 and 112. On retrieval 5 (day 112), the small grain cover residue weights of rye (1.6 g 0.05 m^{-2}), triticale (1.6 g 0.05 m^{-2}) and wheat (1.3 g 0.05 m^{-2}) were not statistically different (Table 38).

Table 38. 2004 Vanceboro small grain cover crop residue oven-dry weights (g 0.05 m^{-2}) by retrieval dates as determined from remaining cover residue within residue bag samples initially placed into corresponding cover crops within the cotton plots on May 18, 2004.

Cover Crop	**Retrieval**				
	1 (7 days)	**2 (14 days)**	**3 (28 days)**	**4 (56 days)**	**5 (112 days)**
Rye	5.7[a*]	5.8[a*]	3.4[b*]	1.7[c*]	1.6[c*]
Triticale	5.9[a*]	6.2[a*]	4.4[b*]	3.1[c‡]	1.6[d*]
Wheat	6.1[a*]	6.0[a*]	4.0[b*]	2.7[c‡]	1.3[d*]

(Means are statistically different at P<0.05. Means with different letters indicate significant difference within each small grain cover crop between retrieval dates. Means within each retrieval date with different symbols indicates significant differences between small grain cover crop residues for that retrieval date).

In 2005, the mean cover residue oven-dry weight of triticale (3.9 g 0.05 m^{-2}) were significantly greater than that of rye (3.0 g 0.05 m^{-2}) and wheat (3.3 g 0.05 m^{-2}) but the mean cover residue oven-dry weights of rye and wheat are not statistically different. Small grain cover residue oven-dry weights significantly decreased between initial placement and day 56 with the mean of retrieval 1 (day 7) (6.0 g 0.05 m^{-2}) > retrieval 2 (day 14) (4.3 g 0.05 m^{-2}) > retrieval 3 (day 28) (2.8 g 0.05 m^{-2}) > retrieval 4 (day 56) (2.0 g 0.05 m^{-2}). The mean cover residue oven-dry weights between retrieval 4 and retrieval 5 (day 112) (1.7 g 0.05 m^{-2}) are not statistically different. This demonstrates rapid decomposition from placement through day 56 with a slowing or undetectable decomposition rate of residues on day 112.

Vanceboro Cover Residue Nitrogen Concentration by Retrieval Dates

Cover crop type (C), retrieval date (RTV) and C x RTV interaction terms were significant effects of N concentration of the small grain cover crop residues in 2004 but only cover type and retrieval dates were significant in 2005 (Tables 39 and 40). In 2004, the rate of N mineralization was the same for all small grain cover crops with no significant difference between placement and day 14. After day 14, N mineralization significantly increased between each retrieval date. However, triticale N concentration values are significantly lower than rye or wheat on all retrieval dates indicating a slower rate of mineralization. Rye and wheat residue N concentrations were not statistically different from placement through retrieval 3 (day 28) ranging from 1.66-1.82% but varied afterward. Cover residue N concentrations from retrieval 4 (day 56) for rye, triticale and wheat of 3.17%, 2.12% and 2.86%, respectively, are all significantly different indicating N mineralization for rye> wheat> triticale. Cover residue N concentrations from retrieval 5 (day 112) were also all significantly different with values for rye, triticale and wheat of 2.83%, 2.53% and 3.27%, respectively, indicating that N mineralization for wheat > rye > triticale (Table 41). In 2005, the mean cover residue N concentrations of all small grain cover crops were significantly different with rye (2.17%) > wheat (1.73%) and triticale (1.44%). No significant N mineralization occurred from the time of placement through retrieval 1 (day 7) with residue N concentrations ranging from 1.16-1.20%. However, significant N mineralization occurred between each retrieval date after day 7 with residue N concentration for retrievals 2, 3, 4 and 5 of 1.40, 1.83, 2.36 and 2.74%, respectively.

Table 39. 2004 Vanceboro cover crop residue nitrogen concentration by residue bag retrieval model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	41	45.56	<.0001*
Retrieval Date (RTV)	4	41	18.77	<.0001*
C*RTV	8	41	3.970	0.0015*
Block (B)	3	41	2.140	0.1093
C*B	6	41	1.710	0.1436

**Indicates significance at P<0.05.*

Table 40. 2005 Vanceboro cover residue nitrogen concentration by residue bag retrieval model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	47	44.93	<.0001*
Retrieval Date (RTV)	4	47	76.25	<.0001*
C*RTV	10	47	1.820	0.0838
Block (B)	3	47	0.570	0.6382

**Indicates significance at P<0.05.*

Table 41. 2004 Vanceboro small grain cover crop residue nitrogen concentration (%) by retrieval dates as determined from remaining cover residue from residue bags initially placed into corresponding small grain cover crops within the rows of cotton plots on May 18, 2004.

Cover Crop	**Retrieval (days)**					
	0	**7**	**14**	**28**	**56**	**112**
Rye	1.81^{a*}	1.76^{a*}	1.82^{a*}	2.54^{b*}	3.17^{c*}	2.83^{d*}
Triticale	$1.30^{a\ddagger}$	$1.32^{a\ddagger}$	$1.33^{a\ddagger}$	$1.65^{b\ddagger}$	$2.11^{c\ddagger}$	$2.53^{d\ddagger}$
Wheat	1.68^{a*}	1.56^{a*}	1.66^{a*}	2.24^{b*}	$2.86^{c\ddagger\ddagger}$	$3.27^{d\ddagger\ddagger}$

(Means are statistically different at P<0.05. Means with different letters indicate significant difference within each small grain cover crop between retrieval dates. Means within each retrieval date with different symbols indicates significant differences between small grain cover crop residues for that retrieval date).

Vanceboro Cover Crop Residue C:N Ratios by Retrieval Dates

In 2004, cover type (C), retrieval date (RTV) and C x RTV were significant effects of small grain cover residue C:N ratios but in 2005, only cover type and retrieval were significant effects (Tables 42 and 43).

Table 42. 2004 Vanceboro small grain residue C:N ratios by retrieval model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Block (B)	3	41	2.440	0.0778
Cover (C)	2	41	140.7	<.0001*
C*B	6	41	3.670	0.0053*
Retrieval Date (RTV)	4	41	153.4	<.0001*
C*RTV	8	41	2.650	0.0193*

**Indicates significance at P<0.05.*

Table 43. 2005 Vanceboro small grain residue C:N ratios by retrieval model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Block (B)	3	41	0.36	0.7815
Cover (C)	2	41	48.9	<.0001*
C*B	6	41	0.40	0.8749
Retrieval Date (RTV)	4	41	63.9	<.0001*
C*RTV	8	41	1.75	0.1154

**Indicates significance at P<0.05.*

In 2004, rye and wheat C:N ratios are similar ranging from 24-27 from time of placement through day 14 of the study. By retrieval 3 (day 28), rye and wheat residue C:N ratios declined to 18-20 and continued to decline throughout the remainder of the study. In contrast, triticale C:N ratios ranged from 31-33, slightly above a level that may lead to N immobilization, during the first 14 days of the study. On day 28, triticale C:N values decreased to 27 indicating some degree of decomposition but still potential N immobilization. On day 56 and day 112, C:N ratios were 18 and 20, respectively.

In 2005, the mean cover residue C:N ratios of all small grains are significantly different with triticale (33) > wheat (29) > rye (23). Mean cover residue C:N ratios of retrievals 1, 2, 3 and 4 are significantly different with C:N values of 38, 32, 26, and 21, respectively. Mean cover residue C:N ratio of retrieval 4 is not significantly different from retrieval 5 (day 112) (18). The higher C:N ratios suggest that N immobilization may occur during the first two weeks of residue decomposition. By day 28, mean cover residue C:N ratio dropped to 26 suggesting N mineralization (Table 44).

Table 44. Vanceboro C:N ratios as estimated from residue nitrogen and carbon contents of cover residue remaining in residue bags initially placed into corresponding small grain cover crop plots within the rows in cotton plants on May 18, 2004 and May 25, 2005.

Retrieval Day	Cover	2004 Mean C:N Ratio	2005 Mean C:N Ratio
0	Rye	24	31
0	Triticale	33	39
0	Wheat	26	36
7	Rye	24	30
7	Triticale	32	48
7	Wheat	27	38
14	Rye	23	26
14	Triticale	31	37
14	Wheat	25	33
28	Rye	18	21
28	Triticale	27	31
28	Wheat	20	26
56	Rye	14	15
56	Triticale	20	26
56	Wheat	15	22
112	Rye	15	15
112	Triticale	18	20
112	Wheat	14	19

Vanceboro Cover Residue Phosphorous Concentrations by Retrieval Dates

In 2004, cover type (C), retrieval date (RTV) and C x RTV were significant effects of phosphorous cover residue P concentrations but in 2005 only cover type and retrieval date were significant effects (Tables 45 and 46).

Table 45. 2004 Vanceboro small grain cover crop residue phosphorous concentration as determined from cover crop residue by retrieval date model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	47	20.27	<.0001*
Retrieval Date (RTV)	4	47	119.7	<.0001*
C*RTV	10	47	4.550	0.0002*
Block (B)	3	47	1.360	0.2678

**Indicates significance at P<0.05.*

Table 46. 2005 Vanceboro small grain cover crop residue phosphorous concentration as determined from cover crop residue by retrieval date model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	47	18.89	<.0001*
Retrieval Date (RTV)	4	47	2.790	0.0369*
C*RTV	10	47	0.730	0.6944
Block (B)	3	47	1.600	0.2026

**Indicates significance at P<0.05.*

Analysis of cover crop and retrieval date interactions reveals that in 2004, the rate of P mineralization for rye and wheat are similar with no significant differences in P concentrations between the time of placement and day 7. Cover residue P concentrations are higher for each retrieval date thereafter indicating rapid P mineralization. Conversely, the rate of P mineralization for triticale resulted in no significant difference in P concentration from time of placement (0.312%), retrieval 1 (day 7) (0.318%), retrieval 2 (day 14) (0.328%) and retrieval 3 (day 28) (0.303%). Additionally, residue P concentrations from retrievals 2, 3 and 4 (day 56)(0.216%) are not statistically different. Triticale cover residue for retrievals 4 (day 56) (0.216%) and retrieval 5 (112) (0.191%) are significantly lower than all other retrieval dates but are not significantly different from each other. Within each retrieval date, there is no significant difference in residue P concentrations between small grain cover crop residues from time of placement through retrieval 2 (day 14). By retrieval 3 (day 28) all small grain cover residue P concentrations are statistically different with rye (0.411%) > wheat (0.367%) > triticale (0.303%). By retrieval 4 (day 56), rye and wheat cover residue P concentration (0.280% and 0.251%, respectively) are not significantly different but are greater than triticale (0.216%). On the final retrieval (day 112), cover residue P concentrations are not statistically different with a range of 0.190-0.215% (Table 47).

Table 47. 2004 Vanceboro small grain cover crop residue nitrogen concentration as determined from remaining residue by retrieval dates of Initial cover residue bags placed into corresponding small grain cover crops within the rows of cotton plots on May 18.

	Retrieval (days)					
Cover Crop	**0**	**7**	**14**	**28**	**56**	**112**
Rye	0.323^{a*}	0.340^{ab*}	0.358^{b*}	0.411^{c*}	0.280^{d*}	0.190^{e*}
Triticale	0.312^{a*}	0.318^{ab*}	0.328^{ab*}	0.303^{b‡}	0.216^{c‡}	0.191^{c*}
Wheat	0.314^{a*}	0.310^{a*}	0.321^{b*}	0.367^{c‡‡}	0.251^{d*‡}	0.215^{e*}

(Means are statistically different at P<0.05. Means with different letters indicate significant difference within each small grain cover crop between retrieval dates. Means within each retrieval date with different symbols indicates significant differences between small grain cover crop residues for that retrieval date)

In 2005, mean cover residue P concentration of rye (0.308%) was significantly greater than triticale (0.219%) and wheat (0.242%). Rapid decomposition of residues resulted in only small differences in residue P concentrations by retrieval dates (Table 48).

Table 48. 2005 Vanceboro small grain cover residue phosphorous concentration by retrieval dates as determined from remaining cover residues of initial cover crop within residue bags placed into corresponding small grain cover crops within the rows of cotton plots on May 25.

	Retrieval (days)					
P Concentration (%)	**0**	**7**	**14**	**28**	**56**	**112**
Mean	0.306[a]	0.237[bc]	0.266[ab]	0.244[c]	0.228[bc]	0.278[a]

(Means with different letters are statistically different at P<0.05)

Vanceboro Cover Residue Mineralization Summary

Extrapolation of the small grain cover crop biomass dry weight of each retrieval date to represent biomass dry weight (kg) per hectare reveals that the lower C:N ratios and higher N content of rye mineralized at a greater rate than either triticale or wheat. Triticale consistently provided slower mineralization due to higher C:N ratios. Wheat provided inconsistent results with mineralization similar to triticale in 2004 but more similar to rye in 2005.

All small grain cover residue decomposed at similar rates from the time of placement through day 14. However by day 28 of the study, 47- 64% of rye cover residue oven-dry weight had decomposed compared to 28-33% of triticale and 39-58% of wheat. Triticale cover residue exceeded 50% decomposition by day 56 of the study. By day 112, 25-37% of the triticale cover oven-dry weight remained compared to 18-25% for rye and 20-25% for wheat (Data in Table 49 and Figure 28).

Cover crop residue N contents ranged from 19-26 kg ha^{-1} in 2004 and from 16-19 kg ha^{-1} in 2005. In 2004, higher C:N ratios of triticale and wheat contributed to a slower N mineralization than rye. By day 56 of the study, 53% of the total N mineralized from rye residues but only 21% of the N mineralized from triticale and 29% from wheat residues. By day 112, the differences are small with 61%, 53% and 63% of the N mineralized from rye, triticale and wheat, respectively. In 2005, rye remained unchanged during the first week of mineralization but 18-25% of the N mineralized from triticale and wheat. However, rye rapidly mineralized from day 7 through day 56 with 47% of the total N mineralized by day 56. Rye N mineralization slowed slightly between day 56 and day 112 with only 58% of the total N uptake mineralized by day 112. Wheat cover residue N mineralization was slightly slower with 41% of the total N mineralized by day 28 and 59% on day 112. In contrast, triticale cover residue mineralized rapidly with 25% of the N mineralized on day 7 but no mineralization occurred for the remainder of the study (Data in Table 49 and Figure 29).

Phosphorous uptake of the small grains varied from 3.9-4.6 kg ha^{-1}. Greater P mineralization rates occurred in 2005 with 73%, 69% and 64% of the P mineralized by day 28 for rye, triticale and wheat cover resides, respectively, compared to 32%, 33% and 28% of P mineralized from the rye, triticale and wheat cover residues, respectively, for the same date in 2004. This relates to P mineralization rate for the first 28 days of 0.05 kg ha^{-1} per day for all small grain cover residues in 2004 and a rate of 0.09-0.13 kg ha^{-1} per day in 2005. By day 56 of the study, P mineralization slowed to a rate of 0.7, 0.5 and 0.6 kg ha^{-1} per day for rye, triticale and wheat, respectively in 2004 and to 0.01, 0.01 and 0.04 for rye, triticale and wheat, respectively, in 2005 (Table 49). This suggests that climatic seasonal variations influence the rate of mineralization more than differences between cover types. However, P mineralization generally was in the order of rye > triticale ≥ wheat (Data in Figure 30).

Table 49. Vanceboro *small grain cover residue nutrient content as determined from cover residue nutrient concentrations and biomass oven-dry weights obtained from remaining cover residues within residue bags initially placed into corresponding small grain cover crops within the rows of cotton plot on May 18, 2004 and May 25, 2005.*

Cover Crop	**Retrieval (Days)**	**2004**				**2005**			
		Cover Crop Biomass Weight	**N Content**	**P Content**	**C:N Ratio**	**Cover Crop Biomass Weight**	**N Content**	**P Content**	**C:N Ratio**
		------------- kg ha^{-1}------------				**------------- kg ha^{-1}------------**			
Rye	0	1418	26	4.6	24	1418	19	4.8	31
	7	1267	22	4.3	24	1356	20	3.8	30
	14	1289	23	4.6	23	853	15	2.7	26
	28	756	19	3.1	18	498	11	1.3	21
	56	378	12	1.1	14	324	10	0.9	15
	112	356	10	0.7	15	258	8	0.9	15
Triticale	0	1453	19	4.5	33	1453	16	4.5	39
	7	1311	17	4.2	32	1371	12	2.9	48
	14	1378	18	4.5	31	1044	12	2.4	37
	28	978	16	3.0	27	780	12	1.4	31
	56	689	15	1.5	20	624	11	1.1	26
	112	356	9	0.7	18	542	12	1.1	20
Wheat	0	1451	24	4.6	26	1451	17	3.9	36
	7	1356	21	4.2	27	1289	14	2.8	38
	14	1333	22	4.3	25	944	12	2.4	33
	28	889	20	3.3	20	609	10	1.4	26
	56	600	17	1.5	15	416	9	0.9	22
	112	289	9	0.6	14	360	10	1.0	19

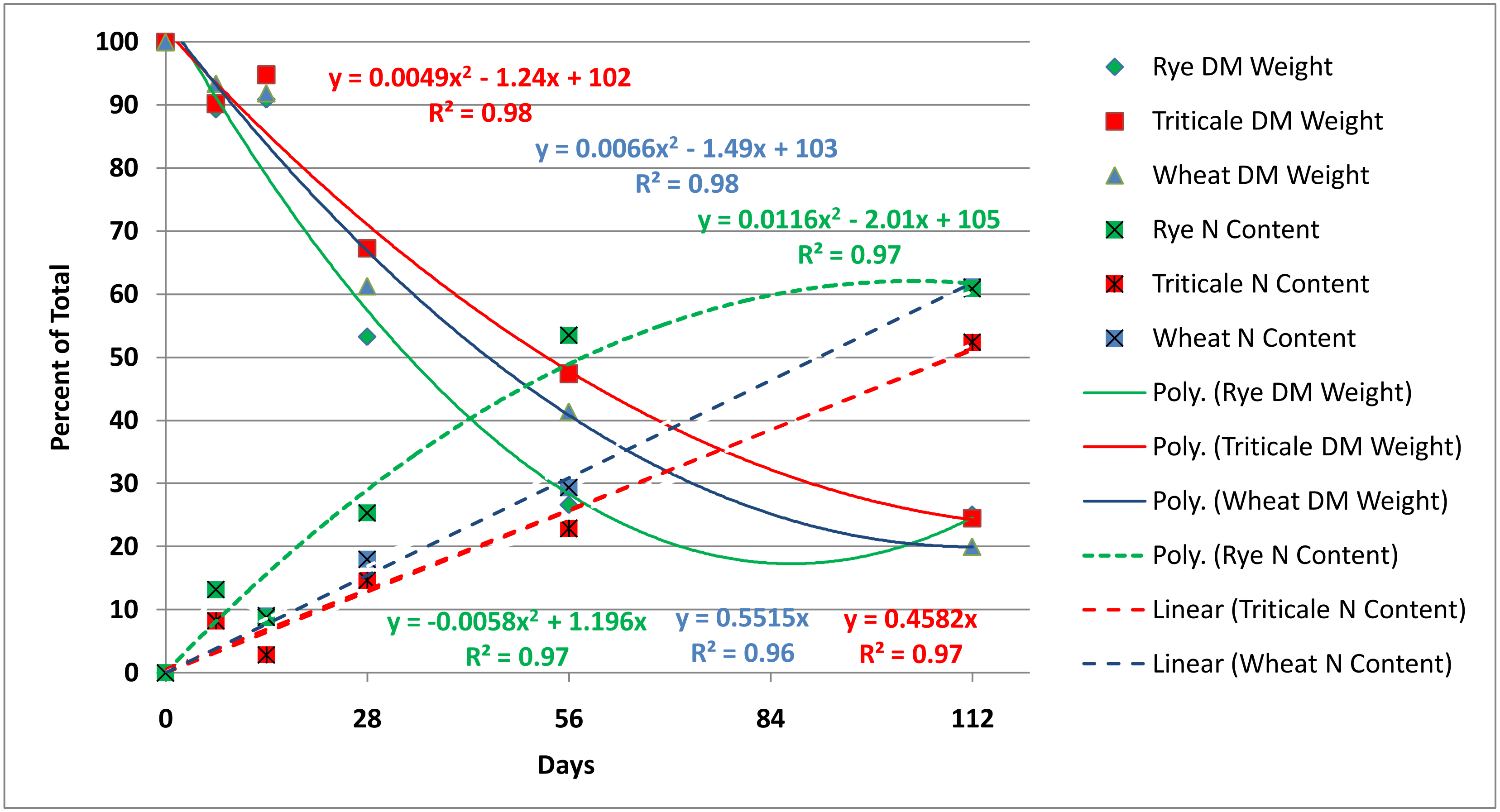


Figure 28. 2004 Vanceboro small grain cover residue decomposition oven-dry weights and nitrogen mineralization presented as percent of original weights from residue bag retrieval dates. (Polynomial and linear equations and R^2 values calculated by Microsoft Excel™. Polynomial equation for cover crop residue dry weights are listed at top of graph and polynomial or linear equations for nitrogen mineralization are listed at the bottom of the graph. N= 22.4 kg ha^{-1} of spring applied nitrogen on March 1, 2004 and March 2, 2005. DM = oven dry weights of cover residues).

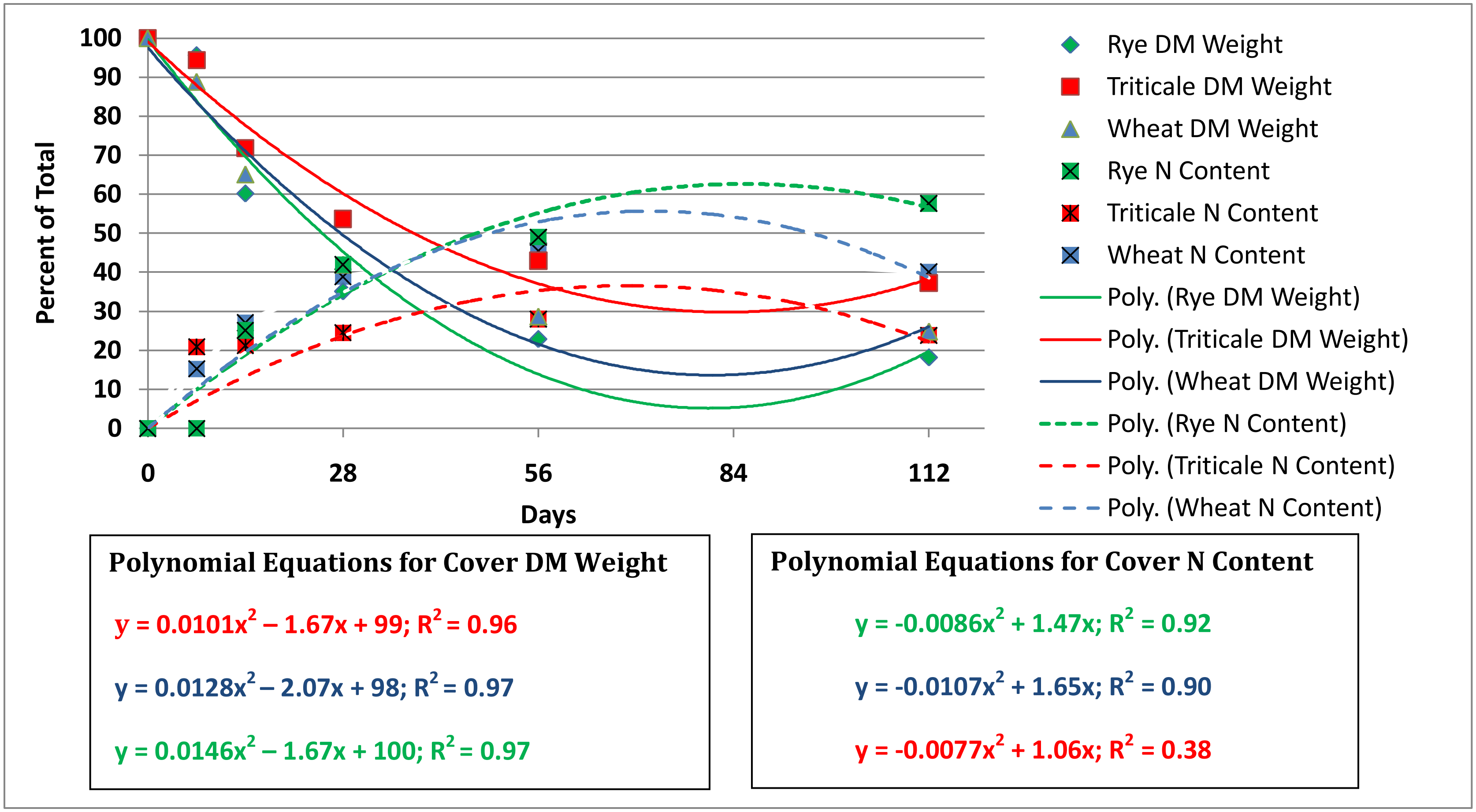


Figure 29. 2005 Vanceboro small grain cover residue oven-dry weights by retrieval dates as presented by original oven dry weights. (Polynomial equations and R^2 values were calculated by Microsoft Excel™. N= 22.4 kg ha^{-1} of spring applied nitrogen on March 2. DM = oven dry weights of cover residues).

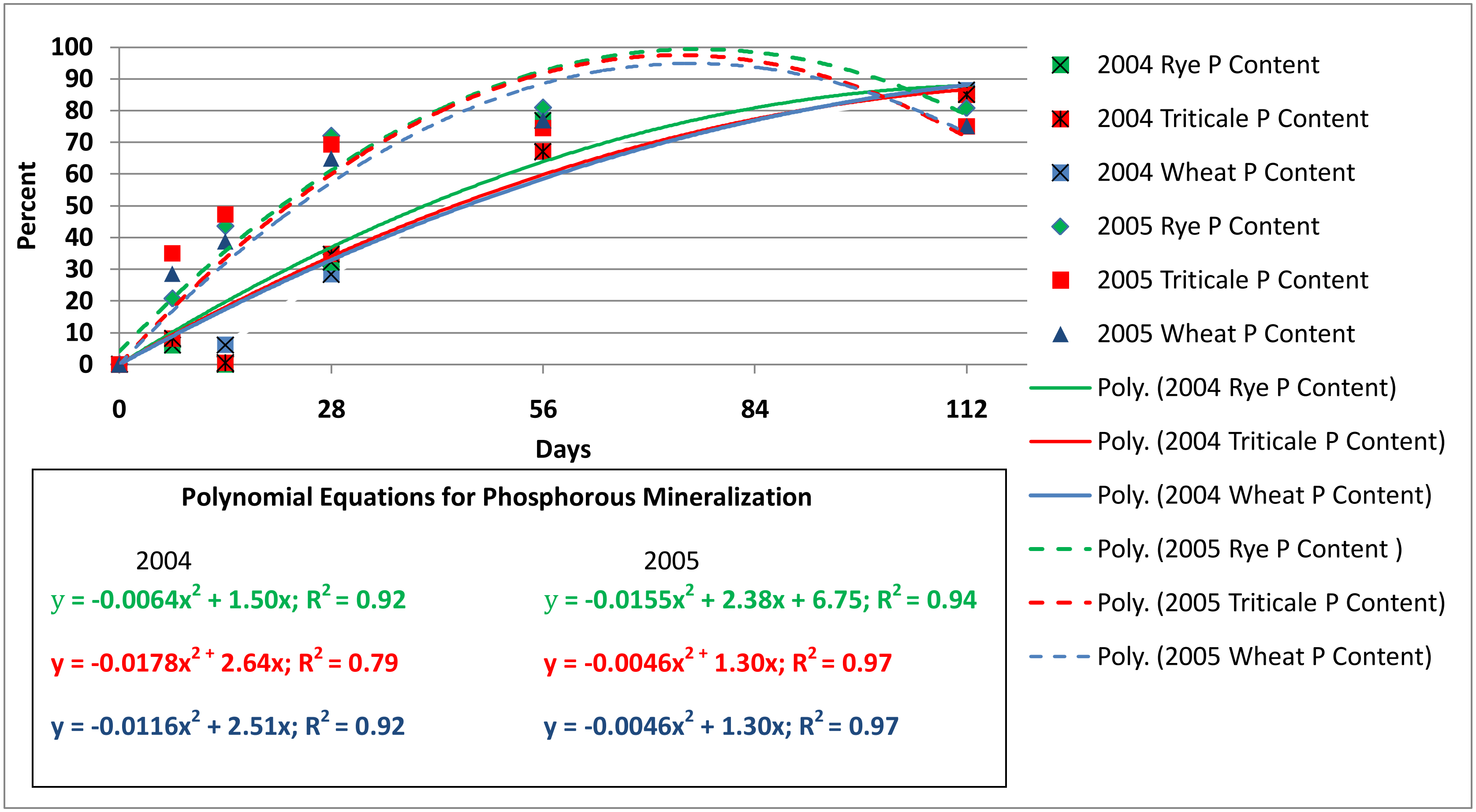


Figure 30. Vanceboro small grain cover residue phosphorous mineralization rate as presented by percent of original phosphorous content based upon phosphorous concentration and oven-dry weights of residue by retrieval dates. (Polynomial equations and R^2 values were calculated by Microsoft Excel™. N= 22.4 kg ha^{-1} of spring applied nitrogen on March 1, 2004 and March 2, 2005. DM = oven dry weights of cover residues)

Cover Residue Nutrient Content and Mineralization Summary

Seasonal variations and differences among small grain cover crops influenced the rate of decomposition of cover residues. While greater decomposition rate were observed in 2004, only small differences existed between small grain cover residue oven-dry weights during the first two weeks of decomposition in both years. Thereafter, triticale exhibited a more persistent cover residue through day 56 of the study. However, by the final day of the study, the dry weights of residue were similar with approximately 20-25% of the original oven-dry weights remaining in 2004 and 35-40% of the triticale, 25-38% of the wheat and 20-30% of the rye remained on day 112 of the study in 2005. Rye exhibited the greatest decomposition rate, triticale the least, and wheat between rye and triticale.

Nitrogen release from small grain cover residues varied according to seasonal influences and C:N ratios but N mineralization generally resulted in rye > wheat > triticale. Approximately 50% or greater N mineralization occurred in the rye and wheat residues by day 56 of the study at both locations. However, only 38% of N mineralized from triticale residues at the Fort Barnwell location in 2004 and 21-31% in Vanceboro for the same date. By the final day of the study, 48-62% of the rye, 41-63% of the wheat and 25-52% of the triticale N mineralized from the cover residues. In part, the slower mineralization rate of triticale is reflected in the higher C:N ratios. Triticale C:N ratios generally ranged above 30 from time of placement through day 14 and frequently 25-30 on day 28 of the study. In contrast, rye and wheat residues initially had C:N ratios at or above 30 but quickly declined below 30 by day 14 of the study.

Phosphorous mineralization rate did not vary greatly by small grain cover type. Rather seasonal variations had a greater influence on P mineralization with greater mineralization occurring in 2005. On day 28 of the study, approximately 44%, 58% and 47% of the residue P mineralized from rye, triticale and wheat, respectively. On the same date in 2005, approximately 73%, 69% and 64% of the residue P mineralized from rye, triticale and wheat, respectively.

Soil Inorganic Nitrogen (NH_4 and NO_3)

Fort Barnwell Soil Inorganic Nitrogen (NH_4 and NO_3)

Preliminary testing using PROC MIXED showed little differences in inorganic soil N. Additional tested using the N-LIN procedure confirmed these results (data not shown). The PROC MIXED procedure provided a better model so the PROC MIXED data is presented.

In 2004 and 2005, soil depth was a significant factor for soil NH_4 N and soil $N0_3$ N levels but not cover type or fertilization treatments (Tables 50 -53). Soil NH_4 N levels were 1.39, 0.784 and 0.451 mg L^{-1}in 2004 and 0.893, 0.911, and 0.919 mg L^{-1} in 2005 for the 0-20, 21-40 and 41-60 cm soil depths, respectively. Soil $N0_3$ N levels were 0.417, 0.349, 0.360 mg L^{-1}in 2004, and 0.214, 0.159 and 0.205 mg L^{-1} in 2005 for the 0-20, 21-40 and 41-60 cm soil depths, respectively. In 2004, soil NH_4 N levels decreased between the 0-20 cm and 21-40 cm depth but not between the 21-40 cm and 41-60 cm depth. Soil NO_3 N levels between the 0-20 cm and 21-40 cm depth are similar but increased sharply between the 21-40 and 41-60 cm depth. In 2005, soil NH_4 N levels decreased with each decrease in soil depth but all NO_3 N levels are similar.

Table 50. 2004 Fort Barnwell soil ammonium model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	107	2.91	0.0587
Fertilization (F)	1	107	0.36	0.5524
Block (B)	3	107	6.32	0.0005*
Depth (D)	2	107	94.8	<.0001*
C*D	4	107	2.53	0.0448*

**Indicates significance at P<0.05.*

Table 51. 2005 Fort Barnwell soil ammonium model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	107	0.120	0.8904
Fertilization (F)	1	107	0.150	0.7024
Block (B)	3	107	3.300	0.0231*
Depth (D)	2	107	127.3	<.0001*
C*D	4	107	0.020	0.9990

**Indicates significance at P<0.05.*

Table 52. 2004 Fort Barnwell soil nitrate model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	107	0.640	0.5287
Fertilization (F)	1	107	0.020	0.8877
Block (B)	2	107	10.53	<.0001*
Depth (D)	3	107	10.46	<.0001*
C*D	4	107	1.750	0.1449

**Indicates significance at P<0.05.*

Table 53. 2005 Fort Barnwell soil nitrate model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	107	1.70	0.1871
Fertilization (F)	1	107	0.00	0.9863
Block (B)	2	107	1.96	0.1465
Depth (D)	3	107	3.63	0.0153*
C*D	4	107	0.63	0.6389

**Indicates significance at P<0.05.*

No soil cover treatment had any effect on soil inorganic N levels at any depth. In 2004, total soil N level to 60 cm depth was 9.2, 9.2 and 8.2 kg ha^{-1} for the no cover treatment, rye and triticale, respectively. In 2005 the total soil N level to 60 cm depth was 7.8, 7.6 and 8.0 kg ha^{-1} for the no cover treatment, rye and triticale, respectively. Most of the soil N was found within the upper 20 cm of soil with 4.5, 4.3 and 3.4 kg ha^{-1} for the no cover treatment, rye and triticale, respectively, in 2004, and 3.7, 3.4 and 3.6 kg ha^{-1} for the no cover treatment, rye and triticale, respectively, in 2005. The lower level of soil NO_3 N in 2005 of each soil depth is likely the result of leaching and dentrification losses due to excessive rainfall and saturated soil rather than treatment effects.

Vanceboro Inorganic Soil Nitrogen (NH_4 and NO_3)

In 2004 cover type and soil depth were significant factors in soil NH_4 N but in 2005 soil NH_4 N only varied significantly by depth (Tables 54 and 55). In 2004, the mean soil NH_4 N level of rye (0.944 mg L^{-1}) is similar to triticale (1.01 mg L^{-1}) but lower than the no cover treatment (1.07 mg L^{-1}). The soil levels of NH_4 N in 2005 are similar with a mean of 0.996, 1.02 and 0.973 mg L^{-1}. In both years, soil NH_4 N levels sharply decreased between each soil depth with a mean of 1.74, 0.797, 0.490 mg L^{-1} for the 0-20 cm, 21-40 cm and 41-60 cm depths, respectively, in 2004 and a mean of 1.55, 0.827 and 0.616 mg L^{-1} for the 0-20 cm, 21-40 cm and 41-60 cm depths, respectively, in 2005.

Table 54. 2004 Vanceboro soil ammonium model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	107	3.860	0.0241*
Fertilization (F)	1	107	1.830	0.1787
Block (B)	3	107	1.450	0.2325
Depth (D)	2	107	409.2	<.0001*
C*D	4	107	0.770	0.5450

**Indicates significance at P<0.05.*

Table 55. 2005 Vanceboro soil ammonium model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	107	0.860	0.4245
Fertilization (F)	1	107	0.220	0.6426
Block (B)	3	107	2.750	0.0461
Depth (D)	2	107	249.3	<.0001*
C*D	4	107	0.460	0.7619

**Indicates significance at P<0.05.*

Significant influences of soil NO_3 N were cover type and depth in 2004 but in 2005 the interaction terms were significant effects (Tables 56 and 57).

Table 56. 2004 Vanceboro soil nitrate model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	107	11.62	<.0001*
Depth (D)	2	107	79.03	<.0001*
Fertilization (F)	1	107	3.730	0.0561
Block (B)	3	107	25.90	<.0001*
C*D	4	107	1.650	0.1679

**Indicates significance at P<0.05.*

Table 57. 2005 Vanceboro soil nitrate model effects

Type 3 Tests of Fixed Effects				
Effect	**Num DF**	**Den DF**	**F Value**	**Pr > F**
Cover (C)	2	107	3.370	0.0379*
Depth (D)	2	107	138.7	<.0001*
Fertilization (F)	1	107	1.540	0.2177
Block (B)	3	107	2.450	0.0674
C*D	4	107	3.520	0.0097*

**Indicates significance at P<0.05.*

In 2004 the soil NO_3 N level for the no cover treatments (0.918 mg L^{-1}) is much higher than rye (0.559 mg L^{-1}) and triticale (0.578 mg L^{-1}). Soil NO_3 levels increased sharply with depth with means of 0.259, 0.604 and 1.19 mg L^{-1} at the 0-20, 21-40 and 41-60 cm depths, respectively. In 2005, the soil NO_3 N significantly increased with depth for all cover treatments with no significant differences between treatments between 0-40 cm. At the 41-60 cm depth, rye is significantly greater than triticale and the no cover treatment. The no cover treatment and triticale are not significantly different (Table 58).

Table 58. 2005 Vanceboro soil nitrate levels (mg L^{-1}) for cover treatments from 0-20, 21-40 and 41-60 cm depth soil cores taken October 2005.

Cover	Soil Depth (cm)		
	0-20	**21-40**	**41-60**
NC	0.147^{a*}	0.355^{b*}	0.856^{c*}
Rye	0.162^{a*}	0.356^{b*}	$1.160^{c\ddagger}$
Triticale	0.200^{a*}	0.326^{b*}	$0.856^{c*`}$

(Means are statistically different at P<.05. Means with different letters indicate significant difference within each cover crop type between soil depths. Means with different symbols indicate significant differences among small grin cover crops within each depth).

Soil Inorganic Nitrogen (NH_4 and NO_3) Summary

Rye and triticale reduced NH_4 and NO_3 N levels the first year of the study but no cover treatment influenced soil N levels the second year. Soil NH_4 N decreased with soil depth and NO_3 N increased with depth. In 2004, total soil N level to 60 cm depth was 14.1, 10.6 and 11.3 kg ha^{-1} for the no cover treatment, rye and triticale, respectively. In 2005 the total soil N level to 60 cm depth was 10.3, 11.2 and 10.1 kg ha^{-1} for the no cover treatment, rye and triticale, respectively. Most of the soil N was found within the upper 20 cm of soil with 5.2, 4.3 and 4.7 kg ha^{-1} for the no cover treatment, rye and triticale, respectively, in 2004, and 3.9, 4.1 and 4.2 kg ha^{-1} for the no cover treatment, rye and triticale, respectively, in 2005. Lower values of soil N in 2005 are equal among all treatments suggesting that excessive rainfall, denitrification or leaching losses caused the lower values compared to 2004 rather than any treatment effect.

Cotton Petiole Nitrogen and Leaf Nutrient Concentrations

Fort Barnwell Early Bloom Cotton Petiole Nitrogen Concentrations

In 2004 and 2005, cover type was the only significant factor in early season cotton petiole N contents (Tables 59 and 60). Analysis shows that in 2004 cotton leaf petiole N from plots with no cover (7818 ppm) and rye (6748 ppm) are higher than those of triticale (5446 ppm) and wheat (5448 ppm). In 2005, the cotton leaf petiole N without a cover crop (7388 ppm), triticale (6866 ppm) and wheat (6767 ppm) are similar but greater than that of rye (6217 ppm). All cover crop residues slightly decreased cotton petiole N compared to the cotton petiole N with no cover suggesting that some degree of N immobilization may have occurred. However, all values are above the 1000-7000 ppm recommended range (Campbell, 2000).

Table 59. 2004 Fort Barnwell early bloom cotton petiole nitrogen model effect.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	60	3.00	0.0375*
Block (B)	3	60	2.81	0.0468*
Fertilization (F)	1	60	2.50	0.1188
C*B	9	60	1.86	0.0757
C*F	3	60	1.17	0.3292

**Indicates significance at P<0.05.*

Table 60. 2005 Fort Barnwell early bloom cotton petiole nitrogen model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	60	3.19	0.0300*
Block (B)	3	60	3.17	0.0305*
Fertilization (F)	1	60	1.26	0.2662
C*B	3	60	1.76	0.1641
C*F	9	60	0.98	0.4623

**Indicates significance at P<0.05.*

Fort Barnwell Early Bloom Cotton Leaf Nitrogen Concentrations

In 2004, fertilization was a significant influence of early season cotton leaf N concentration but in 2005, cover crop type and fertilization interactions were significant influences (Tables 61 and 62).

Table 61. 2004 Fort Barnwell early bloom cotton leaf nitrogen model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	60	1.56	0.2086
Block (B)	3	60	10.7	<.0001*
Fertilization (F)	1	60	4.34	0.0415*
C*F	3	60	0.99	0.4043
C*B	9	60	2.61	0.0129*

**Indicates significance at P<0.05.*

Table 62. 2005 Fort Barnwell early bloom cotton leaf nitrogen model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	60	0.49	0.6905
Block (B)	3	60	1.06	0.3745
Fertilization (F)	1	60	0.04	0.8416
C*F	3	60	3.16	0.0309*
C*B	9	60	1.83	0.0806

**Indicates significance at P<0.05.*

In 2004 cotton leaf N concentration without spring applied N (46825 ppm) was 4% higher than cotton leaf N concentration with spring applied N (44784 ppm). In 2005, cotton leaf N concentration following triticale without spring applied N (48197 ppm) is significantly higher than that of triticale with spring applied N (45378 ppm). There were no other statistical differences among other treatment comparisons (Table 63). While this data suggests potential N immobilization from residue mineralization, N was not limiting. All values are above the recommended sufficiency range of 3.5-4.0% (Campbell, 2000).

Table 63. 2005 Fort Barnwell early bloom cotton leaf nitrogen concentration response to nitrogen fertilization applied March 3, as determined from the most recently mature, fully expanded leaf samples taken July 10.

Cover Type	**Nitrogen Fertilization**	
	None	**22.4 kg ha^{-1}**
No Cover	46099[ab]	47957[ab]
Rye	46252[ab]	46267[ab]
Triticale	48197[a]	45378[b]
Wheat	46764[ab]	47243[ab]

(Means with different letters are statistically different at P<0.05).

Fort Barnwell Early Bloom Cotton Leaf Phosphorous Concentrations

In 2004, neither cover type nor fertilization was significant effects for early season cotton leaf concentration but in 2005, cover and fertilization interactions were significant effects (Tables 64 and 65).

Table 64. 2004 Fort Barnwell early bloom cotton leaf phosphorous concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	69	0.18	0.9069
Block (B)	3	69	4.38	0.0070*
Fertilization (F)	1	69	1.21	0.2752
C*F	3	69	0.09	0.9634

**Indicates significance at P<0.05.*

Table 65. 2005 Fort Barnwell early bloom cotton leaf phosphorous concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	69	2.44	0.0713
Block (B)	3	69	6.65	0.0005*
Fertilization (F)	1	69	0.84	0.3619
C*F	3	69	4.42	0.0067*

**Indicates significance at P<0.05.*

In 2004, the mean cotton leaf P concentration ranged from 5548-5676 ppm. In 2005, the mean early season cotton leaf P concentration following rye cover crops (3719 ppm) was statistically greater than those following soil cover from wheat (3400 ppm), rye with spring applied N (3557 ppm), no cover (3290 ppm) and triticale with spring applied N (3282 ppm). There was no statistical difference between any other treatments (Table 66). These data suggests that the type of cover treatment does not influence cotton leaf P concentrations. Rather, increases are more likely the response of added growth of cotton plants due to the nitrogen. Regardless, all values are well above the minimum recommended P leaf concentration sufficiency level of 3.0 % (Campbell, 2000).

Table 66. 2005 Vanceboro early bloom cotton leaf phosphorous concentration response to nitrogen fertilization applied March 3, as determined from the most recently mature, fully expanded leaf samples taken on July 10.

Cover Type	**Nitrogen Fertilization**	
	None	**22.4 kg ha^{-1}**
No Cover	3290^{b}	3557^{ab}
Rye	3719^{a}	3384^{b}
Triticale	3467^{ab}	3282^{b}
Wheat	3400^{b}	3436^{ab}

(Means with different letters are statistically different at P<0.05).

Fort Barnwell Late Season Cotton Petiole Nitrogen Concentrations

In 2004 and 2005, neither cover type nor fertilization treatments were significant effects of cotton petiole N concentrations (Tables 67and 68). In 2004 mean cotton petiole N concentrations for soil cover treatments ranged from 126-162 ppm and in 2005 from 480-556 ppm. All values are well below the recommended minimum of 1000 ppm but leaf N contents are well above sufficiently levels suggesting that these low cotton petiole N values were the result of temporary demand of the high number of maturing bolls.

Table 67. 2004 Fort Barnwell late season cotton petiole nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	0.49	0.6931
Block (B)	3	60	2.53	0.0655*
Fertilization (F)	1	60	1.84	0.1801
C*F	3	60	1.16	0.3341
C*B	9	60	1.59	0.1395

**Indicates significance at P<0.05.*

Table 68. 2005 Fort Barnwell late season cotton petiole nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	0.99	0.4035
Block (B)	3	60	4.67	0.0053
Fertilization (F)	1	60	1.69	0.1989
C*F	3	60	0.70	0.5561
C*B	9	60	2.96	0.0056

**Indicates significance at P<0.05.*

Fort Barnwell Late Season Cotton Leaf Nitrogen Concentrations

In 2004 and 2005, neither cover type or fertilization treatments were significant effects in late season cotton leaf N concentration (Tables 69 and 70). In 2004, only small differences existed among treatments with mean cotton petiole N for no cover, rye, triticale, and wheat of 35462, 34287, 33802 and 32805 ppm respectively. Likewise in 2005, differences were small with mean cotton petiole N for no cover, rye, triticale, and wheat of 34752, 33683, 32631, and 33870, respectively. All values are above the recommended minimum of 3.0% suggesting that cotton N uptake was not limiting.

Table 69. 2004 Fort Barnwell late season cotton leaf nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	69	1.110	0.3494
Block (B)	3	69	23.21	<.0001*
Fertilization (F)	1	69	0.330	0.5695
C*F	3	69	0.870	0.4632

**Indicates significance at P<0.05.*

Table 70. 2005 Fort Barnwell late season cotton leaf nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	69	1.110	0.3494
Block (B)	3	69	23.21	<.0001*
Fertilization (F)	1	69	0.330	0.5695
C*F	3	69	0.870	0.4632

**Indicates significance at P<0.05.*

Fort Barnwell Late Season Cotton Leaf Phosphorous Concentrations

In 2004 and 2005 only fertilizer treatments were significant in late season cotton leaf P concentrations (Tables 71 and 72). In both years the application of spring applied N increased cotton leaf P concentrations. The application of spring applied N increased mean cotton P leaf concentration from 2818 ppm to 2887 ppm in 2004 and from 2818 ppm to 2971 ppm in 2005. The lack of significance of cover treatments in statistical models support previous statements suggesting that cotton leaf P concentrations are more influenced by the application of N rather than soil cover treatment. All cotton leaf P concentrations are within acceptable range of 0.15-0.6% (Campbell, 2000).

Table 71. 2004 Fort Barnwell late season cotton leaf phosphorous concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	69	1.68	0.1787
Block (B)	3	69	7.36	0.0002*
Fertilization (F)	1	69	8.42	0.0050*
C*F	3	69	0.05	0.9861

**Indicates significance at P<0.05.*

Table 72. 2005 Fort Barnwell late season cotton leaf phosphorous concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	69	0.54	0.6555
Block (B)	3	69	3.61	0.0174*
Fertilization (F)	1	69	4.97	0.0290*
C*F	3	69	0.11	0.9551

**Indicates significance at P<0.05.*

Fort Barnwell Cotton Petiole Nitrogen and Leaf Nutrient Concentration Summary

In 2004, soil cover treatments and fertilization treatments were significant factors of early season cotton petiole N and cotton leaf N concentrations. The mineralization rate of cover residues was greater in 2004 than in 2005. In contrast, in 2005, no cover treatments were significant effects of the cotton petiole N and cotton leaf N concentrations. Additionally, as previously shown, mineralization of cover residues was slower. This suggests that seasonal climatic factors have a greater influence on cotton N uptake and translocation than these late planted small grain cover crops. Small differences in N concentration levels did occur in 2004. It is likely that the greater mineralization rate of cover residues led to lower cotton petiole N concentrations for small grain cover crops (11503-12308 ppm) than the no cover treatment (14128 ppm) due to N immobilization. However, all values of early season cotton petiole and cotton leaf N concentrations are above the desired sufficiency range and N release patterns from the cover crops had no effect on N uptake or cotton growth.

By late season, cotton petiole N concentrations were lower than the desired range in both years. The potential cotton yield at the time of sampling was above normal in both years and it is assumed that these low values simply reflect the temporary increased demand of N by the maturing cotton bolls. All cotton leaf N concentration values were above the desired range of 3.0-4.5%.

Differences in cotton leaf P concentrations resulted from fertilization treatments rather than soil cover treatments. As previously shown, the application of spring N resulted in additional N in the soil system. Cotton utilized this added N for additional growth and subsequently, greater cotton leaf P concentrations. All cotton leaf P concentrations were well above the desired range.

Vanceboro Early Bloom Cotton Petiole Nitrogen Concentrations

In 2004, cover type and fertilization treatments were significant factors in early season cotton petiole N concentrations at Vanceboro but not in 2005 (Tables 73 and 74). In 2004 the mean cotton petiole N concentration for plots with no cover crop (14128 ppm) was greater than that of rye, triticale and wheat of 12141, 12308 and 11503 ppm, respectively. This suggests that cover crop mineralization led to slight N immobilization. However, all values are well in excess of the recommended maximum of 7000 ppm. The mean petiole N concentration of plots with spring applied N (11690 ppm) is lower than plots without spring applied N (13355 ppm). In 2005, differences in mean cotton petiole N concentrations between cover treatments were small (5166, 5207, 5479 and 5209 ppm for treatments of no cover, rye, triticale and wheat, respectively).

Table 73. 2004 Vanceboro early bloom cotton petiole nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	3.250	0.0278*
Block (B)	3	60	0.310	0.8194
Fertilization (F)	1	60	10.29	0.0021*
C*F	3	60	1.180	0.3258
C*B	9	60	2.440	0.0192*

**Indicates significance at P<0.05.*

Table 74. 2005 Vanceboro early bloom cotton petiole nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	1.49	0.2261
Block (B)	3	60	5.28	0.0027*
Fertilization (F)	1	60	0.14	0.7118
C*F	3	60	0.67	0.5760
C*B	9	60	1.28	0.2644

**Indicates significance at P<0.05.*

Vanceboro Early Bloom Cotton Leaf Nitrogen Concentrations

In 2004, fertilization, cover type and interaction terms of these main effects were significant factors of early season cotton leaf N concentrations but in 2005, neither cover, fertilization or interaction terms were significant (Tables 75 and 76). In 2004, cotton leaf N concentrations for cover treatments without spring applied N ranged from 49573 -52782 ppm, well above the recommended range of 3.5-4%. Among cover treatments with spring applied N, rye (48478 ppm) and triticale (47701 ppm) are lower than the no cover treatment (51818 ppm) and wheat (50198 ppm) suggesting that the mineralization of the greater biomass produced from rye and triticale may have resulted in N immobilization. Even so, this did not limit cotton N uptake, most likely due to the banding and split application of N fertilizer. In 2005, there was no significant difference in the mean cotton leaf N concentration (no cover, rye, triticale, and wheat of 45238, 45644, 46173 and 45514 ppm, respectively). All treatment cotton leaf N concentrations are above the recommended minimum range of 3.0%.

Table 75. 2004 Vanceboro early bloom cotton leaf nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	1.24	0.3041
Block (B)	3	60	10.4	<.0001*
Fertilization (F)	1	60	4.53	0.0375*
C*F	3	60	4.01	0.0114*
C*B	9	60	1.40	0.2103

**Indicates significance at P<0.05.*

Table 76. 2005 Vanceboro early bloom cotton leaf nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	0.58	0.6320
Block (B)	3	60	2.47	0.0703
Fertilization (F)	1	60	1.06	0.3065
C*F	3	60	0.30	0.8265
C*B	9	60	1.50	0.1704

**Indicates significance at P<0.05.*

Vanceboro Early Bloom Cotton Leaf Phosphorous Concentrations

In 2004 and 2005, there were no significant differences in early season cotton leaf P concentrations (Tables 77 and 78). In 2004, mean cotton leaf P for cover treatments ranged from 5112-5301 ppm and in 2005 from 4261-4424 ppm. All early season cotton P concentrations are above recommended range of 800 ppm.

Table 77. 2004 Vanceboro early bloom cotton leaf phosphorous concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	0.49	0.6874
Block (B)	3	60	3.90	0.0131*
Fertilization (F)	1	60	0.51	0.4775
C*F	3	60	2.09	0.1108
C*B	9	60	0.29	0.9761

**Indicates significance at P<0.05.*

Table 78. 2005 Vanceboro early bloom cotton leaf phosphorous concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	1.11	0.3515
Block (B)	3	60	1.56	0.2081
Fertilization (F)	1	60	0.64	0.4272
C*F	3	60	0.71	0.5478
C*B	9	60	2.80	0.0082*

**Indicates significance at P<0.05.*

Vanceboro Late Season Cotton Petiole Nitrogen Concentrations

In 2004 cover was a significant factor in late season cotton petiole N concentrations but not in 2005 (Tables 79 and 80). In 2004, the mean cotton petiole N concentration of the no cover treatment (526 ppm) is greater than rye (200 ppm), triticale (245 ppm) and wheat (240 ppm). In 2005, late season cotton petiole N concentrations ranged from 224-271 ppm. All values are well below the recommended minimum of 1000 ppm but leaf N contents are well above sufficiency levels suggesting that these low cotton petiole N values were the result of temporary demand of the high number of maturing bolls.

Table 79. 2004 Vanceboro late season cotton petiole nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	60	17.02	<.0001*
Block (B)	3	60	20.41	<.0001*
Fertilization (F)	1	60	0.030	0.8733
C*F	3	60	0.510	0.6772
C*B	9	60	4.420	0.0002*

**Indicates significance at P<0.05.*

Table 80. 2005 Vanceboro late season cotton petiole nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	60	2.71	0.0529
Block (B)	3	60	15.83	<.0001*
Fertilization (F)	1	60	0.21	0.6508
C*F	3	60	1.37	0.2599
C*B	9	60	1.33	0.2417

**Indicates significance at P<0.05.*

Vanceboro Late Season Cotton Leaf Nitrogen Concentrations

In 2004, cover type was a significant influence of late season cotton leaf N concentrations but in 2005 there were no significant factors (Tables 81 and 82). In 2004, mean late season cotton leaf N concentration for treatments with no cover (38987 ppm) were greater than the cover crop treatments of rye (32985 ppm), triticale (33766 ppm) and wheat (34616 ppm) suggesting that cover crops slightly limited cotton N uptake through N immobilization. In 2005, mean cotton leaf N concentrations ranged from 34868-36278 ppm. All values of cotton leaf N concentrations are within the recommended range of 3.0-4.5% in both years.

Table 81. 2004 Vanceboro late season cotton leaf nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	25.06	<.0001*
Block (B)	3	60	7.220	0.0003*
Fertilization (F)	1	60	1.260	0.2667
C*F	3	60	1.210	0.3123
C*B	9	60	5.790	<.0001*

**Indicates significance at P<0.05.*

Table 82. 2005 Vanceboro late season cotton leaf nitrogen concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	0.290	0.8345
Block (B)	3	60	15.98	<.0001*
Fertilization (F)	1	60	7.670	0.0075*
C*F	3	60	0.250	0.8602
C*B	9	60	1.260	0.2771

**Indicates significance at P<0.05.*

Vanceboro Late Season Cotton Leaf Phosphorous Concentrations

In 2004 fertilization treatments but not soil cover type significantly affected late season cotton leaf P concentrations but in 2005 neither soil cover type nor fertilization treatments were significant effects for cotton leaf P concentrations (Tables 83 and 84). In 2004, the mean cotton leaf P concentration of treatments with spring applied N (2912 ppm) is higher than treatments without spring applied N (2696 ppm). Greater cotton leaf P concentrations in 2005 (4248-4713 ppm) were more likely the result of seasonal influences. All cotton leaf P concentrations are well above the recommended minimum range of 800 ppm.

Table 83. 2004 Vanceboro late season cotton phosphorous concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	1.69	0.1779
Block (B)	3	60	6.89	0.0005*
Fertilization (F)	1	60	6.38	0.0142*
C*F	3	60	0.29	0.8329
C*B	9	60	2.39	0.0218*

**Indicates significance at P<0.05.*

Table 84. 2005 Vanceboro late season cotton phosphorous concentration model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C))	3	60	2.26	0.0902
Block (B)	3	60	1.81	0.1546
Fertilization (F)	1	60	1.35	0.2493
C*F	3	60	0.97	0.4114
C*B	9	60	5.42	<.0001*

**Indicates significance at P<0.05.*

Vanceboro Cotton Petiole Nitrogen and Cotton Leaf Nutrient Concentration Summary

As in Fort Barnwell, in 2004, soil cover treatments and fertilization treatments were significant factors for cotton petiole N and cotton leaf N concentrations but no treatment was significant in 2005. This suggests that seasonal climatic variations had a greater effect on cotton N uptake and translocation than cover treatments. As previously shown, the more rapid mineralization of small grain cover crop residues in 2004 may have resulted in N immobilization. This is supported by the lower range of cotton petiole N concentrations for treatments with small grain cover crops (11503-12308 ppm) than the cotton petiole N concentration for the no cover treatment (14128 ppm). This trend is not evident in 2005 with cotton petiole N concentrations ranging from 5166-5479 ppm. Even with seasonal variability, no cotton leaf N concentrations or cotton petiole N concentrations were below the desirable range for early season cotton N uptake. Furthermore, the cotton leaf N concentrations in both years were well above the maximum recommended range implying excessive cotton N uptake.

By late season, cotton petiole N concentrations were lower than the desired range in both years. Consistent differences due to soil cover treatments are not evident. It is assumed these low cotton petiole N values were the result of temporary demand of the high number of maturing bolls. This is supported by the fact that all cotton leaf N concentration were above the 3.0-4.5% recommended range.

Cotton P uptake was not affected by soil cover treatment in either year of the study with a range of 5112-5301 ppm in 2004 and 4261-4424 ppm in 2005 for early season cotton leaf P concentration. Likewise only small difference occurred in late season cotton leaf P concentrations with a range of 2589-2884 ppm in 2004 and 4248-4773 ppm in 2005. As with N, these values are in excess of the minimum 800 ppm range suggesting luxury consumption. Spring applied N was a significant factor for late season cotton leaf P concentration in 2004 but not in 2005. However, the difference between cotton leaf P concentrations of treatment with spring applied N (2912 ppm) and that without spring applied N (2696 ppm) is small.

Cotton Petiole Nitrogen and Cotton Leaf Nutrient Summary

The type of soil cover treatment had little effect on cotton N or P uptake. The greatest difference existed at the Fort Barnwell location in 2004 with early season cotton leaf N concentration of rye (48478 ppm) and triticale (47701 ppm) less than that of the no cover treatment (51818 ppm). Corresponding cotton petiole N concentrations for the no cover treatment, rye and triticale cover crops of 14128, 12141 and 12308 ppm, respectively, shows lower N concentrations for cover crop treatments. However, since all values exceed the desirable range for N concentrations, prior cover crops do not seem to affect early season cotton leaf N concentrations. This is most likely due to banding and split application of N fertilizer which increases cotton N uptake and prevents potential leaching losses.

Late season cotton petiole N and cotton leaf N concentrations were lower than the desired range at both sites. However, as mentioned earlier, this is more likely a temporary low value due to increased N demand of maturing cotton bolls. Corresponding cotton leaf N concentrations are above the minimum 3.0% range.

Cotton leaf P concentrations were not influenced by the type of soil cover treatment and all cotton leaf P concentration values were well above the desired range. However, nitrogen fertilization influenced cotton leaf P concentrations. At the Fort Barnwell location, the mean early season cotton leaf P concentration (combining cover crop and seeding rates) without spring applied N increased 4% from 5525 ppm to 5720 ppm in 2004 and 2% from 3469 ppm to 3415 ppm in 2005. At the Vanceboro location the mean early season cotton leaf P concentration (combining cover crop and seeding rates) without spring applied N increased 2% from 4272 ppm to 5269 ppm in 2004 and by 2% from 4272ppm to 4341 ppm in 2005.

Late season cotton leaf P concentration differences were only slightly greater. At the Fort Barnwell location, the mean late season cotton leaf P concentration (combining cover crop and seeding rates) without spring applied N increased 15% from 2512 ppm to 2887 ppm in 2004 and 10% from 2677 ppm to 2971 ppm in 2005. At the Vanceboro location the mean early season cotton leaf P concentration increased 8% from 2696 ppm to 2912 ppm in 2004 and 4% from 4457 ppm to 4631 ppm in 2005.

Cotton Plant Density, Lint Yield and Lint Quality

Cotton Plant Density

Cotton plant density was higher at Vanceboro with a range of 8-12 plants m^{-1} and a mean of 10 plants m^{-1} compared to a range of 6-7 plants m^{-1} and a mean of 6 plants m^{-1} at Fort Barnwell. The lower cotton population for strip-tillage production of this study differs from reports of greater populations due to tillage as reported by Rickerl et al. (1988), but is similar to the work of Schwab et al. (2002) showing variability in cotton populations associated with tillage is more dependent upon accumulation of heat units and soil moisture at planting rather than tillage. It is likely that strip tillage, while removing modest amounts of cover, also depleted limited soil moisture that reduced cotton seedling emergence compared to the no-till. Even with differing populations, both locations provided acceptable cotton populations to produce adequate yields.

Cotton Lint Yield

At the Fort Barnwell location, neither soil cover nor fertilization treatments significantly affected cotton lint yield (Tables 85 and 86). Cotton lint yields were similar in both years with a range from 1270 kg ha^{-1} to 1509 kg ha^{-1} in 2004 and from 1118 kg ha^{-1} to 1308 kg ha^{-1} in 2005 (Table 87).

Table 85. 2004 Fort Barnwell cotton lint yield model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	48	1.68	0.1829
Fertilization (F)	1	48	3.67	0.0612
C*Block (B)	12	48	4.61	<.0001*
C*Seeding Rate (S)	6	48	1.16	0.3411
C*F	3	48	0.28	0.8401
C*S*F	6	48	2.06	0.0759

**Indicates significance at P<0.05.*

Table 86. 2005 Fort Barnwell cotton lint yield model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	48	1.92	0.1391
Fertilization (F)	1	48	0.30	0.5883
C*Block (B)	12	48	2.03	0.0413*
C*Seeding Rate (S)	6	48	0.59	0.7402
C*F	3	48	0.54	0.6556
C*S*F	6	48	0.22	0.9672

**Indicates significance at P<0.05.*

Table 87. Fort Barnwell mean cotton lint yields of soil cover treatments (combined seeding rates) and fertilization of nitrogen at 22.4 kg ha^{-1} applied on February 28, 2004 and March 2 & 3, 2005, as determined by assuming 0.43% lint from hand harvested field weights from 4.5 m of two adjacent rows on October 12-13, 2004, and October 18-21, 2005.

	Cotton Lint Yield (kg ha^{-1})	
Soil Cover	**2004**	**2005**
No Cover	1503	1308
No Cover + Spring Nitrogen	1428	1176
Rye	1509	1232
Rye + Spring Nitrogen	1333	1296
Triticale	1331	1140
Triticale + Spring Nitrogen	1270	1118
Wheat	1496	1274
Wheat + Spring Nitrogen	1380	1220

At Vanceboro In 2004, cover type and fertilization were significant factors in cotton lint yields but in 2005 only fertilization had a significant effect (Tables 88 and 89). In 2004, the mean cotton lint yield with no cover crop (1161 kg ha^{-1}) is less than the cotton yields following rye (1360 kg ha^{-1}), triticale (1414 kg ha^{-1}) and wheat (1373 kg ha^{-1}). This represents 17-22% increase of in cotton lint yield following cover crops (Table 90). The mean cotton yield without spring applied N (1281 kg ha^{-1}) is 7% less than with spring applied N (1373 kg ha^{-1}). In 2005, the mean cotton lint yield of cover treatments without spring N (1479 kg ha^{-1}) is 9% less than the mean cotton lint yield with spring applied N (1608 kg ha^{-1}). These data suggests that increases in cotton lint yield resulting from benefits of these small grain cover crops are small and variable.

Table 88. 2004 Vanceboro cotton lint yields model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	63	5.190	0.0029*
Fertilization (F)	1	63	5.370	0.0238*
Block (B)	3	63	11.56	<.0001*
C*Seeding Rate	6	63	0.700	0.6258
C*F	3	63	0.480	0.6978

**Indicates significance at P<0.05.*

Table 89. 2005 Vanceboro cotton lint yields model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	63	0.72	0.5414
Block (B)	3	63	5.60	0.0018*
Fertilization (F)	1	63	5.71	0.0198*
C*Seeding Rate	6	63	0.93	0.4820
C*F	3	63	0.93	0.4309

**Indicates significance at P<0.05.*

Table 90 Vanceboro mean cotton lint yields of soil cover treatments (combined seeding rates) and fertilization of nitrogen at 22.4 kg ha^{-1} applied on February 28, 2004 and March 2, 2005, as determined by assuming 0.43% lint from hand harvested field weights from 4.5 m of two adjacent rows on October 12-13, 2004, and October 18-21, 2005.

Soil Cover	Cotton Lint Yield (kg ha^{-1})	
	2004	**2005**
No Cover	1137	1425
No Cover + Spring Nitrogen	1184	1729
Rye	1283	1504
Rye + Spring Nitrogen	1437	1607
Triticale	1359	1427
Triticale + Spring Nitrogen	1470	1558
Wheat	1346	1516
Wheat + Spring Nitrogen	1400	1543

Seasonal variation and soil difference resulted in greater cotton yield differences than cover or fertilization treatments. In 2004, frequent rainfall from May through early July, benefited cotton at the Fort Barnwell location due to better water drainage than at the Vanceboro location. Conversely, May through early July of 2005 had less frequent rainfall. Consequently, yields were higher in Vanceboro in 2005, most likely due to the greater water holding capacity of the finer textured soils at this location.

Evidence of treatment effects is small. Cotton yields for treatments with spring applied N are slightly lower than those without spring applied N at Fort Barnwell in 2004 and generally so in 2005. It is possible that the additional N rates resulted in greater vegetation growth which may have contributed to increased moisture stress during short periods of low soil moisture. The highest cotton yields were obtained with no cover crop in both years at the Fort Barnwell location. However, at the Vanceboro location, the highest cotton yields followed triticale with spring applied N in 2004 and no cover with spring applied N in 2005. Collectively, data suggests that differences in cotton yields due to cover treatments are small and extremely variable.

Cotton Lint Quality

Three lint qualities were evaluated in this study: cotton gin turnout (percent lint), cotton staple length (UHM) and Micronaire (mic).   Only one year of data was gathered due to the extreme degradation of cotton lint in 2005 due to Hurricane Ophelia and lingering rainfall.

Gin Turnout (Percent Lint)

At both sites neither soil cover type or fertilization treatments were significant factors of cotton gin turnout (Tables 91 and 92) ranging from 37-38% at Fort Barnwell and 40% at Vanceboro.

Table 91. 2004 Fort Barnwell cotton lint gin turnout model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	69	1.31	0.2793
Fertilization (F)	1	69	0.58	0.4477
C*F	3	69	0.69	0.5587
Block (B)	3	69	3.29	0.0258*

***Indicates significance at P<0.05.**

Table 92. 2004 Vanceboro cotton lint gin turnout model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	70	1.07	0.3657
Fertilization (F)	1	70	1.48	0.2272
C*F	3	70	0.52	0.6684
Block (B)	3	70	3.99	0.0110*

**Indicates significance at P<0.05.*

Staple Length

Neither soil cover type or fertilization treatments were significant effects of cotton staple length at either location (Tables 93 and 94). Cotton staple length was around 2.87 cm at the Fort Barnwell location and 2.90 cm at the Vanceboro location.

Table 93. 2004 Fort Barnwell cotton lint staple length model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	68	0.52	0.6671
Block (B)	3	68	3.23	0.0275*
Fertilization (F)	1	68	2.74	0.1023
C*F	3	68	0.49	0.6896

**Indicates significance at P<0.05.*

Table 94. 2004 Vanceboro cotton lint staple length model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	70	0.72	0.5446
Block (B)	3	70	3.87	0.0128*
Fertilization (F)	1	70	0.13	0.7246
C*F	3	70	1.18	0.3230

**Indicates significance at P<0.05.*

Micronaire

Neither soil cover treatment nor fertilization treatments were significant factors of cotton micronaire at either location (Tables 95 and 96). At the Fort Barnwell location, micronaire for all treatments was 4.9 and around 4.7 at the Vanceboro location.

Table 95. 2004 Fort Barnwell cotton lint micronaire model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	68	0.390	0.7579
Block (B)	3	68	14.99	<.0001*
Fertilization (F)	1	68	1.840	0.1792
C*F	3	68	0.720	0.5406

**Indicates significance at P<0.05.*

Table 96. 2004 Vanceboro cotton lint micronaire model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	3	70	1.99	0.1233
Block (B)	3	70	10.7	<.0001*
Fertilization (F)	1	70	0.03	0.8578
C*F	3	70	1.77	0.1602

**Indicates significance at P<0.05.*

Soil Bulk Density

The type of cover did not significantly affect soil bulk density at either location as there were no statistical difference at either location with the soil bulk densities at 0-7.5 cm depth for all soil cover treatments of 1.7 g cm^{-3} and 1.8 g cm^{-3} at the 7.5-15.0 cm depth. All bulk density values are above root restricting levels.

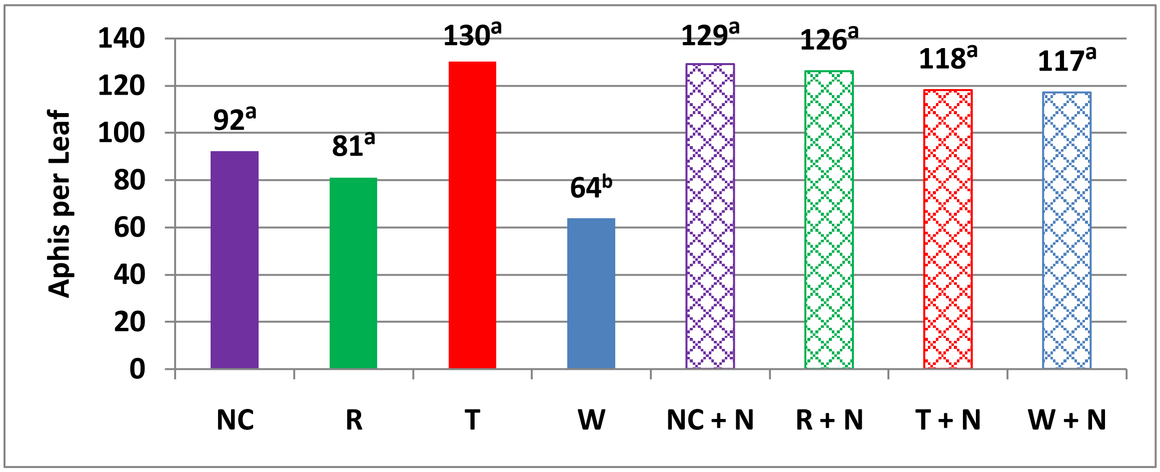
Cotton Insect Management

At the Fort Barnwell location, the type of cover crop (C), seeding rate of small grain cover crops (S), fertilization treatment (F), C x F and C x S interactions were significant effects of aphid population on cotton plants (Table 97). Aphid population ranged from a low of 64 aphids per cotton leaf following wheat and a high of 130 aphids per leaf following triticale when no spring N was applied. The addition of spring N increased the aphid populations by 40%, 55%, and 83% for the no cover treatment, rye and wheat, respectively. However, aphid populations decreased 10% in triticale plots when spring N was applied (Figure 31).

Table 97. Fort Barnwell cotton aphid leaf population model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	376	4.60	0.0107*
Seeding Rate (S)	2	376	5.90	0.0030*
Fertilization (F)	1	376	12.2	0.0005*
Block (B)	3	376	17.9	<.0001*
C*F	3	376	3.57	0.0142*
C*S	4	376	3.97	0.0036*
C*S*F	6	376	1.17	0.3241

**Indicates significance at P<0.05.*



Figures 31. Fort Barnwell cotton aphid population response to cover type and fertilization as determined from the number of aphids on the most recently, fully expanded mature leaf samples taken from each plot on July 9,2004. (NC= No cover; R=rye; T= triticale and W=Wheat. N = Fertilization treatment of 22.4 kg ha^{-1} of spring nitrogen applied on February 28, 2004).

Analysis of seeding rate and cover interactions reveals that the lowest aphid populations were found on cotton following wheat planted at the low and high seeding rates (61 and 83 aphids per leaf, respectively).   The highest aphid population was found on cotton following triticale planted at the medium seeding rate (161 aphids per leaf). All other treatment had only slight difference in aphid populations ranging from 92-126 aphids per leaf (Figure 32).

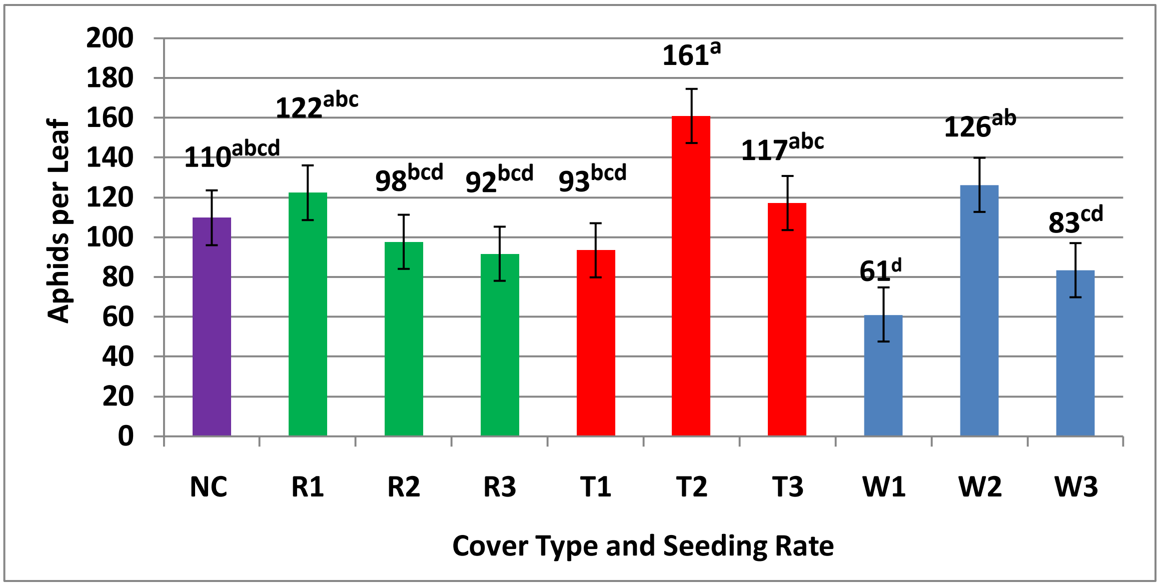


Figure 32. Fort Barnwell cotton aphid population cover type and seeding response as determined from the number of aphids on the most recent, fully expanded mature leaf samples taken on July 9, 2004. (NC= No cover; R=rye; T= triticale and W=Wheat. Seeding rate for small grain cover crops designated as: 1= 129 seeds m^2; 2= 258 seeds m^2, and 3= 387 seeds m^2).

At the Vanceboro location cover crop type and seeding rate interactions as well as cover type, seeding rate and fertilization interactions were significant influences in cotton aphid leaf populations (Table 98). Cotton aphid populations following triticale planted at the high seeding rate (T3) (35) and wheat planted at the low seeding rate with spring N (W1N)(41) are not significantly different but are significantly less than all other treatments. Cotton aphid leaf populations for all other treatments are not significantly different (Figure 33).

Table 98. Vanceboro cotton aphid leaf population model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	392	2.09	0.1245
Seeding Rate (S)	2	392	1.15	0.3185
Fertilization (F)	1	392	0.26	0.6118
Block (B)	3	392	4.52	0.0039*
C*F	3	392	1.14	0.3321
C*S	4	392	3.01	0.0182*
C*S*F	6	392	2.54	0.0198*

**Indicates significance at P<0.05.*

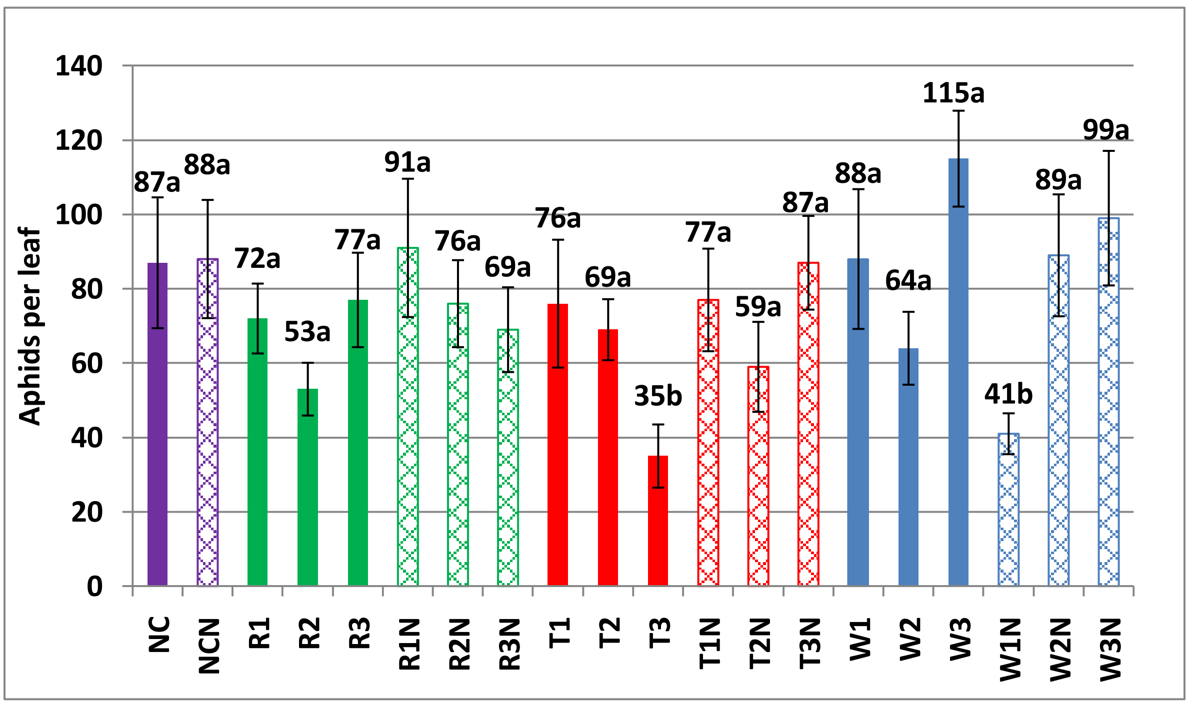


Figure 33. Vanceboro cotton aphid population cover, seeding rate and fertilization interactions as determined from the number of aphids on the most recently, fully expanded mature leaf samples taken on July 9, 2004. (NC= No cover; R=rye; T= triticale and W=Wheat. Seeding rate for small grain cover crops designated as: 1= 129 seeds m^2; 2= 258 seeds m^2, and 3= 387 seeds m^2 N = spring applied nitrogen at 22.4 kg ha-1 on February 28, 2004.).

The Fort Barnwell location had the greater aphid population with a mean leaf aphid population of 105 compared to the Vanceboro location at 76. The addition of spring applied N increased the aphid population by 18% with a mean of 98 aphids per leaf compared to treatments without N of 83 aphids per leaf (location and soil cover treatments combined). Aphid populations of cotton following rye were similar to those of cotton with no cover crop but aphid populations in cotton following triticale and wheat showed no consistent trends. It is feasible that aphid populations simply increased according to excess nitrogen uptake resultant from spring applied N. Excess nitrogen rates have been shown to increases aphid survival and subsequently aphid population (Jahn, et al., 2005; Godfrey et al, 2000).

DISCUSSION

Seasonal variation and soil characteristics strongly influenced winter survival of these late planted small grain cover crops with plant densities typically 25-50% below the targeted seeding rates. Consequently, the lower plant density and later planting dates resulted in low biomass dry weights. Additionally, small grain cover crop growth was influenced by seeding rates and fertilization treatments.

Except for wheat with spring applied N, increasing seeding rates increased biomass dry weights of these small grain cover crops between the low and medium seeding rate by approximately 20-30% but increasing the seeding rate beyond the medium seeding rate had little to no effect upon biomass dry weights. Wheat with spring applied N increased biomass dry weights with increasing seeding rates. This suggests that optimum seeding rate of 258 plants m^{-2} is adequate for all late planted cover crops.

Soil and fertilization influences are evident from differences in biomass dry weights between locations. On the sandy soils at the Fort Barnwell location, biomass dry weights were lower with a range from 492 kg ha^{-1} to 1202 kg ha^{-1} when no spring N was applied and from 1112 kg ha^{-1} to 1962 kg ha^{-1} when spring N was applied. At the Vanceboro location, biomass production was greater due to better soils with a range of 845 kg ha^{-1} to 3685 kg ha^{-1} when no spring N was applied and from 845 kg ha^{-1} to 3425 kg $ha^{-1}$when spring N was applied. Thus, biomass production is strongly influenced by soils. Even with the added biomass production from spring applied N, no cover biomass dry weights approached biomass dry weight levels of timely planted small grain cover crops. Thus, lower biomass production should be expected and potential biomass yields should be considered prior to any late planting of small grain cover crops.

The greater biomass production in 2004 of 737 kg ha^{-1} to 1945 kg ha^{-1} under climatic conditions with greater GDD accumulation compared to lower range of 492 kg ha^{-1} to 1002 kg ha^{-1} in 2005 under less favorable GDD accumulation at the Fort Barnwell location provides evidence of variation in biomass production resulting from seasonal climatic conditions. Similar results are evident at the Vanceboro location but the increase in small grain cover crop biomass from spring applied N resulted in less influence of adverse weather climatic conditions. The biomass dry weight range in 2004 at the Vanceboro location was 985 kg ha^{-1} to 3685 kg ha^{-1} and only slightly less with a range of 845 kg ha^{-1} to 3425 kg ha^{-1} in 2005. This emphasizes the risk of low biomass production from late planted small grain cover crops, regardless of soil type.

While triticale produced the most biomass, rye more consistently produced the highest measured cover residues. However the differences between rye and triticale were often very small. It is likely that rye and triticale produced equal amounts of cover residue but all triticale biomass residues were not included in estimations of this study. Much of the triticale was at early boot stage with erect stems which remained upright or slightly bent after termination. Consequently, at the time of cover residue evaluation, these stems and small seed heads were not touching the ground and thus not included in residue estimations. Conversely, rye growth was primarily vegetative and had a more prostrate growth at cover crop termination affording greater contact with soil. Thus, values of triticale residue are under-estimated in this study.

Soil, climatic variance, fertilization, seeding rate and small grain type influenced biomass N content. When no spring N was applied, cover crop biomass N contents ranged from 9.7 -16.6 kg ha^{-1} at the Fort Barnwell location. On the less sandy soils at the Vanceboro location, the range of biomass N content ranged from 13-29 kg ha^{-1}. Triticale generally had more consistent and higher biomass N contents followed by those of rye. Wheat biomass N contents were inconsistent.

The addition of spring applied N increased biomass N contents from as little as 10% to as much as 187%. However, no cover crop utilized 100% of the spring applied N. Consequently, all treatments of spring applied N contributed additional N to the soil system, which may be lost to the environment.

Biomass P contents increased with increasing biomass. At Ft. Barnwell biomass P contents of small grain cover crops are similar, ranging from 2.2-4.0 kg ha^{-1} when no spring N was applied and 4.3-6.7 kg ha^{-1} with application of spring N. The addition of spring applied N slightly increased biomass growth, and subsequently P uptake, but the sandier soils still limited small grain growth. Conversely, with more favorable soil conditions at the Vanceboro location, triticale biomass P contents were greater than rye or wheat, with or without spring applied N. Triticale biomass P contents ranged from 6.4-7.8 kg ha^{-1} when no spring N was applied and 10.2-12.2 kg ha^{-1} with the application of spring N compared to the range of 3.3-6.1 kg $ha-^{1}$ of rye or wheat with N spring N and 5.6-7.8 kg ha^{-1} for rye and wheat with spring applied N. Phosphorous uptake is closely associated with factors that limit biomass production.

Based upon placement of the residue bag decomposition study and assuming that a C:N ratio below 20 results in N mineralization, approximately half of the rye and wheat residues mineralized 28 days after placement. Conversely, triticale C:N ratios typically remained above 20 beyond day 28 but reached C:N values of 20 or lower by day 56. Thus, the persistence of triticale residue may offer greater benefits to regulate soil temperature, increase water infiltration and N mineralization closer to peak N demand of cotton than rye or wheat. However, by day 112 of this study, there was no difference between small grain cover residues suggesting no distinct advantage of longer term N sequestration from any small grain cover crop. In addition, cover type did not affect cotton yield, nutrient content or any other crop parameter measured.

In contrast to N mineralization, P mineralization of cover residues was rapid for all small grain cover crops with approximately half of the P mineralized by day 28 at the Fort Barnwell location and by day 56 at the Vanceboro location. Seasonal climatic factors influenced P mineralization but differences between small grain cover crop residues were extremely small.

No treatment greatly influenced inorganic soil N levels. Soil N levels were low at both locations ranging from 2.9-3.8 N kg per hectare furrow slice (HFS) at the Fort Barnwell location in 2004 and from 1.4-2.9 kg HFS in 2005. At Vanceboro, total soil N ranged from 10.6 -14.1 kg per HFS in 2004 to 10.3-10.1 kg per HFS in 2005. It is feasible that this reduction in soil N levels is strictly the result of excessive rainfall that led to leaching and dentrification losses of N since all treatment at both locations were lower in 2005 than in 2004. However, this assumption assumes that rye and triticale have the ability to reduce soil N levels in high soil N environments but not in low soil N environments and that the Vanceboro location had significantly greater soil N levels than the Fort Barnwell location in year 1 of the study. However, the composite soil samples taken prior to planting (Appendix

B) show that total soil N is similar (3.6-4.0 kg HFS) at both locations. Thus, it is more likely that leaching and dentrification losses did occur and late planted cover crops have the ability to sequester N and protect it from leaching.

Variable results of study are in part due to soils that were continually wet during both winters. Also, in late July 2004, April 2005, June 2005, July 2005 and August 2005, soils were saturated by excessive rains for 3-5 day periods. Thus, N losses from leaching or dentrification may have masked any treatment effects. However, these conditions are not unusual for North Carolina.

No treatment effect was observed for cotton yield or lint quality. However, this data should be reviewed cautiously. Damage to cotton lint yields and quality from storm events and rainfall is documented in literature but documentation of the effects of multiple tropical storm events is not evident. In both years, adverse weather conditions consisted of excessive rainfall events and at least one tropical storm system that limited cotton yields or degraded lint quality. Any potential effect on cotton yields or lint quality may be masked by adverse weather.

Both sites contained small areas of soils that differed either in texture or landscape position due to the high variability of soils in Eastern North Carolina. While these inclusions are not advisable scientific procedure, it was necessary in order to utilize grower equipment. At the Fort Barnwell location, small inclusion of poorly drained Pantego and Rains series within replication two and slightly greater landscape position of approximately

10% of the plot area in replication three resulted in blocks showing significance in statistical analysis. Most of the rye plots were located within the Pantego-Rains series within replication two and triticale plots in the slightly higher landscape position of replication three. Consequently, biomass measurement of these two small grains within these replications may be overestimated or underestimated based upon rainfall and soil water relationships.

At the Vanceboro location, very small areas of scattered soils of the Craven series were located within replications one and two. This soil contains greater clay content which resulted in ponding surface water due to frequent rainfall. This resulted in reduced germination, limited root growth and dentrification. During drought conditions, water uptake and root growth was limited. Unfortunately, rye plots were located within this area, adding greater source of error and significance of replications.

These inclusions resulted in significant effects of replication and replication interaction with main effects in most of the statistical models. However, these inclusions also emphasize the extreme variability of soil-plant relationships of late planted small grain cover crops. Normal expectations and benefits of cover crops planted closely following harvest of the primary crop when climatic factors favor rapid GDD accumulation and soil moisture relatively steady cannot be expected from late planted small grains due to the potential negative influences that may contribute added stress to these small grain cover crops.

Based upon the results of this study, the potential benefits of these small grains planted late are questionable, at best. Sequestering N to reduce potential leaching is a worthy effort, as is the addition of cover residue to provide soil property benefits. However, results demonstrate that late planted small grain cover crops are a net cost to cotton producers providing no benefit in cotton yield, lint quality or the environment.

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APPENDICES

APPENDIX A

Table A1. Soil test results as reported by the North Carolina Department of Agriculture and Consumer Services (NCDA & CS) Agronomic Division as determined from soil samples taken at 18 cm soil depth from each replication at each study location in October 2003, prior to planting small grain cover crops.

Location	**Sample No.**	**Soil Class**	**HM%**	**W/V**	**CEC**	**BS %**	**Ac**	**pH**	**P-I**	**K-I**	**Ca%**	**Mg%**	**Mn-I**	**Zn-I**	**Cu-I**	**S-I**
Fort Barnwell	1	Min	0.86	1.41	4.3	74	1.1	5.8	82	62	55	13	67	113	49	28
	2	Min	1.32	1.38	4.6	70	1.4	5.7	106	46	53	13	78	136	103	38
	3	Min	0.97	1.43	3.9	72	1.1	5.8	106	72	49	13	67	132	83	32
	4	Min	0.86	1.37	4.3	72	1.2	5.5	68	91	48	12	60	112	47	29
Vanceboro	V1	Min	0.76	1.23	4.9	88	0.6	6.1	143	109	58	18	137	65	49	28
	V2	Min	0.81	1.31	5.2	77	1.2	6.1	191	85	54	15	114	61	48	24
	V3	Min	0.76	1.34	5.4	70	1.6	6.1	219	86	49	14	128	59	44	24
	V4	Min	0.71	1.31	4.5	87	0.6	6.2	218	94	61	17	129	59	53	25

(Result obtained from Mehlich-3 extraction method and reported using NCDA & CS index system where 0-25, 25-50 and 50 or higher represents a high, medium and little to no crop response to fertilization, respectively for phosphorous (P) and potassium (K). Micronutrient critical values representing a response to fertilization are below 25. Numbers 1-4 represent replication location at the Fort Barnwell location and V1-V4 represents samples from each replication at the Vanceboro location.)

Table A2. North Carolina Department of Agriculture and Consumer Services Agronomic Division soil test recommendations (kg ha^{-1}) of samples taken prior to planting of small grain in October 2003.

Location	Sample No.	Lime	N	P_20_5	K_20	Mg	Cu	Zn	B	Mn
Ft. Barnwell	1	1344	56-78	0	22-45	0	0	0	1.12	0
	2	1792	56-78	0	56-78	0	0	0	1.12	0
	3	1344	56-78	0	11-34	0	0	0	1.12	0
	4	1792	56-78	0	00-22	0	0	0	1.12	0
Vanceboro	VR1	000	56-78	0	0000	0	0	0	1.12	0
	VR2	000	56-78	0	0-22	0	0	0	1.12	0
	VR3	672	56-78	0	0-22	0	0	0	1.12	0
	VR4	000	56-78	0	0000	0	0	0	1.12	0

(The numbers 1-4 represent samples from each replication at the Fort Barnwell location and V1-V4 represents samples from each replication taken at the Vanceboro location).

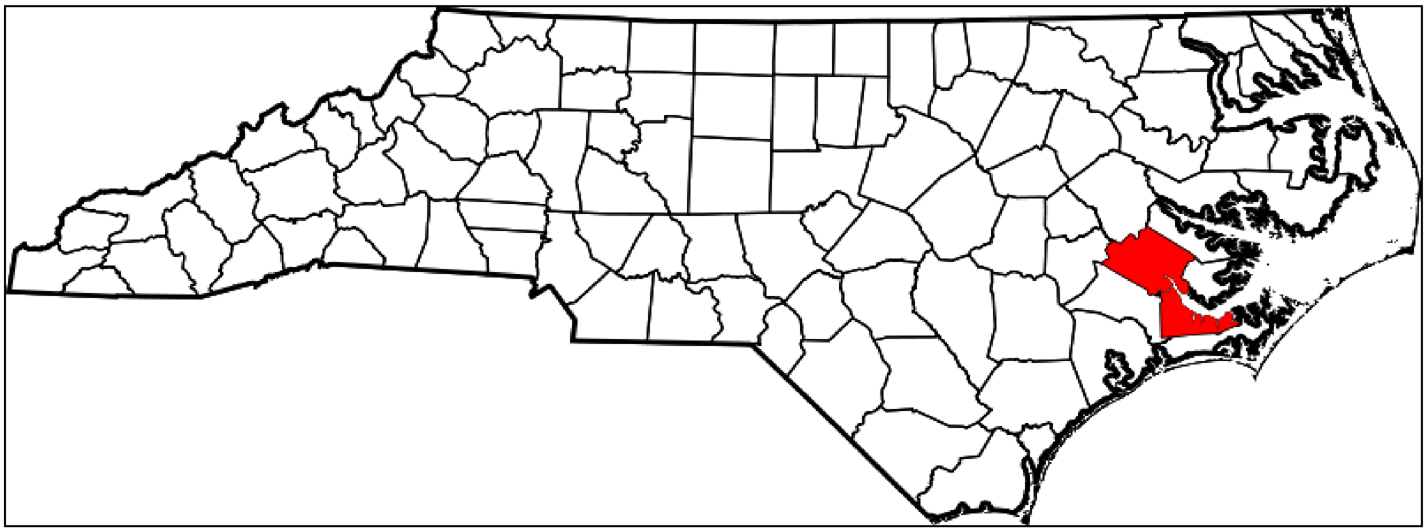

Figure 34. Map of Craven County, North Carolina. (Craven County designated in red).

Source: http://commons.wikimedia.org/wiki/File:Map_of_North_Carolina_highlighting_Craven_County.svg

Figure 35. Aerial map of the Fort Barnwell testing site as outlined by black square.

(Soil Mapping Unit is Craven series. Source: Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm).

Figure 36. Aerial map of the Vanceboro testing site as outlined by the black square.

(Soil Mapping Unit is Altavista series. Source: Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm).

Table A3. Vanceboro mean soil ammonium and nitrate levels as determined from composite samples taken at 0-20 (20), 21-40 (40) and 41-60 (60) cm depths from each replication in October 2003 prior to establishment of cover crops.

Block	***Soil NH_4 Mean (mg L^{-1})***			***Soil NO_3 Mean (mg L^{-1})***			***Total Soil N (mg L^{-1})***		
	20 cm Depth	**40 cm Depth**	**60 cm Depth**	**20 cm Depth**	**40 cm Depth**	**60 cm Depth**	**20 cm Depth**	**40 cm Depth**	**60 cm Depth**
1	1.90	1.30	1.16	0.05	0.17	1.04	1.95	1.47	2.20
2	2.04	1.12	0.86	0.05	0.17	1.00	2.09	1.29	1.86
3	1.89	0.76	0.61	0.05	0.01	0.62	1.94	0.77	1.23
4	2.14	0.66	0.55	0.02	0.01	0.38	2.16	0.67	0.93

Table A4. Fort Barnwell mean soil ammonium and nitrate levels as determined from composite samples taken at 0-20 (20), 21-40 (40) and 41-60 (60) cm depths from each replication on October 2003 prior to establishment of cover crops.

Block	***Soil NH_4 Mean (mg L^{-1})***			***Soil NO_3 Mean (mg L^{-1})***			***Total Soil N (mg L^{-1})***		
	20 cm Depth	**40 cm Depth**	**60 cm Depth**	**20 cm Depth**	**40 cm Depth**	**60 cm Depth**	**20 cm Depth**	**40 cm Depth**	**60 cm Depth**
1	1.32	0.85	1.02	0.03	0.02	0.01	1.35	0.88	1.03
2	0.64	0.33	1.48	0.04	0.04	0.03	0.68	0.36	1.51
3	0.58	0.55	1.20	0.01	0.23	0.03	0.59	0.78	1.23
4	0.84	0.35	1.20	0.02	0.05	0.14	0.86	0.40	1.34

APPENDIX B

List of Abbreviations for Appendix B

Fort Barnwell = Ftbarn

Vanceboro = Vboro

Non Sufficient Sample = NSS

No Sample = NS

Missing Data = *

NC = No cover crop

R= Rye cover crop

T= Triticale cover crop

W= Wheat cover crop

0 = No seeding rate

1= Cover crop seeding rate of 129 seeds m^2

2 = Cover crop seeding rate of 258 seeds m^2

3= Cover crop seeding rate of 387 seeds m^2

Table B1. Cover crop population data recorded from the number of live plants found within randomly placed, 0.25 m^2 frames *on December 2, 2004 and December 4, 2005.*

Plot	Location	Replication	Cover	Cover Seeding Rate	Sample 1 (0.25 m^2)	Sample 2 (0.25 m^2)	Sample 3 (0.25 m^2)	Sample 4 (0.25 m^2)
H101	ftbarn	1	T	2	24	34	51	52
H102	ftbarn	1	T	1	34	32	40	38
H103	ftbarn	1	T	3	42	37	69	77
H104	ftbarn	1	W	3	46	54	103	79
H105	ftbarn	1	W	3	41	54	74	78
H106	ftbarn	1	W	2	47	53	46	63
H107	ftbarn	1	NC	0	00	00	00	00
H108	ftbarn	1	R	1	32	33	44	42
H109	ftbarn	1	R	3	46	58	81	99
H110	ftbarn	1	R	2	35	34	77	75
H111	ftbarn	1	T	3	26	28	71	62
H112	ftbarn	1	T	1	24	20	29	34
H113	ftbarn	1	T	2	33	36	52	57
H114	ftbarn	1	W	1	29	28	30	30
H115	ftbarn	1	W	2	47	44	54	62
H116	ftbarn	1	W	1	37	30	31	26
H117	ftbarn	1	NC	0	00	00	00	00
H118	ftbarn	1	R	3	43	44	92	102
H119	ftbarn	1	R	1	29	18	40	43
H120	ftbarn	1	R	2	43	39	79	72

(*Table B1*, continued)

Plot	Location	Replication	Cover	Cover Seeding Rate	Sample 1 (0.25 m^2)	Sample 2 (0.25 m^2)	Sample 3 (0.25 m^2)	Sample 4 (0.25 m^2)
H201	ftbarn	2	NC	0	00	00	00	00
H202	ftbarn	2	R	2	33	39	60	74
H203	ftbarn	2	R	1	24	24	36	45
H204	ftbarn	2	R	3	30	38	77	80
H205	ftbarn	2	W	3	49	59	87	82
H206	ftbarn	2	W	2	44	45	51	47
H207	ftbarn	2	W	2	34	47	52	58
H208	ftbarn	2	T	1	21	23	42	35
H209	ftbarn	2	T	2	51	32	66	60
H210	ftbarn	2	T	3	35	45	72	84
H211	ftbarn	2	NC	0	00	00	00	00
H212	ftbarn	2	R	3	53	49	102	93
H213	ftbarn	2	R	2	29	30	52	61
H214	ftbarn	2	R	1	15	17	38	29
H215	ftbarn	2	W	1	38	36	32	30
H216	ftbarn	2	W	1	28	31	26	23
H217	ftbarn	2	W	3	59	42	70	81
H218	ftbarn	2	T	1	36	30	54	45
H219	ftbarn	2	T	3	38	28	80	77
H220	ftbarn	2	T	2	56	41	67	71

(*Table B1*, continued)

Plot	Location	Replication	Cover	Cover Seeding Rate	Sample 1 (0.25 m^2)	Sample 2 (0.25 m^2)	Sample 3 (0.25 m^2)	Sample 4 (0.25 m^2)
H301	ftbarn	3	W	2	55	41	29	33
H302	ftbarn	3	W	1	28	26	17	36
H303	ftbarn	3	W	3	61	58	65	76
H304	ftbarn	3	NC	0	00	00	00	00
H305	ftbarn	3	T	1	22	29	24	31
H306	ftbarn	3	T	2	31	30	67	60
H307	ftbarn	3	T	3	32	36	77	72
H308	ftbarn	3	R	3	45	56	92	85
H309	ftbarn	3	R	1	25	30	37	37
H310	ftbarn	3	R	1	17	21	33	36
H311	ftbarn	3	W	1	24	28	32	34
H312	ftbarn	3	W	3	48	51	63	74
H313	ftbarn	3	W	2	31	30	39	34
H314	ftbarn	3	NC	0	00	00	00	00
H315	ftbarn	3	T	2	34	28	52	51
H316	ftbarn	3	T	1	21	19	32	36
H317	ftbarn	3	T	3	30	33	69	74
H318	ftbarn	3	R	2	52	53	74	61
H319	ftbarn	3	R	2	30	36	57	59
H320	ftbarn	3	R	3	35	26	99	87

(*Table B1*, continued)

Plot	Location	Replication	Cover	Cover Seeding Rate	Sample 1 (0.25 m^2)	Sample 2 (0.25 m^2)	Sample 3 (0.25 m^2)	Sample 4 (0.25 m^2)
H401	ftbarn	4	R	2	27	28	52	55
H402	ftbarn	4	R	3	40	44	81	75
H403	ftbarn	4	R	2	36	41	75	79
H404	ftbarn	4	T	3	41	39	79	81
H405	ftbarn	4	T	1	23	21	36	28
H406	ftbarn	4	T	2	27	34	65	52
H407	ftbarn	4	W	1	26	30	36	35
H408	ftbarn	4	W	3	63	75	72	88
H409	ftbarn	4	W	3	47	68	57	65
H410	ftbarn	4	NC	0	00	00	00	00
H411	ftbarn	4	R	3	41	39	109	92
H412	ftbarn	4	R	1	24	19	55	49
H413	ftbarn	4	R	1	18	16	40	47
H414	ftbarn	4	T	1	20	22	37	44
H415	ftbarn	4	T	2	20	32	59	52
H416	ftbarn	4	T	3	38	44	72	79
H417	ftbarn	4	W	2	35	43	52	59
H418	ftbarn	4	W	1	25	30	20	31
H419	ftbarn	4	W	2	47	54	44	56
H420	ftbarn	4	NC	0	00	00	00	00

(*Table B1*, continued)

Plot	Location	Replication	Cover	Cover Seeding Rate	Sample 1 (0.25 m^2)	Sample 2 (0.25 m^2)	Sample 3 (0.25 m^2)	Sample 4 (0.25 m^2)
V101	vboro	1	T	2	18	12	34	37
V102	vboro	1	T	1	17	13	23	29
V103	vboro	1	T	3	35	34	66	60
V104	vboro	1	W	3	24	28	78	74
V105	vboro	1	W	3	32	26	72	65
V106	vboro	1	W	2	33	30	42	38
V107	vboro	1	NC	0	00	00	00	00
V108	vboro	1	R	1	10	18	50	51
V109	vboro	1	R	3	28	30	60	88
V110	vboro	1	R	2	16	5	57	49
V111	vboro	1	T	3	18	13	47	53
V112	vboro	1	T	1	16	16	23	27
V113	vboro	1	T	2	21	22	42	44
V114	vboro	1	W	1	15	17	32	28
V115	vboro	1	W	2	17	21	36	29
V116	vboro	1	W	1	10	17	18	24
V117	vboro	1	NC	0	00	00	00	00
V118	vboro	1	R	3	33	34	91	99
V119	vboro	1	R	1	19	22	38	35
V120	vboro	1	R	2	27	29	78	70

(*Table B1*, continued)

Plot	Location	Replication	Cover	Cover Seeding Rate	Sample 1 (0.25 m^2)	Sample 2 (0.25 m^2)	Sample 3 (0.25 m^2)	Sample 4 (0.25 m^2)
V201	vboro	2	NC	0	00	00	00	00
V202	vboro	2	R	2	14	18	45	51
V203	vboro	2	R	1	11	6	36	30
V204	vboro	2	R	3	9	19	90	86
V205	vboro	2	W	3	21	20	59	54
V206	vboro	2	W	2	31	36	40	41
V207	vboro	2	W	2	30	29	39	43
V208	vboro	2	T	1	22	23	27	31
V209	vboro	2	T	2	25	29	47	45
V210	vboro	2	T	3	35	36	81	87
V211	vboro	2	NC	0	00	00	00	00
V212	vboro	2	R	3	26	32	76	88
V213	vboro	2	R	2	16	19	46	46
V214	vboro	2	R	1	12	10	39	40
V215	vboro	2	W	1	25	21	20	27
V216	vboro	2	W	1	26	23	24	31
V217	vboro	2	W	3	45	48	63	60
V218	vboro	2	T	1	20	20	25	30
V219	vboro	2	T	3	37	35	59	52
V220	vboro	2	T	2	26	28	63	59

(*Table B1*, continued)

Plot	Location	Replication	Cover	Cover Seeding Rate	Sample 1 (0.25 m^2)	Sample 2 (0.25 m^2)	Sample 3 (0.25 m^2)	Sample 4 (0.25 m^2)
V301	vboro	3	W	2	32	23	36	31
V302	vboro	3	W	1	37	25	32	24
V303	vboro	3	W	3	47	44	59	60
V304	vboro	3	NC	0	00	00	00	00
V305	vboro	3	T	1	18	20	20	31
V306	vboro	3	T	2	29	29	45	50
V307	vboro	3	T	3	46	57	62	69
V308	vboro	3	R	3	63	48	78	83
V309	vboro	3	R	1	23	21	35	35
V310	vboro	3	R	1	24	25	43	54
V311	vboro	3	W	1	37	29	37	35
V312	vboro	3	W	3	56	54	66	71
V313	vboro	3	W	2	52	42	40	40
V314	vboro	3	NC	0	00	00	00	00
V315	vboro	3	T	2	32	30	52	44
V316	vboro	3	T	1	20	22	28	35
V317	vboro	3	T	3	36	44	74	82
V318	vboro	3	R	2	34	42	75	70
V319	vboro	3	R	2	30	26	54	55
V320	vboro	3	R	3	35	40	88	87

(*Table B1*, continued)

Plot	Location	Replication	Cover	Cover Seeding Rate	Sample 1 (0.25 m^2)	Sample 2 (0.25 m^2)	Sample 3 (0.25 m^2)	Sample 4 (0.25 m^2)
V401	vboro	4	R	2	24	36	51	49
V402	vboro	4	R	3	37	46	66	79
V403	vboro	4	R	2	36	36	61	58
V404	vboro	4	T	3	50	47	66	56
V405	vboro	4	T	1	14	15	32	37
V406	vboro	4	T	2	32	36	55	49
V407	vboro	4	W	1	28	23	40	35
V408	vboro	4	W	3	47	59	64	76
V409	vboro	4	W	3	56	47	77	84
V410	vboro	4	NC	0	00	00	00	00
V411	vboro	4	R	3	34	39	79	70
V412	vboro	4	R	1	21	19	42	51
V413	vboro	4	R	1	26	25	30	33
V414	vboro	4	T	1	28	20	30	29
V415	vboro	4	T	2	25	44	36	44
V416	vboro	4	T	3	46	44	61	71
V417	vboro	4	W	2	57	47	63	57
V418	vboro	4	W	1	31	40	31	34
V419	vboro	4	W	2	41	49	62	57
V420	vboro	4	NC	0	00	00	00	00

Table B2. Cover crop biomass oven-dry weight as determined from 0.25 m^2 samples taken prior to cover crop termination on April 18, 2004 and April 22, 2005.

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
V101	vboro	2004	T	2	0.00	0.0700	0.2200	0.0480
V102	vboro	2004	T	1	22.4	0.1085	0.2200	0.0865
V103	vboro	2004	T	3	22.4	0.1060	0.2200	0.0840
V104	vboro	2004	W	3	0.00	0.0720	0.2200	0.0500
V105	vboro	2004	W	3	22.4	0.0940	0.2200	0.0720
V106	vboro	2004	W	2	0.00	0.0755	0.2200	0.0535
V108	vboro	2004	R	1	0.00	0.0430	0.2200	0.0210
V109	vboro	2004	R	3	22.4	0.0775	0.2200	0.0555
V110	vboro	2004	R	2	22.4	0.0935	0.2200	0.0715
V111	vboro	2004	T	3	0.00	0.0865	0.2200	0.0645
V112	vboro	2004	T	1	0.00	0.0800	0.2200	0.0580
V113	vboro	2004	T	2	22.4	0.1260	0.2200	0.1040
V114	vboro	2004	W	1	0.00	0.0620	0.2200	0.0400
V115	vboro	2004	W	2	22.4	0.0820	0.2200	0.0600
V116	vboro	2004	W	1	22.4	0.0835	0.2200	0.0615
V118	vboro	2004	R	3	0.00	0.0850	0.2200	0.0630
V119	vboro	2004	R	1	22.4	0.0900	0.2200	0.0680
V120	vboro	2004	R	2	0.00	0.0865	0.2200	0.0645
V202	vboro	2004	R	2	0.00	0.0460	0.2200	0.0240
V203	vboro	2004	R	1	22.4	0.0690	0.2200	0.0470
V204	vboro	2004	R	3	22.4	0.0520	0.2200	0.0300
V205	vboro	2004	W	3	0.00	0.0645	0.2200	0.0425

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
V206	vboro	2004	W	2	22.4	0.0535	0.2200	0.0315
V207	vboro	2004	W	2	0.00	0.0545	0.2200	0.0325
V208	vboro	2004	T	1	22.4	0.1090	0.2200	0.0870
V209	vboro	2004	T	2	22.4	0.1210	0.2200	0.0990
V210	vboro	2004	T	3	22.4	0.1000	0.2200	0.0780
V212	vboro	2004	R	3	0.00	0.0800	0.2200	0.0580
V213	vboro	2004	R	2	22.4	0.0680	0.2200	0.0460
V214	vboro	2004	R	1	0.00	0.0515	0.2200	0.0295
V215	vboro	2004	W	1	22.4	0.0495	0.2200	0.0275
V216	vboro	2004	W	1	0.00	0.0620	0.2200	0.0400
V217	vboro	2004	W	3	22.4	0.1130	0.2200	0.0910
V218	vboro	2004	T	1	0.00	0.0570	0.2200	0.0350
V219	vboro	2004	T	3	0.00	0.0660	0.2200	0.0440
V220	vboro	2004	T	2	0.00	0.0700	0.2200	0.0480
V301	vboro	2004	W	2	22.4	0.1015	0.2200	0.0795
V302	vboro	2004	W	1	0.00	0.0690	0.2200	0.0470
V303	vboro	2004	W	3	22.4	0.1115	0.2200	0.0895
V305	vboro	2004	T	1	22.4	0.1015	0.2200	0.0795
V306	vboro	2004	T	2	0.00	0.0705	0.2200	0.0485

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
V307	vboro	2004	T	3	22.4	0.1050	0.2200	0.0830
V308	vboro	2004	R	3	0.00	0.0460	0.2200	0.0240
V309	vboro	2004	R	1	22.4	0.0690	0.2200	0.0470
V310	vboro	2004	R	1	0.00	0.0370	0.2200	0.0150
V311	vboro	2004	W	1	22.4	0.0840	0.2200	0.0620
V312	vboro	2004	W	3	0.00	0.0820	0.2200	0.0600
V313	vboro	2004	W	2	0.00	0.1160	0.2200	0.0940
V315	vboro	2004	T	2	22.4	0.1110	0.2200	0.0890
V316	vboro	2004	T	1	0.00	0.0945	0.2200	0.0725
V317	vboro	2004	T	3	0.00	0.0650	0.2200	0.0430
V318	vboro	2004	R	2	0.00	0.0440	0.2200	0.0220
V319	vboro	2004	R	2	22.4	0.0685	0.2200	0.0465
V320	vboro	2004	R	3	22.4	0.0695	0.2200	0.0475
V401	vboro	2004	R	2	22.4	0.0720	0.2200	0.0500
V402	vboro	2004	R	3	22.4	0.1160	0.2200	0.0940
V403	vboro	2004	R	2	0.00	0.0880	0.2200	0.0660
V404	vboro	2004	T	3	0.00	0.0875	0.2200	0.0655
V405	vboro	2004	T	1	22.4	0.1375	0.2200	0.1155
V406	vboro	2004	T	2	22.4	0.0970	0.2200	0.0750
V407	vboro	2004	W	1	0.00	0.0515	0.2200	0.0295

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
V408	vboro	2004	W	3	0.00	0.0690	0.2200	0.0470
V409	vboro	2004	W	3	22.4	0.0610	0.2200	0.0390
V411	vboro	2004	R	3	0.00	0.0625	0.2200	0.0405
V412	vboro	2004	R	1	0.00	0.0550	0.2200	0.0330
V413	vboro	2004	R	1	22.4	0.0955	0.2200	0.0735
V414	vboro	2004	T	1	0.00	0.0915	0.2200	0.0695
V415	vboro	2004	T	2	0.00	0.0770	0.2200	0.0550
V416	vboro	2004	T	3	22.4	0.0865	0.2200	0.0645
V417	vboro	2004	W	2	0.00	0.0545	0.2200	0.0325
V418	vboro	2004	W	1	22.4	0.0605	0.2200	0.0385
V419	vboro	2004	W	2	22.4	0.0810	0.2200	0.0590
H101	ftbarn	2004	T	2	0.00	0.0465	0.2200	0.0243
H102	ftbarn	2004	T	1	22.4	0.0520	0.2200	0.0298
H103	ftbarn	2004	T	3	22.4	0.0545	0.2200	0.0323
H104	ftbarn	2004	W	3	0.00	0.0500	0.2200	0.0278
H105	ftbarn	2004	W	3	22.4	0.0420	0.2200	0.0198
H106	ftbarn	2004	W	2	0.00	0.0395	0.2200	0.0173
H108	ftbarn	2004	R	1	0.00	0.0370	0.2200	0.0148
H109	ftbarn	2004	R	3	22.4	0.0570	0.2200	0.0348
H110	ftbarn	2004	R	2	22.4	0.0450	0.2200	0.0228

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
H111	ftbarn	2004	T	3	0.00	0.0415	0.2200	0.0193
H112	ftbarn	2004	T	1	0.00	0.0445	0.2200	0.0223
H113	ftbarn	2004	T	2	22.4	0.0713	0.2200	0.0491
H114	ftbarn	2004	W	1	0.00	0.0495	0.2200	0.0273
H115	ftbarn	2004	W	2	22.4	0.0605	0.2200	0.0383
H116	ftbarn	2004	W	1	22.4	0.0380	0.2200	0.0158
H118	ftbarn	2004	R	3	0.00	0.0480	0.2200	0.0258
H119	ftbarn	2004	R	1	22.4	0.0555	0.2200	0.0333
H120	ftbarn	2004	R	2	0.00	0.0445	0.2200	0.0223
H202	ftbarn	2004	R	2	0.00	0.0550	0.2200	0.0328
H203	ftbarn	2004	R	1	22.4	0.0895	0.2200	0.0673
H204	ftbarn	2004	R	3	22.4	0.0925	0.2200	0.0703
H205	ftbarn	2004	W	3	0.00	0.0500	0.2200	0.0278
H206	ftbarn	2004	W	2	22.4	0.0475	0.2200	0.0253
H207	ftbarn	2004	W	2	0.00	0.0485	0.2200	0.0263
H208	ftbarn	2004	T	1	22.4	0.0400	0.2200	0.0178
H209	ftbarn	2004	T	2	22.4	0.0710	0.2200	0.0488
H210	ftbarn	2004	T	3	22.4	0.0665	0.2200	0.0443

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
H212	ftbarn	2004	R	3	0.00	0.0360	0.2200	0.0138
H213	ftbarn	2004	R	2	22.4	0.0710	0.2200	0.0488
H214	ftbarn	2004	R	1	0.00	0.0550	0.2200	0.0328
H215	ftbarn	2004	W	1	22.4	0.0560	0.2200	0.0338
H216	ftbarn	2004	W	1	0.00	0.0425	0.2200	0.0203
H217	ftbarn	2004	W	3	22.4	0.0405	0.2200	0.0183
H218	ftbarn	2004	T	1	0.00	0.0470	0.2200	0.0248
H219	ftbarn	2004	T	3	0.00	0.0425	0.2200	0.0203
H220	ftbarn	2004	T	2	0.00	0.0515	0.2200	0.0293
H301	ftbarn	2004	W	2	22.4	0.0625	0.2200	0.0403
H302	ftbarn	2004	W	1	0.00	0.0360	0.2200	0.0138
H303	ftbarn	2004	W	3	22.4	0.0745	0.2200	0.0523
H305	ftbarn	2004	T	1	22.4	0.0790	0.2200	0.0568
H306	ftbarn	2004	T	2	0.00	0.0450	0.2200	0.0228
H307	ftbarn	2004	T	3	22.4	0.0795	0.2200	0.0573
H308	ftbarn	2004	R	3	0.00	0.0310	0.2200	0.0088
H309	ftbarn	2004	R	1	22.4	0.0570	0.2200	0.0348
H310	ftbarn	2004	R	1	0.00	0.0385	0.2200	0.0163
H311	ftbarn	2004	W	1	22.4	0.0635	0.2200	0.0413
H312	ftbarn	2004	W	3	0.00	0.0625	0.2200	0.0403

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
H313	ftbarn	2004	W	2	0.00	0.0445	0.2200	0.0223
H315	ftbarn	2004	T	2	22.4	0.0825	0.2200	0.0603
H316	ftbarn	2004	T	1	0.00	0.0360	0.2200	0.0138
H317	ftbarn	2004	T	3	0.00	0.0435	0.2200	0.0213
H318	ftbarn	2004	R	2	0.00	0.0445	0.2200	0.0223
H319	ftbarn	2004	R	2	22.4	0.0575	0.2200	0.0353
H320	ftbarn	2004	R	3	22.4	0.0470	0.2200	0.0248
H401	ftbarn	2004	R	2	22.4	0.0935	0.2200	0.0713
H402	ftbarn	2004	R	3	22.4	0.0495	0.2200	0.0273
H403	ftbarn	2004	R	2	0.00	0.0380	0.2200	0.0158
H404	ftbarn	2004	T	3	0.00	0.0555	0.2200	0.0333
H405	ftbarn	2004	T	1	22.4	0.0770	0.2200	0.0548
H406	ftbarn	2004	T	2	22.4	0.0585	0.2200	0.0363
H407	ftbarn	2004	W	1	0.00	0.0515	0.2200	0.0293
H408	ftbarn	2004	W	3	0.00	0.0465	0.2200	0.0243
H409	ftbarn	2004	W	3	22.4	0.0640	0.2200	0.0418
H411	ftbarn	2004	R	3	0.00	0.0490	0.2200	0.0268
H412	ftbarn	2004	R	1	0.00	0.0315	0.2200	0.0093
H413	ftbarn	2004	R	1	22.4	0.0380	0.2200	0.0158

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
H414	ftbarn	2004	T	1	0.00	0.0495	0.2200	0.0273
H415	ftbarn	2004	T	2	0.00	0.0410	0.2200	0.0188
H416	ftbarn	2004	T	3	22.4	0.0845	0.2200	0.0623
H417	ftbarn	2004	W	2	0.00	0.0500	0.2200	0.0278
H418	ftbarn	2004	W	1	22.4	0.0690	0.2200	0.0468
H419	ftbarn	2004	W	2	22.4	0.0725	0.2200	0.0503
H101	ftbarn	2005	T	2	0.00	0.0415	0.2200	0.0193
H102	ftbarn	2005	T	1	22.4	0.0420	0.2200	0.0198
H103	ftbarn	2005	T	3	22.4	0.0590	0.2200	0.0368
H104	ftbarn	2005	W	3	0.00	0.0390	0.2200	0.0168
H105	ftbarn	2005	W	3	22.4	0.0400	0.2200	0.0178
H106	ftbarn	2005	W	2	0.00	0.0300	0.2200	0.0078
H108	ftbarn	2005	R	1	0.00	0.0315	0.2200	0.0093
H109	ftbarn	2005	R	3	22.4	0.0435	0.2200	0.0213
H110	ftbarn	2005	R	2	22.4	0.0345	0.2200	0.0123
H111	ftbarn	2005	T	3	0.00	0.0400	0.2200	0.0178
H112	ftbarn	2005	T	1	0.00	0.0400	0.2200	0.0178
H113	ftbarn	2005	T	2	22.4	0.0680	0.2200	0.0458
H114	ftbarn	2005	W	1	0.00	0.0385	0.2200	0.0163

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
H115	ftbarn	2005	W	2	22.4	0.0510	0.2200	0.0288
H116	ftbarn	2005	W	1	22.4	0.0370	0.2200	0.0148
H118	ftbarn	2005	R	3	0.00	0.0385	0.2200	0.0163
H119	ftbarn	2005	R	1	22.4	0.0530	0.2200	0.0308
H120	ftbarn	2005	R	2	0.00	0.0350	0.2200	0.0128
H202	ftbarn	2005	R	2	0.00	0.0515	0.2200	0.0293
H203	ftbarn	2005	R	1	22.4	0.0830	0.2200	0.0608
H204	ftbarn	2005	R	3	22.4	0.0725	0.2200	0.0503
H205	ftbarn	2005	W	3	0.00	0.0405	0.2200	0.0183
H206	ftbarn	2005	W	2	22.4	0.0440	0.2200	0.0218
H207	ftbarn	2005	W	2	0.00	0.0395	0.2200	0.0173
H208	ftbarn	2005	T	1	22.4	0.0465	0.2200	0.0243
H209	ftbarn	2005	T	2	22.4	0.0665	0.2200	0.0443
H210	ftbarn	2005	T	3	22.4	0.0530	0.2200	0.0308
H212	ftbarn	2005	R	3	0.00	0.0475	0.2200	0.0253
H213	ftbarn	2005	R	2	22.4	0.0730	0.2200	0.0508
H214	ftbarn	2005	R	1	0.00	0.0430	0.2200	0.0208
H215	ftbarn	2005	W	1	22.4	0.0490	0.2200	0.0268

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
H216	ftbarn	2005	W	1	0.00	0.0395	0.2200	0.0173
H217	ftbarn	2005	W	3	22.4	0.0455	0.2200	0.0233
H218	ftbarn	2005	T	1	0.00	0.0375	0.2200	0.0153
H219	ftbarn	2005	T	3	0.00	0.0505	0.2200	0.0283
H220	ftbarn	2005	T	2	0.00	0.0415	0.2200	0.0193
H301	ftbarn	2005	W	2	22.4	0.0595	0.2200	0.0373
H302	ftbarn	2005	W	1	0.00	0.0385	0.2200	0.0163
H303	ftbarn	2005	W	3	22.4	0.0610	0.2200	0.0388
H305	ftbarn	2005	T	1	22.4	0.0660	0.2200	0.0438
H306	ftbarn	2005	T	2	0.00	0.0470	0.2200	0.0248
H307	ftbarn	2005	T	3	22.4	0.0650	0.2200	0.0428
H308	ftbarn	2005	R	3	0.00	0.0405	0.2200	0.0183
H309	ftbarn	2005	R	1	22.4	0.0455	0.2200	0.0233
H310	ftbarn	2005	R	1	0.00	0.0335	0.2200	0.0113
H311	ftbarn	2005	W	1	22.4	0.0605	0.2200	0.0383
H312	ftbarn	2005	W	3	0.00	0.0520	0.2200	0.0298
H313	ftbarn	2005	W	2	0.00	0.0440	0.2200	0.0218
H315	ftbarn	2005	T	2	22.4	0.0700	0.2200	0.0478
H316	ftbarn	2005	T	1	0.00	0.0415	0.2200	0.0193

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
H317	ftbarn	2005	T	3	0.00	0.0425	0.2200	0.0203
H318	ftbarn	2005	R	2	0.00	0.0365	0.2200	0.0143
H319	ftbarn	2005	R	2	22.4	0.0620	0.2200	0.0398
H320	ftbarn	2005	R	3	22.4	0.0515	0.2200	0.0293
H401	ftbarn	2005	R	2	22.4	0.0805	0.2200	0.0583
H402	ftbarn	2005	R	3	22.4	0.0510	0.2200	0.0288
H403	ftbarn	2005	R	2	0.00	0.0405	0.2200	0.0183
H404	ftbarn	2005	T	3	0.00	0.0560	0.2200	0.0338
H405	ftbarn	2005	T	1	22.4	0.0610	0.2200	0.0388
H406	ftbarn	2005	T	2	22.4	0.0645	0.2200	0.0423
H407	ftbarn	2005	W	1	0.00	0.0440	0.2200	0.0218
H408	ftbarn	2005	W	3	0.00	0.0380	0.2200	0.0158
H409	ftbarn	2005	W	3	22.4	0.0695	0.2200	0.0473
H411	ftbarn	2005	R	3	0.00	0.0405	0.2200	0.0183
H412	ftbarn	2005	R	1	0.00	0.0300	0.2200	0.0078
H413	ftbarn	2005	R	1	22.4	0.0490	0.2200	0.0268
H414	ftbarn	2005	T	1	0.00	0.0395	0.2200	0.0173
H415	ftbarn	2005	T	2	0.00	0.0495	0.2200	0.0273
H416	ftbarn	2005	T	3	22.4	0.0800	0.2200	0.0578
H417	ftbarn	2005	W	2	0.00	0.0410	0.2200	0.0188

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
H418	ftbarn	2005	W	1	22.4	0.0535	0.2200	0.0313
H419	ftbarn	2005	W	2	22.4	0.0595	0.2200	0.0373
V101	vboro	2005	T	2	0.00	0.0765	0.2200	0.0545
V102	vboro	2005	T	1	22.4	0.0895	0.2200	0.0675
V103	vboro	2005	T	3	22.4	0.1075	0.2200	0.0855
V104	vboro	2005	W	3	0.00	0.0615	0.2200	0.0395
V105	vboro	2005	W	3	22.4	0.0800	0.2200	0.0580
V106	vboro	2005	W	2	0.00	0.0625	0.2200	0.0405
V108	vboro	2005	R	1	0.00	0.0335	0.2200	0.0115
V109	vboro	2005	R	3	22.4	0.0650	0.2200	0.0430
V110	vboro	2005	R	2	22.4	0.0750	0.2200	0.0530
V111	vboro	2005	T	3	0.00	0.0880	0.2200	0.0660
V112	vboro	2005	T	1	0.00	0.0820	0.2200	0.0600
V113	vboro	2005	T	2	22.4	0.1060	0.2200	0.0840
V114	vboro	2005	W	1	0.00	0.0635	0.2200	0.0415
V115	vboro	2005	W	2	22.4	0.0720	0.2200	0.0500
V116	vboro	2005	W	1	22.4	0.0705	0.2200	0.0485
V118	vboro	2005	R	3	0.00	0.0920	0.2200	0.0700

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
V119	vboro	2005	R	1	22.4	0.0845	0.2200	0.0625
V120	vboro	2005	R	2	0.00	0.0720	0.2200	0.0500
V202	vboro	2005	R	2	0.00	0.0425	0.2200	0.0205
V203	vboro	2005	R	1	22.4	0.0545	0.2200	0.0325
V204	vboro	2005	R	3	22.4	0.0530	0.2200	0.0310
V205	vboro	2005	W	3	0.00	0.0540	0.2200	0.0320
V206	vboro	2005	W	2	22.4	0.0600	0.2200	0.0380
V207	vboro	2005	W	2	0.00	0.0625	0.2200	0.0405
V208	vboro	2005	T	1	22.4	0.0940	0.2200	0.0720
V209	vboro	2005	T	2	22.4	0.1305	0.2200	0.1085
V210	vboro	2005	T	3	22.4	0.1215	0.2200	0.0995
V212	vboro	2005	R	3	0.00	0.0770	0.2200	0.0550
V213	vboro	2005	R	2	22.4	0.0660	0.2200	0.0440
V214	vboro	2005	R	1	0.00	0.0465	0.2200	0.0245
V215	vboro	2005	W	1	22.4	0.0575	0.2200	0.0355
V216	vboro	2005	W	1	0.00	0.0545	0.2200	0.0325
V217	vboro	2005	W	3	22.4	0.1020	0.2200	0.0800
V218	vboro	2005	T	1	0.00	0.0535	0.2200	0.0315
V219	vboro	2005	T	3	0.00	0.0550	0.2200	0.0330
V220	vboro	2005	T	2	0.00	0.0610	0.2200	0.0390

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
V301	vboro	2005	W	2	22.4	0.0960	0.2200	0.0740
V302	vboro	2005	W	1	0.00	0.0635	0.2200	0.0415
V303	vboro	2005	W	3	22.4	0.0995	0.2200	0.0775
V305	vboro	2005	T	1	22.4	0.0990	0.2200	0.0770
V306	vboro	2005	T	2	0.00	0.0605	0.2200	0.0385
V307	vboro	2005	T	3	22.4	0.1120	0.2200	0.0900
V308	vboro	2005	R	3	0.00	0.0505	0.2200	0.0285
V309	vboro	2005	R	1	22.4	0.0740	0.2200	0.0520
V310	vboro	2005	R	1	0.00	0.0410	0.2200	0.0190
V311	vboro	2005	W	1	22.4	0.0770	0.2200	0.0550
V312	vboro	2005	W	3	0.00	0.0670	0.2200	0.0450
V313	vboro	2005	W	2	0.00	0.1025	0.2200	0.0805
V315	vboro	2005	T	2	22.4	0.0970	0.2200	0.0750
V316	vboro	2005	T	1	0.00	0.0830	0.2200	0.0610
V317	vboro	2005	T	3	0.00	0.0710	0.2200	0.0490
V318	vboro	2005	R	2	0.00	0.0350	0.2200	0.0130
V319	vboro	2005	R	2	22.4	0.0560	0.2200	0.0340
V320	vboro	2005	R	3	22.4	0.0580	0.2200	0.0360

(*Table B2*, continued)

Plot	Location	Year	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	Weight (Kg) (Bag +Tag)	Bag & Tag Weight (kg)	Net Wt. (kg) (Residue -Tag)
V401	vboro	2005	R	2	22.4	0.0610	0.2200	0.0390
V402	vboro	2005	R	3	22.4	0.0990	0.2200	0.0770
V403	vboro	2005	R	2	0.00	0.0860	0.2200	0.0640
V404	vboro	2005	T	3	0.00	0.0925	0.2200	0.0705
V405	vboro	2005	T	1	22.4	0.1150	0.2200	0.0930
V406	vboro	2005	T	2	22.4	0.0825	0.2200	0.0605
V407	vboro	2005	W	1	0.00	0.0545	0.2200	0.0325
V408	vboro	2005	W	3	0.00	0.0685	0.2200	0.0465
V409	vboro	2005	W	3	22.4	0.0670	0.2200	0.0450
V411	vboro	2005	R	3	0.00	0.0490	0.2200	0.0270
V412	vboro	2005	R	1	0.00	0.0515	0.2200	0.0295
V413	vboro	2005	R	1	22.4	0.0780	0.2200	0.0560
V414	vboro	2005	T	1	0.00	0.0820	0.2200	0.0600
V415	vboro	2005	T	2	0.00	0.0830	0.2200	0.0610
V416	vboro	2005	T	3	22.4	0.0895	0.2200	0.0675
V417	vboro	2005	W	2	0.00	0.0465	0.2200	0.0245
V418	vboro	2005	W	1	22.4	0.0720	0.2200	0.0500
V419	vboro	2005	W	2	22.4	0.0805	0.2200	0.0585

Table B3. Small grain cover biomass nutrient concentrations as measured from remaining cover crop residues within reside bag samples placed into corresponding small grain cover crops within the rows of cotton plots on May 18, 2004 and May 25, 2005. (Retrieval 0 represents time of placement and 1, 2, 3, 4 and 5 represents 1, 2, 4, 8 and 16 weeks after placement).

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Wt. (g)
control	2004	vboro	0	R	0	43.46	1.86	0.33	0.000	1.250	1.250
control	2004	vboro	0	R	0	43.04	1.74	0.34	0.000	1.250	1.250
control	2004	vboro	0	R	0	43.02	1.84	0.30	0.000	1.250	1.250
control	2004	vboro	0	T	0	42.57	1.41	0.31	0.000	1.250	1.250
control	2004	vboro	0	T	0	42.29	1.19	0.30	0.000	1.250	1.250
control	2004	vboro	0	T	0	42.84	1.30	0.32	0.000	1.250	1.250
control	2004	vboro	0	W	0	42.72	1.73	0.31	0.000	1.250	1.250
control	2004	vboro	0	W	0	43.06	1.58	0.31	0.000	1.250	1.250
control	2004	vboro	0	W	0	42.46	1.72	0.32	0.000	1.250	1.250
120	2004	vboro	1	R	5	22.70	1.67	0.12	0.578	1.250	0.672
202	2004	vboro	2	R	5	29.05	2.12	0.15	0.309	1.074	0.765
318	2004	vboro	3	R	5	35.74	2.15	0.13	0.137	0.625	0.488
403	2004	vboro	4	R	5	23.34	1.56	0.11	0.231	0.625	0.394
101	2004	vboro	1	T	5	34.55	1.84	0.15	0.189	1.022	0.833
220	2004	vboro	2	T	5	35.32	2.24	0.16	0.307	1.250	0.943
306	2004	vboro	3	T	5	35.34	2.14	0.15	0.275	1.250	0.975
415	2004	vboro	4	T	5	33.38	1.61	0.14	0.314	1.250	0.936
106	2004	vboro	1	W	5	*	*	*	*	*	*
207	2004	vboro	2	W	5	24.98	1.89	0.13	0.238	0.625	0.387
313	2004	vboro	3	W	5	28.12	2.08	0.13	0.531	1.250	0.719
417	2004	vboro	4	W	5	29.41	2.15	0.14	0.198	0.625	0.427
120	2004	vboro	1	R	4	33.41	2.42	0.20	0.331	1.177	0.846
202	2004	vboro	2	R	4	25.88	2.00	0.19	0.475	1.250	0.775
318	2004	vboro	3	R	4	33.78	2.30	0.20	0.263	1.250	0.987

(*Table B3*, continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
403	2004	vboro	4	R	4	29.48	2.15	0.18	0.399	1.250	0.851
101	2004	vboro	1	T	4	25.61	1.48	0.14	0.425	1.250	0.825
220	2004	vboro	2	T	4	29.17	1.47	0.15	0.306	1.250	0.944
306	2004	vboro	3	T	4	34.54	1.83	0.18	0.280	1.250	0.970
415	2004	vboro	4	T	4	36.16	1.53	0.17	0.250	1.250	1.000
106	2004	vboro	1	W	4	27.35	1.86	0.16	0.457	1.250	0.793
207	2004	vboro	2	W	4	25.37	1.82	0.13	0.489	1.250	0.761
313	2004	vboro	3	W	4	35.08	2.09	0.19	0.264	1.250	0.986
417	2004	vboro	4	W	4	27.18	1.85	0.18	0.449	1.250	0.801
120	2004	vboro	1	R	3	40.01	2.80	0.38	0.148	1.250	1.102
202	2004	vboro	2	R	3	39.51	2.08	0.38	0.120	1.250	1.130
318	2004	vboro	3	R	3	41.19	2.16	0.39	0.060	1.250	1.190
403	2004	vboro	4	R	3	40.57	2.23	0.36	0.097	1.250	1.153
101	2004	vboro	1	T	3	41.57	1.41	0.27	0.074	1.250	1.176
220	2004	vboro	2	T	3	41.60	1.53	0.26	0.068	1.250	1.182
306	2004	vboro	3	T	3	42.24	1.80	0.33	0.058	1.250	1.192
415	2004	vboro	4	T	3	42.43	1.53	0.30	0.050	1.250	1.200
106	2004	vboro	1	W	3	40.98	2.07	0.32	0.081	1.250	1.169
207	2004	vboro	2	W	3	40.53	2.13	0.34	0.093	1.250	1.157
313	2004	vboro	3	W	3	40.69	2.19	0.39	0.090	1.250	1.160
417	2004	vboro	4	W	3	40.80	1.93	0.31	0.104	1.250	1.146
120	2004	vboro	1	R	2	41.98	2.12	0.34	0.000	1.250	1.250
202	2004	vboro	2	R	2	41.76	1.66	0.35	0.000	1.250	1.250
318	2004	vboro	3	R	2	41.39	1.77	0.38	0.000	1.250	1.250
403	2004	vboro	4	R	2	42.00	1.73	0.36	0.000	1.250	1.250

(*Table B3*, continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
101	2004	vboro	1	T	2	41.88	1.30	0.31	0.000	1.250	1.250
220	2004	vboro	2	T	2	42.02	1.32	0.33	0.000	1.250	1.250
306	2004	vboro	3	T	2	41.96	1.34	0.35	0.000	1.250	1.250
415	2004	vboro	4	T	2	41.67	1.37	0.32	0.000	1.250	1.250
106	2004	vboro	1	W	2	41.28	1.67	0.31	0.000	1.250	1.250
207	2004	vboro	2	W	2	42.02	1.76	0.35	0.000	1.250	1.250
313	2004	vboro	3	W	2	41.60	1.59	0.32	0.000	1.250	1.250
417	2004	vboro	4	W	2	42.21	1.62	0.30	0.000	1.250	1.250
120	2004	vboro	1	R	1	42.36	1.80	0.33	0.000	1.250	1.250
202	2004	vboro	2	R	1	42.20	1.86	0.33	0.000	1.250	1.250
318	2004	vboro	3	R	1	41.60	1.55	0.34	0.000	1.250	1.250
403	2004	vboro	4	R	1	41.97	1.84	0.35	0.000	1.250	1.250
101	2004	vboro	1	T	1	42.22	1.29	0.33	0.000	1.250	1.250
220	2004	vboro	2	T	1	42.37	1.29	0.29	0.000	1.250	1.250
306	2004	vboro	3	T	1	42.19	1.50	0.32	0.000	1.250	1.250
415	2004	vboro	4	T	1	42.15	1.21	0.32	0.000	1.250	1.250
106	2004	vboro	1	W	1	41.70	1.57	0.29	0.000	1.250	1.250
207	2004	vboro	2	W	1	41.60	1.68	0.34	0.000	1.250	1.250
313	2004	vboro	3	W	1	41.62	1.51	0.31	0.000	1.250	1.250
417	2004	vboro	4	W	1	41.84	1.47	0.29	0.000	1.250	1.250
control	2004	ftbarn	0	R	0	42.74	1.54	0.31	0.000	1.250	1.250
control	2004	ftbarn	0	R	0	41.48	1.49	0.29	0.000	1.250	1.250
control	2004	ftbarn	0	T	0	42.74	1.35	0.33	0.000	1.250	1.250

(*Table B3*, continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
control	2004	ftbarn	0	T	0	42.23	1.37	0.34	0.000	1.250	1.250
control	2004	ftbarn	0	T	0	42.11	1.53	0.32	0.000	1.250	1.250
control	2004	ftbarn	0	W	0	42.86	1.62	0.32	0.000	1.250	1.250
control	2004	ftbarn	0	W	0	41.91	1.50	0.34	0.000	1.250	1.250
control	2004	ftbarn	0	W	0	42.33	1.75	0.29	0.000	1.250	1.250
120	2004	ftbarn	1	R	5	36.52	2.61	0.27	0.282	1.250	0.968
202	2004	ftbarn	2	R	5	25.54	1.57	0.20	0.494	1.250	0.756
318	2004	ftbarn	3	R	5	35.11	2.17	0.21	0.313	1.250	0.937
403	2004	ftbarn	4	R	5	33.93	2.31	0.25	0.313	1.250	0.937
101	2004	ftbarn	1	T	5	29.84	1.59	0.13	0.400	1.250	0.850
220	2004	ftbarn	2	T	5	31.61	1.76	0.14	0.319	1.250	0.931
306	2004	ftbarn	3	T	5	28.06	1.58	0.11	0.528	1.250	0.722
415	2004	ftbarn	4	T	5	*	*	*	*	*	*
106	2004	ftbarn	1	W	5	35.49	2.38	0.20	0.293	1.250	0.957
207	2004	ftbarn	2	W	5	32.04	2.05	0.15	0.344	1.148	0.804
313	2004	ftbarn	3	W	5	25.08	1.83	0.15	0.519	1.250	0.731
417	2004	ftbarn	4	W	5	*	*	*	*	*	*
120	2004	ftbarn	1	R	4	33.48	2.14	0.19	0.319	1.250	0.931
202	2004	ftbarn	2	R	4	35.45	2.39	0.19	0.125	0.625	0.500
318	2004	ftbarn	3	R	4	*	*	*	*	*	*
403	2004	ftbarn	4	R	4	32.82	2.12	0.22	0.319	1.250	0.931
101	2004	ftbarn	1	T	4	33.45	1.76	0.15	0.258	1.250	0.992
220	2004	ftbarn	2	T	4	37.51	1.69	0.19	0.213	1.250	1.037
306	2004	ftbarn	3	T	4	38.33	1.79	0.18	0.213	1.250	1.037
415	2004	ftbarn	4	T	4	28.56	1.69	0.16	0.389	1.250	0.861

(*Table B3*, continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
106	2004	ftbarn	1	W	4	33.98	2.21	0.22	0.318	1.250	0.932
207	2004	ftbarn	2	W	4	31.95	1.91	0.20	0.430	1.250	0.820
313	2004	ftbarn	3	W	4	31.00	2.18	0.20	0.370	1.250	0.880
417	2004	ftbarn	4	W	4	32.97	2.07	0.19	0.314	1.250	0.936
120	2004	ftbarn	1	R	3	39.30	2.03	0.33	0.170	1.250	1.080
202	2004	ftbarn	2	R	3	40.86	2.76	0.41	0.155	1.250	1.095
318	2004	ftbarn	3	R	3	41.32	2.15	0.34	0.111	1.250	1.139
403	2004	ftbarn	4	R	3	39.85	1.86	0.37	0.106	1.250	1.144
101	2004	ftbarn	1	T	3	41.33	1.45	0.24	0.110	1.250	1.140
220	2004	ftbarn	2	T	3	41.44	1.26	0.23	0.103	1.250	1.147
306	2004	ftbarn	3	T	3	38.91	1.40	0.24	0.140	1.250	1.110
415	2004	ftbarn	4	T	3	39.64	1.37	0.23	0.144	1.250	1.106
106	2004	ftbarn	1	W	3	41.20	2.09	0.32	0.118	1.250	1.132
207	2004	ftbarn	2	W	3	36.56	2.03	0.33	0.160	1.250	1.090
313	2004	ftbarn	3	W	3	40.23	2.17	0.34	0.138	1.250	1.112
417	2004	ftbarn	4	W	3	38.35	2.04	0.31	0.202	1.250	1.048
120	2004	ftbarn	1	R	2	40.84	1.40	0.27	0.000	1.250	1.250
202	2004	ftbarn	2	R	2	41.11	1.63	0.32	0.000	1.250	1.250
318	2004	ftbarn	3	R	2	42.19	1.44	0.32	0.000	1.250	1.250
403	2004	ftbarn	4	R	2	39.36	1.51	0.32	0.000	1.250	1.250
101	2004	ftbarn	1	T	2	42.01	1.31	0.27	0.000	1.250	1.250
220	2004	ftbarn	2	T	2	40.71	1.32	0.24	0.000	1.250	1.250
306	2004	ftbarn	3	T	2	41.65	1.30	0.29	0.000	1.250	1.250
415	2004	ftbarn	4	T	2	42.52	1.12	0.28	0.000	1.250	1.250

(*Table B3,* continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
106	2004	ftbarn	1	W	2	41.08	1.57	0.30	0.000	1.250	1.250
207	2004	ftbarn	2	W	2	39.79	1.47	0.27	0.000	1.250	1.250
313	2004	ftbarn	3	W	2	41.02	1.72	0.35	0.000	1.250	1.250
417	2004	ftbarn	4	W	2	38.32	1.60	0.28	0.000	1.250	1.250
120	2004	ftbarn	1	R	1	41.89	1.47	0.30	0.000	1.250	1.250
202	2004	ftbarn	2	R	1	42.34	1.64	0.31	0.000	1.250	1.250
318	2004	ftbarn	3	R	1	42.09	1.46	0.29	0.000	1.250	1.250
403	2004	ftbarn	4	R	1	41.98	1.35	0.30	0.000	1.250	1.250
101	2004	ftbarn	1	T	1	42.31	1.33	0.29	0.000	1.250	1.250
220	2004	ftbarn	2	T	1	42.48	1.20	0.28	0.000	1.250	1.250
306	2004	ftbarn	3	T	1	42.66	1.41	0.31	0.000	1.250	1.250
415	2004	ftbarn	4	T	1	42.61	1.30	0.29	0.000	1.250	1.250
106	2004	ftbarn	1	W	1	42.16	1.60	0.27	0.000	1.250	1.250
207	2004	ftbarn	2	W	1	41.71	1.48	0.30	0.000	1.250	1.250
313	2004	ftbarn	3	W	1	42.50	1.62	0.29	0.000	1.250	1.250
417	2004	ftbarn	4	W	1	41.95	1.52	0.28	0.000	1.250	1.250
control	2005	vboro	0	R	0	41.38	1.32	0.34	0.000	1.250	1.250
control	2005	vboro	0	R	0	42.00	1.53	0.36	0.000	1.250	1.250
control	2005	vboro	0	R	0	41.76	1.26	0.31	0.000	1.250	1.250
control	2005	vboro	0	T	0	41.55	1.07	0.34	0.000	1.250	1.250
control	2005	vboro	0	T	0	41.85	1.10	0.31	0.000	1.250	1.250
control	2005	vboro	0	T	0	41.85	1.04	0.28	0.000	1.250	1.250
control	2005	vboro	0	W	0	41.55	1.08	0.27	0.000	1.250	1.250
control	2005	vboro	0	W	0	41.51	1.32	0.29	0.000	1.250	1.250

(*Table B3*, continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
control	2005	vboro	0	W	0	41.54	1.12	0.24	0.000	1.250	1.250
120	2005	vboro	1	R	5	42.37	2.77	0.24	0.073	0.625	0.552
202	2005	vboro	2	R	5	40.08	2.36	0.21	0.095	0.625	0.530
318	2005	vboro	3	R	5	31.34	2.31	0.19	0.223	0.625	0.402
403	2005	vboro	4	R	5	43.25	2.96	0.56	0.038	0.416	0.378
101	2005	vboro	1	T	5	32.19	1.36	0.13	0.314	1.250	0.936
220	2005	vboro	2	T	5	20.43	1.12	0.14	0.483	1.250	0.767
306	2005	vboro	3	T	5	36.29	1.82	0.15	0.364	1.250	0.886
415	2005	vboro	4	T	5	39.88	1.99	0.17	0.133	0.625	0.492
106	2005	vboro	1	W	5	32.74	2.19	0.18	0.481	1.250	0.769
207	2005	vboro	2	W	5	39.05	2.38	0.19	0.068	0.359	0.291
313	2005	vboro	3	W	5	43.25	1.84	0.21	0.003	0.024	0.021
417	2005	vboro	4	W	5	39.88	2.00	0.23	0.007	0.026	0.019
120	2005	vboro	1	R	4	35.70	2.38	0.22	0.079	0.390	0.311
202	2005	vboro	2	R	4	38.59	2.51	0.21	0.050	0.329	0.279
318	2005	vboro	3	R	4	39.65	2.30	NSS	NSS	NSS	*
403	2005	vboro	4	R	4	41.59	2.94	0.30	0.034	0.393	0.359
101	2005	vboro	1	T	4	32.36	1.52	0.15	0.134	0.500	0.366
220	2005	vboro	2	T	4	29.35	1.10	0.12	0.135	0.500	0.365
306	2005	vboro	3	T	4	40.42	1.17	0.12	0.090	0.500	0.410
415	2005	vboro	4	T	4	39.54	1.79	0.17	0.076	0.441	0.365
106	2005	vboro	1	W	4	38.20	1.87	0.16	0.011	0.041	0.030
207	2005	vboro	2	W	4	38.38	1.59	0.16	0.062	0.302	0.240
313	2005	vboro	3	W	4	41.96	1.95	0.21	0.006	0.053	0.047
417	2005	vboro	4	W	4	37.31	1.83	0.17	0.068	0.419	0.351

(*Table B3*, continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
120	2005	vboro	1	R	3	44.43	1.90	0.22	0.007	0.158	0.151
202	2005	vboro	2	R	3	39.92	2.00	0.23	0.075	0.500	0.425
318	2005	vboro	3	R	3	39.87	2.05	0.24	0.053	0.500	0.447
403	2005	vboro	4	R	3	43.62	2.26	0.29	0.016	0.233	0.217
101	2005	vboro	1	T	3	43.63	1.26	0.14	0.015	0.500	0.485
220	2005	vboro	2	T	3	40.12	1.39	0.17	0.061	0.500	0.439
306	2005	vboro	3	T	3	41.20	1.42	0.17	0.067	0.500	0.433
415	2005	vboro	4	T	3	41.33	1.39	0.16	0.037	0.500	0.463
106	2005	vboro	1	W	3	39.18	1.41	0.18	0.053	0.500	0.447
207	2005	vboro	2	W	3	38.32	1.61	0.20	0.051	0.500	0.449
313	2005	vboro	3	W	3	43.58	1.67	0.24	0.062	1.250	1.188
417	2005	vboro	4	W	3	42.01	1.59	0.20	0.088	1.250	1.162
120	2005	vboro	1	R	2	43.63	1.72	0.35	0.000	1.250	1.250
202	2005	vboro	2	R	2	43.45	1.81	0.30	0.000	1.250	1.250
318	2005	vboro	3	R	2	42.87	1.39	0.29	0.000	1.250	1.250
403	2005	vboro	4	R	2	43.58	1.90	0.33	0.000	1.250	1.250
101	2005	vboro	1	T	2	43.29	1.16	0.23	0.000	1.250	1.250
220	2005	vboro	2	T	2	42.11	1.12	0.22	0.000	1.250	1.250
306	2005	vboro	3	T	2	43.46	1.24	0.23	0.000	1.250	1.250
415	2005	vboro	4	T	2	43.22	1.17	0.22	0.000	1.250	1.250
106	2005	vboro	1	W	2	42.83	1.52	0.25	0.000	1.250	1.250
207	2005	vboro	2	W	2	42.84	1.25	0.26	0.000	1.250	1.250
313	2005	vboro	3	W	2	42.89	1.37	0.27	0.000	1.250	1.250
417	2005	vboro	4	W	2	42.91	1.12	0.23	0.000	1.250	1.250

(*Table B3*, continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
120	2005	vboro	1	R	1	42.42	1.33	0.27	0.000	1.250	1.250
202	2005	vboro	2	R	1	42.80	1.67	0.35	0.000	1.250	1.250
318	2005	vboro	3	R	1	42.17	1.28	0.24	0.000	1.250	1.250
403	2005	vboro	4	R	1	42.54	1.51	0.26	0.000	1.250	1.250
101	2005	vboro	1	T	1	42.46	0.94	0.23	0.000	1.250	1.250
220	2005	vboro	2	T	1	42.61	0.97	0.20	0.000	1.250	1.250
306	2005	vboro	3	T	1	41.83	0.94	0.23	0.000	1.250	1.250
415	2005	vboro	4	T	1	41.96	0.74	0.20	0.000	1.250	1.250
106	2005	vboro	1	W	1	42.03	1.00	0.21	0.000	1.250	1.250
207	2005	vboro	2	W	1	42.56	1.12	0.21	0.000	1.250	1.250
313	2005	vboro	3	W	1	40.86	1.15	0.22	0.000	1.250	1.250
417	2005	vboro	4	W	1	42.29	1.21	0.23	0.000	1.250	1.250
control	2005	ftbarn	0	R	0	42.08	1.08	0.31	0.000	1.250	1.250
control	2005	ftbarn	0	R	0	41.57	1.09	0.30	0.000	1.250	1.250
control	2005	ftbarn	0	R	0	42.00	1.34	0.30	0.000	1.250	1.250
control	2005	ftbarn	0	T	0	42.20	1.09	0.34	0.000	1.250	1.250
control	2005	ftbarn	0	T	0	42.15	1.19	0.36	0.000	1.250	1.250
control	2005	ftbarn	0	T	0	41.98	1.26	0.38	0.000	1.250	1.250
control	2005	ftbarn	0	W	0	42.04	1.13	0.34	0.000	1.250	1.250
control	2005	ftbarn	0	W	0	41.26	1.09	0.32	0.000	1.250	1.250
control	2005	ftbarn	0	W	0	41.08	1.20	0.36	0.000	1.250	1.250
120	2005	ftbarn	1	R	5	34.24	2.26	0.16	0.510	1.250	0.740
202	2005	ftbarn	2	R	5	32.42	2.03	0.15	0.446	1.250	0.804
318	2005	ftbarn	3	R	5	38.70	2.54	0.17	0.390	1.102	0.712
403	2005	ftbarn	4	R	5	34.42	2.17	0.16	0.539	1.250	0.711

(*Table B3*. continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
101	2005	ftbarn	1	T	5	31.52	1.44	0.13	0.317	1.250	0.933
220	2005	ftbarn	2	T	5	21.46	1.10	0.13	0.473	1.250	0.777
306	2005	ftbarn	3	T	5	28.06	1.64	0.17	0.414	1.250	0.836
415	2005	ftbarn	4	T	5	23.84	1.33	0.16	0.430	1.250	0.820
106	2005	ftbarn	1	W	5	31.54	1.90	0.13	0.560	1.250	0.690
207	2005	ftbarn	2	W	5	29.46	1.74	0.22	0.131	0.500	0.369
313	2005	ftbarn	3	W	5	18.30	1.17	0.12	0.705	1.250	0.545
417	2005	ftbarn	4	W	5	38.60	1.94	0.15	0.432	1.221	0.789
120	2005	ftbarn	1	R	4	31.81	2.01	0.17	0.478	1.250	0.772
202	2005	ftbarn	2	R	4	39.53	2.10	0.20	0.237	1.250	1.013
318	2005	ftbarn	3	R	4	27.62	1.58	0.15	0.536	1.250	0.714
403	2005	ftbarn	4	R	4	36.35	2.19	0.16	0.512	1.250	0.738
101	2005	ftbarn	1	T	4	25.60	1.12	0.11	0.524	1.250	0.726
220	2005	ftbarn	2	T	4	27.84	1.16	0.12	0.487	1.250	0.763
306	2005	ftbarn	3	T	4	27.53	1.43	0.15	0.476	1.250	0.774
415	2005	ftbarn	4	T	4	18.50	0.95	0.14	0.496	1.250	0.754
106	2005	ftbarn	1	W	4	29.02	1.83	0.14	0.691	1.250	0.559
207	2005	ftbarn	2	W	4	26.40	1.38	0.15	0.493	1.250	0.757
313	2005	ftbarn	3	W	4	32.46	1.98	0.16	0.541	1.250	0.709
417	2005	ftbarn	4	W	4	39.78	1.45	0.19	0.182	1.250	1.068
120	2005	ftbarn	1	R	3	26.28	1.11	0.19	0.239	1.250	1.011
202	2005	ftbarn	2	R	3	34.06	1.47	0.22	0.258	1.250	0.992
318	2005	ftbarn	3	R	3	32.99	1.84	0.23	0.427	1.250	0.823
403	2005	ftbarn	4	R	3	27.33	1.20	0.18	0.514	1.250	0.736

(*Table B3*, continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
101	2005	ftbarn	1	T	3	35.08	1.14	0.14	0.252	1.250	0.998
220	2005	ftbarn	2	T	3	30.07	1.14	0.15	0.352	1.250	0.898
306	2005	ftbarn	3	T	3	39.09	1.52	0.19	0.229	1.250	1.021
415	2005	ftbarn	4	T	3	30.84	1.86	0.13	0.714	1.250	0.536
106	2005	ftbarn	1	W	3	31.62	1.56	0.25	0.320	1.250	0.930
207	2005	ftbarn	2	W	3	32.00	1.57	0.20	0.333	1.250	0.917
313	2005	ftbarn	3	W	3	26.98	1.24	0.17	0.645	1.250	0.605
417	2005	ftbarn	4	W	3	23.01	1.17	0.22	0.503	1.250	0.747
120	2005	ftbarn	1	R	2	41.30	1.29	0.26	0.000	1.250	1.250
202	2005	ftbarn	2	R	2	43.21	1.32	0.30	0.000	1.250	1.250
318	2005	ftbarn	3	R	2	41.17	1.43	0.29	0.000	1.250	1.250
403	2005	ftbarn	4	R	2	42.57	1.60	0.28	0.000	1.250	1.250
101	2005	ftbarn	1	T	2	41.31	1.20	0.28	0.000	1.250	1.250
220	2005	ftbarn	2	T	2	41.87	1.16	0.21	0.000	1.250	1.250
306	2005	ftbarn	3	T	2	42.01	1.00	0.20	0.000	1.250	1.250
415	2005	ftbarn	4	T	2	41.48	1.31	0.24	0.000	1.250	1.250
106	2005	ftbarn	1	W	2	41.29	1.60	0.26	0.000	1.250	1.250
207	2005	ftbarn	2	W	2	40.71	1.40	0.25	0.000	1.250	1.250
313	2005	ftbarn	3	W	2	42.26	1.28	0.27	0.000	1.250	1.250
417	2005	ftbarn	4	W	2	42.15	1.30	0.25	0.000	1.250	1.250
101	2005	ftbarn	1	R	1	42.26	1.25	0.28	0.000	1.250	1.250
120	2005	ftbarn	1	R	1	41.85	1.22	0.25	0.000	1.250	1.250
220	2005	ftbarn	2	R	1	42.31	1.15	0.23	0.000	1.250	1.250
202	2005	ftbarn	2	R	1	42.03	1.29	0.25	0.000	1.250	1.250

(*Table B3*, continued)

Plot	Year	Location	Block	Cover	Retrieval	% C	% N	% P	Sand Wt. (g)	Sample Wt. (g)	Net Weight (g)
101	2005	ftbarn	3	T	1	42.00	0.90	0.22	0.000	1.250	1.250
220	2005	ftbarn	3	T	1	42.97	1.09	0.22	0.000	1.250	1.250
306	2005	ftbarn	4	T	1	42.70	1.00	0.25	0.000	1.250	1.250
415	2005	ftbarn	4	T	1	41.87	1.22	0.26	0.000	1.250	1.250
106	2005	ftbarn	1	W	1	41.69	1.19	0.24	0.000	1.250	1.250
207	2005	ftbarn	2	W	1	41.05	1.24	0.23	0.000	1.250	1.250
313	2005	ftbarn	3	W	1	42.21	1.19	0.25	0.000	1.250	1.250
417	2005	ftbarn	4	W	1	41.33	1.15	0.26	0.000	1.250	1.250

Table B4. Cover crop surface residue data as measured from a 7.6 m line transect of two adjacent cotton rows measured May 19-21, 2004 and June 1-3, 2005 and multiplied by four to determine residue cover percent.

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H101	ftbarn	1	Trit.	2	0.00	1	2004	18	72
H101	ftbarn	1	Trit.	2	0.00	2	2004	15	60
H101	ftbarn	1	Trit.	2	0.00	3	2005	9	36
H101	ftbarn	1	Trit.	2	0.00	4	2005	7	28
H102	ftbarn	1	Trit.	1	22.4	1	2004	20	80
H102	ftbarn	1	Trit.	1	22.4	2	2004	20	80
H102	ftbarn	1	Trit.	1	22.4	3	2005	15	60
H102	ftbarn	1	Trit.	1	22.4	4	2005	13	52
H103	ftbarn	1	Trit.	3	22.4	1	2004	20	80
H103	ftbarn	1	Trit.	3	22.4	2	2004	21	84
H103	ftbarn	1	Trit.	3	22.4	3	2005	18	72
H103	ftbarn	1	Trit.	3	22.4	4	2005	18	72
H104	ftbarn	1	Wheat	3	0.00	1	2004	20	80
H104	ftbarn	1	Wheat	3	0.00	2	2004	21	84
H104	ftbarn	1	Wheat	3	0.00	3	2005	14	56
H104	ftbarn	1	Wheat	3	0.00	4	2005	11	44

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H101	ftbarn	1	Trit.	2	0.00	1	2004	18	72
H101	ftbarn	1	Trit.	2	0.00	2	2004	15	60
H101	ftbarn	1	Trit.	2	0.00	3	2005	9	36
H101	ftbarn	1	Trit.	2	0.00	4	2005	7	28
H102	ftbarn	1	Trit.	1	22.4	1	2004	20	80
H102	ftbarn	1	Trit.	1	22.4	2	2004	20	80
H102	ftbarn	1	Trit.	1	22.4	3	2005	15	60
H102	ftbarn	1	Trit.	1	22.4	4	2005	13	52
H103	ftbarn	1	Trit.	3	22.4	1	2004	20	80
H103	ftbarn	1	Trit.	3	22.4	2	2004	21	84
H103	ftbarn	1	Trit.	3	22.4	3	2005	18	72
H103	ftbarn	1	Trit.	3	22.4	4	2005	18	72
H104	ftbarn	1	Wheat	3	0.00	1	2004	20	80
H104	ftbarn	1	Wheat	3	0.00	2	2004	21	84
H104	ftbarn	1	Wheat	3	0.00	3	2005	14	56
H104	ftbarn	1	Wheat	3	0.00	4	2005	11	44
H105	ftbarn	1	Wheat	3	22.4	1	2004	18	72
H105	ftbarn	1	Wheat	3	22.4	2	2004	15	60
H105	ftbarn	1	Wheat	3	22.4	3	2005	14	56
H105	ftbarn	1	Wheat	3	22.4	4	2005	15	60

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H106	ftbarn	1	Wheat	2	0.00	1	2004	10	40
H106	ftbarn	1	Wheat	2	0.00	2	2004	13	52
H106	ftbarn	1	Wheat	2	0.00	3	2005	8	32
H106	ftbarn	1	Wheat	2	0.00	4	2005	7	28
H108	ftbarn	1	Rye	1	0.00	1	2004	10	40
H108	ftbarn	1	Rye	1	0.00	2	2004	8	32
H108	ftbarn	1	Rye	1	0.00	3	2005	8	32
H108	ftbarn	1	Rye	1	0.00	4	2005	7	28
H109	ftbarn	1	Rye	3	22.4	1	2004	16	64
H109	ftbarn	1	Rye	3	22.4	2	2004	12	48
H109	ftbarn	1	Rye	3	22.4	3	2005	20	80
H109	ftbarn	1	Rye	3	22.4	4	2005	21	84
H110	ftbarn	1	Rye	2	22.4	1	2004	20	80
H110	ftbarn	1	Rye	2	22.4	2	2004	18	72
H110	ftbarn	1	Rye	2	22.4	3	2005	15	60
H110	ftbarn	1	Rye	2	22.4	4	2005	17	68
H111	ftbarn	1	Trit.	3	0.00	1	2004	13	52
H111	ftbarn	1	Trit.	3	0.00	2	2004	12	48
H111	ftbarn	1	Trit.	3	0.00	3	2005	10	40
H111	ftbarn	1	Trit.	3	0.00	4	2005	13	52

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H106	ftbarn	1	Wheat	2	0.00	1	2004	10	40
H106	ftbarn	1	Wheat	2	0.00	2	2004	13	52
H106	ftbarn	1	Wheat	2	0.00	3	2005	8	32
H106	ftbarn	1	Wheat	2	0.00	4	2005	7	28
H108	ftbarn	1	Rye	1	0.00	1	2004	10	40
H108	ftbarn	1	Rye	1	0.00	2	2004	8	32
H108	ftbarn	1	Rye	1	0.00	3	2005	8	32
H108	ftbarn	1	Rye	1	0.00	4	2005	7	28
H109	ftbarn	1	Rye	3	22.4	1	2004	16	64
H112	ftbarn	1	Trit.	1	0.00	1	2004	12	48
H112	ftbarn	1	Trit.	1	0.00	2	2004	14	56
H112	ftbarn	1	Trit.	1	0.00	3	2005	8	32
H112	ftbarn	1	Trit.	1	0.00	4	2005	9	36
H113	ftbarn	1	Trit.	2	22.4	1	2004	16	64
H113	ftbarn	1	Trit.	2	22.4	2	2004	19	76
H113	ftbarn	1	Trit.	2	22.4	3	2005	15	60
H113	ftbarn	1	Trit.	2	22.4	4	2005	19	76

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H114	ftbarn	1	Wheat	1	0.00	1	2004	10	40
H114	ftbarn	1	Wheat	1	0.00	2	2004	9	36
H114	ftbarn	1	Wheat	1	0.00	3	2005	6	24
H114	ftbarn	1	Wheat	1	0.00	4	2005	8	32
H115	ftbarn	1	Wheat	2	22.4	1	2004	17	68
H115	ftbarn	1	Wheat	2	22.4	2	2004	19	76
H115	ftbarn	1	Wheat	2	22.4	3	2005	14	56
H115	ftbarn	1	Wheat	2	22.4	4	2005	14	56
H116	ftbarn	1	Wheat	1	22.4	1	2004	17	68
H116	ftbarn	1	Wheat	1	22.4	2	2004	16	64
H116	ftbarn	1	Wheat	1	22.4	3	2005	13	52
H116	ftbarn	1	Wheat	1	22.4	4	2005	14	56
H118	ftbarn	1	Rye	3	0.00	1	2004	13	52
H118	ftbarn	1	Rye	3	0.00	2	2004	14	56
H118	ftbarn	1	Rye	3	0.00	3	2005	6	24
H118	ftbarn	1	Rye	3	0.00	4	2005	11	44
H119	ftbarn	1	Rye	1	22.4	1	2004	15	60
H119	ftbarn	1	Rye	1	22.4	2	2004	14	56

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H119	ftbarn	1	Rye	1	22.4	3	2005	13	52
H119	ftbarn	1	Rye	1	22.4	4	2005	12	48
H120	ftbarn	1	Rye	2	0.00	1	2004	14	56
H120	ftbarn	1	Rye	2	0.00	2	2004	13	52
H120	ftbarn	1	Rye	2	0.00	3	2005	5	20
H120	ftbarn	1	Rye	2	0.00	4	2005	9	36
H202	ftbarn	2	Rye	2	0.00	1	2004	15	60
H202	ftbarn	2	Rye	2	0.00	2	2004	15	60
H202	ftbarn	2	Rye	2	0.00	3	2005	16	64
H202	ftbarn	2	Rye	2	0.00	4	2005	19	76
H203	ftbarn	2	Rye	1	22.4	1	2004	18	72
H203	ftbarn	2	Rye	1	22.4	2	2004	18	72
H203	ftbarn	2	Rye	1	22.4	3	2005	21	84
H203	ftbarn	2	Rye	1	22.4	4	2005	24	96
H204	ftbarn	2	Rye	3	22.4	1	2004	21	84
H204	ftbarn	2	Rye	3	22.4	2	2004	20	80
H204	ftbarn	2	Rye	3	22.4	3	2005	18	72
H204	ftbarn	2	Rye	3	22.4	4	2005	22	88

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H205	ftbarn	2	Wheat	3	0.00	1	2004	13	52
H205	ftbarn	2	Wheat	3	0.00	2	2004	11	44
H205	ftbarn	2	Wheat	3	0.00	3	2005	10	40
H205	ftbarn	2	Wheat	3	0.00	4	2005	10	40
H206	ftbarn	2	Wheat	2	22.4	1	2004	18	72
H206	ftbarn	2	Wheat	2	22.4	2	2004	16	64
H206	ftbarn	2	Wheat	2	22.4	3	2005	13	52
H206	ftbarn	2	Wheat	2	22.4	4	2005	12	48
H207	ftbarn	2	Wheat	2	0.00	1	2004	10	40
H207	ftbarn	2	Wheat	2	0.00	2	2004	9	36
H207	ftbarn	2	Wheat	2	0.00	3	2005	6	24
H207	ftbarn	2	Wheat	2	0.00	4	2005	9	36
H208	ftbarn	2	Trit.	1	22.4	1	2004	15	60
H208	ftbarn	2	Trit.	1	22.4	2	2004	13	52
H208	ftbarn	2	Trit.	1	22.4	3	2005	10	40
H208	ftbarn	2	Trit.	1	22.4	4	2005	13	52
H209	ftbarn	2	Trit.	2	22.4	1	2004	17	68
H209	ftbarn	2	Trit.	2	22.4	2	2004	15	60

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H209	ftbarn	2	Trit.	2	22.4	3	2005	16	64
H209	ftbarn	2	Trit.	2	22.4	4	2005	17	68
H210	ftbarn	2	Trit.	3	22.4	1	2004	13	52
H210	ftbarn	2	Trit.	3	22.4	2	2004	16	64
H210	ftbarn	2	Trit.	3	22.4	3	2005	16	64
H210	ftbarn	2	Trit.	3	22.4	4	2005	19	76
H212	ftbarn	2	Rye	3	0.00	1	2004	17	68
H212	ftbarn	2	Rye	3	0.00	2	2004	16	64
H212	ftbarn	2	Rye	3	0.00	3	2005	17	68
H212	ftbarn	2	Rye	3	0.00	4	2005	13	52
H213	ftbarn	2	Rye	2	22.4	1	2004	17	68
H213	ftbarn	2	Rye	2	22.4	2	2004	16	64
H213	ftbarn	2	Rye	2	22.4	3	2005	22	88
H213	ftbarn	2	Rye	2	22.4	4	2005	20	80
H214	ftbarn	2	Rye	1	0.00	1	2004	10	40
H214	ftbarn	2	Rye	1	0.00	2	2004	11	44
H214	ftbarn	2	Rye	1	0.00	3	2005	15	60
H214	ftbarn	2	Rye	1	0	4	2005	16	64

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H215	ftbarn	2	Wheat	1	22.4	1	2004	14	56
H215	ftbarn	2	Wheat	1	22.4	2	2004	12	48
H215	ftbarn	2	Wheat	1	22.4	3	2005	14	56
H215	ftbarn	2	Wheat	1	22.4	4	2005	11	44
H216	ftbarn	2	Wheat	1	0.00	1	2004	7	28
H216	ftbarn	2	Wheat	1	0.00	2	2004	8	32
H216	ftbarn	2	Wheat	1	0.00	3	2005	8	32
H216	ftbarn	2	Wheat	1	0.00	4	2005	7	28
H217	ftbarn	2	Wheat	3	22.4	1	2004	10	40
H217	ftbarn	2	Wheat	3	22.4	2	2004	12	48
H217	ftbarn	2	Wheat	3	22.4	3	2005	14	56
H217	ftbarn	2	Wheat	3	22.4	4	2005	13	52
H218	ftbarn	2	Trit.	1	0.00	1	2004	4	16
H218	ftbarn	2	Trit.	1	0.00	2	2004	5	20
H218	ftbarn	2	Trit.	1	0.00	3	2005	10	40
H218	ftbarn	2	Trit.	1	0.00	4	2005	13	52
H219	ftbarn	2	Trit.	3	0.00	1	2004	8	32
H219	ftbarn	2	Trit.	3	0.00	2	2004	7	28

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H219	ftbarn	2	Trit.	3	0.00	3	2005	9	36
H219	ftbarn	2	Trit.	3	0.00	4	2005	9	36
H220	ftbarn	2	Trit.	2	0.00	1	2004	12	48
H220	ftbarn	2	Trit.	2	0.00	2	2004	9	36
H220	ftbarn	2	Trit.	2	0.00	3	2005	9	36
H220	ftbarn	2	Trit.	2	0.00	4	2005	11	44
H301	ftbarn	3	Wheat	2	22.4	1	2004	13	52
H301	ftbarn	3	Wheat	2	22.4	2	2004	11	44
H301	ftbarn	3	Wheat	2	22.4	3	2005	14	56
H301	ftbarn	3	Wheat	2	22.4	4	2005	13	52
H302	ftbarn	3	Wheat	1	0.00	1	2004	8	32
H302	ftbarn	3	Wheat	1	0.00	2	2004	6	24
H302	ftbarn	3	Wheat	1	0.00	3	2005	5	20
H302	ftbarn	3	Wheat	1	0.00	4	2005	8	32
H303	ftbarn	3	Wheat	3	22.4	1	2004	15	60
H303	ftbarn	3	Wheat	3	22.4	2	2004	14	56
H303	ftbarn	3	Wheat	3	22.4	3	2005	16	64
H303	ftbarn	3	Wheat	3	22.4	4	2005	14	56

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H305	ftbarn	3	Trit.	1	22.4	1	2004	10	40
H305	ftbarn	3	Trit.	1	22.4	2	2004	10	40
H305	ftbarn	3	Trit.	1	22.4	3	2005	7	28
H305	ftbarn	3	Trit.	1	22.4	4	2005	9	36
H306	ftbarn	3	Trit.	2	0.00	1	2004	9	36
H306	ftbarn	3	Trit.	2	0.00	2	2004	13	52
H306	ftbarn	3	Trit.	2	0.00	3	2005	12	48
H306	ftbarn	3	Trit.	2	0.00	4	2005	14	56
H307	ftbarn	3	Trit.	3	22.4	1	2004	15	60
H307	ftbarn	3	Trit.	3	22.4	2	2004	15	60
H307	ftbarn	3	Trit.	3	22.4	3	2005	18	72
H307	ftbarn	3	Trit.	3	22.4	4	2005	19	76
H308	ftbarn	3	Rye	3	0.00	1	2004	10	40
H308	ftbarn	3	Rye	3	0.00	2	2004	13	52
H308	ftbarn	3	Rye	3	0.00	3	2005	9	36
H308	ftbarn	3	Rye	3	0.00	4	2005	9	36
H309	ftbarn	3	Rye	1	22.4	1	2004	8	32
H309	ftbarn	3	Rye	1	22.4	2	2004	8	32

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H309	ftbarn	3	Rye	1	22.4	3	2005	10	40
H309	ftbarn	3	Rye	1	22.4	4	2005	11	44
H310	ftbarn	3	Rye	1	0.00	1	2004	4	16
H310	ftbarn	3	Rye	1	0.00	2	2004	6	24
H310	ftbarn	3	Rye	1	0.00	3	2005	9	36
H310	ftbarn	3	Rye	1	0.00	4	2005	12	48
H311	ftbarn	3	Wheat	1	22.4	1	2004	11	44
H311	ftbarn	3	Wheat	1	22.4	2	2004	13	52
H311	ftbarn	3	Wheat	1	22.4	3	2005	14	56
H311	ftbarn	3	Wheat	1	22.4	4	2005	12	48
H312	ftbarn	3	Wheat	3	0.00	1	2004	9	36
H312	ftbarn	3	Wheat	3	0.00	2	2004	11	44
H312	ftbarn	3	Wheat	3	0.00	3	2005	11	44
H312	ftbarn	3	Wheat	3	0.00	4	2005	11	44
H313	ftbarn	3	Wheat	2	0.00	1	2004	8	32
H313	ftbarn	3	Wheat	2	0.00	2	2004	8	32
H313	ftbarn	3	Wheat	2	0.00	3	2005	11	44

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H313	ftbarn	3	Wheat	2	0.00	4	2005	10	40
H315	ftbarn	3	Trit.	2	22.4	1	2004	12	48
H315	ftbarn	3	Trit.	2	22.4	2	2004	15	60
H315	ftbarn	3	Trit.	2	22.4	3	2005	15	60
H315	ftbarn	3	Trit.	2	22.4	4	2005	17	68
H316	ftbarn	3	Trit.	1	0.00	1	2004	6	24
H316	ftbarn	3	Trit.	1	0.00	2	2004	9	36
H316	ftbarn	3	Trit.	1	0.00	3	2005	13	52
H316	ftbarn	3	Trit.	1	0.00	4	2005	14	56
H317	ftbarn	3	Trit.	3	0.00	1	2004	11	44
H317	ftbarn	3	Trit.	3	0.00	2	2004	12	48
H317	ftbarn	3	Trit.	3	0.00	3	2005	11	44
H317	ftbarn	3	Trit.	3	0.00	4	2005	15	60
H318	ftbarn	3	Rye	2	0.00	1	2004	11	44
H318	ftbarn	3	Rye	2	0.00	2	2004	13	52
H318	ftbarn	3	Rye	2	0.00	3	2005	10	40
H318	ftbarn	3	Rye	2	0.00	4	2005	13	52
H319	ftbarn	3	Rye	2	22.4	1	2004	13	52

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H319	ftbarn	3	Rye	2	22.4	2	2004	14	56
H319	ftbarn	3	Rye	2	22.4	3	2005	19	76
H319	ftbarn	3	Rye	2	22.4	4	2005	18	72
H320	ftbarn	3	Rye	3	22.4	1	2004	7	28
H320	ftbarn	3	Rye	3	22.4	2	2004	7	28
H320	ftbarn	3	Rye	3	22.4	3	2005	17	68
H320	ftbarn	3	Rye	3	22.4	4	2005	19	76
H401	ftbarn	4	Rye	2	22.4	1	2004	16	64
H401	ftbarn	4	Rye	2	22.4	2	2004	19	76
H401	ftbarn	4	Rye	2	22.4	3	2005	22	88
H401	ftbarn	4	Rye	2	22.4	4	2005	21	84
H402	ftbarn	4	Rye	3	22.4	1	2004	15	60
H402	ftbarn	4	Rye	3	22.4	2	2004	13	52
H402	ftbarn	4	Rye	3	22.4	3	2005	21	84
H402	ftbarn	4	Rye	3	22.4	4	2005	21	84
H403	ftbarn	4	Rye	2	0.00	1	2004	15	60
H403	ftbarn	4	Rye	2	0.00	2	2004	11	44
H403	ftbarn	4	Rye	2	0.00	3	2005	9	36

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H403	ftbarn	4	Rye	2	0.00	4	2005	13	52
H404	ftbarn	4	Trit.	3	0.00	1	2004	11	44
H404	ftbarn	4	Trit.	3	0.00	2	2004	11	44
H404	ftbarn	4	Trit.	3	0.00	3	2005	12	48
H404	ftbarn	4	Trit.	3	0.00	4	2005	12	48
H405	ftbarn	4	Trit.	1	22.4	1	2004	13	52
H405	ftbarn	4	Trit.	1	22.4	2	2004	11	44
H405	ftbarn	4	Trit.	1	22.4	3	2005	14	56
H405	ftbarn	4	Trit.	1	22.4	4	2005	11	44
H406	ftbarn	4	Trit.	2	22.4	1	2004	18	72
H406	ftbarn	4	Trit.	2	22.4	2	2004	15	60
H406	ftbarn	4	Trit.	2	22.4	3	2005	19	76
H406	ftbarn	4	Trit.	2	22.4	4	2005	17	68
H407	ftbarn	4	Wheat	1	0.00	1	2004	7	28
H407	ftbarn	4	Wheat	1	0.00	2	2004	7	28
H407	ftbarn	4	Wheat	1	0.00	3	2005	8	32
H407	ftbarn	4	Wheat	1	0.00	4	2005	9	36
H408	ftbarn	4	Wheat	3	0.00	1	2004	12	48

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H408	ftbarn	4	Wheat	3	0.00	2	2004	10	40
H408	ftbarn	4	Wheat	3	0.00	3	2005	7	28
H408	ftbarn	4	Wheat	3	0.00	4	2005	6	24
H409	ftbarn	4	Wheat	3	22.4	1	2004	12	48
H409	ftbarn	4	Wheat	3	22.4	2	2004	13	52
H409	ftbarn	4	Wheat	3	22.4	3	2005	15	60
H409	ftbarn	4	Wheat	3	22.4	4	2005	16	64
H411	ftbarn	4	Rye	3	0.00	1	2004	12	48
H411	ftbarn	4	Rye	3	0.00	2	2004	13	52
H411	ftbarn	4	Rye	3	0.00	3	2005	7	28
H411	ftbarn	4	Rye	3	0.00	4	2005	9	36
H412	ftbarn	4	Rye	1	0.00	1	2004	12	48
H412	ftbarn	4	Rye	1	0.00	2	2004	9	36
H412	ftbarn	4	Rye	1	0.00	3	2005	9	36
H412	ftbarn	4	Rye	1	0.00	4	2005	7	28
H413	ftbarn	4	Rye	1	22.4	1	2004	12	48
H413	ftbarn	4	Rye	1	22.4	2	2004	14	56
H413	ftbarn	4	Rye	1	22.4	3	2005	16	64

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H413	ftbarn	4	Rye	1	22.4	4	2005	16	64
H414	ftbarn	4	Trit.	1	0.00	1	2004	11	44
H414	ftbarn	4	Trit.	1	0.00	2	2004	6	24
H414	ftbarn	4	Trit.	1	0.00	3	2005	13	52
H414	ftbarn	4	Trit.	1	0.00	4	2005	8	32
H415	ftbarn	4	Trit.	2	0.00	1	2004	11	44
H415	ftbarn	4	Trit.	2	0.00	2	2004	10	40
H415	ftbarn	4	Trit.	2	0.00	3	2005	11	44
H415	ftbarn	4	Trit.	2	0.00	4	2005	12	48
H416	ftbarn	4	Trit.	3	22.4	1	2004	14	56
H416	ftbarn	4	Trit.	3	22.4	2	2004	13	52
H416	ftbarn	4	Trit.	3	22.4	3	2005	20	80
H416	ftbarn	4	Trit.	3	22.4	4	2005	23	92
H417	ftbarn	4	Wheat	2	0.00	1	2004	8	32
H417	ftbarn	4	Wheat	2	0.00	2	2004	8	32
H417	ftbarn	4	Wheat	2	0.00	3	2005	8	32
H417	ftbarn	4	Wheat	2	0.00	4	2005	11	44
H418	ftbarn	4	Wheat	1	22.4	1	2004	9	36

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
H418	ftbarn	4	Wheat	1	22.4	2	2004	12	48
H418	ftbarn	4	Wheat	1	22.4	3	2005	14	56
H418	ftbarn	4	Wheat	1	22.4	4	2005	12	48
H419	ftbarn	4	Wheat	2	22.4	1	2004	14	56
H419	ftbarn	4	Wheat	2	22.4	2	2004	10	40
H419	ftbarn	4	Wheat	2	22.4	3	2005	13	52
H419	ftbarn	4	Wheat	2	22.4	4	2005	11	44
V101	vboro	1	Trit.	2	0.00	1	2004	14	56
V101	vboro	1	Trit.	2	0.00	2	2004	15	60
V101	vboro	1	Trit.	2	0.00	3	2005	19	76
V101	vboro	1	Trit.	2	0.00	4	2005	20	80
V102	vboro	1	Trit.	1	22.4	1	2004	12	48
V102	vboro	1	Trit.	1	22.4	2	2004	13	52
V102	vboro	1	Trit.	1	22.4	3	2005	14	56
V102	vboro	1	Trit.	1	22.4	4	2005	15	60
V103	vboro	1	Trit.	3	22.4	1	2004	18	72
V103	vboro	1	Trit.	3	22.4	2	2004	19	76
V103	vboro	1	Trit.	3	22.4	3	2005	22	88

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V103	vboro	1	Trit.	3	22.4	4	2005	24	96
V104	vboro	1	Wheat	3	0.00	1	2004	13	52
V104	vboro	1	Wheat	3	0.00	2	2004	12	48
V104	vboro	1	Wheat	3	0.00	3	2005	16	64
V104	vboro	1	Wheat	3	0.00	4	2005	18	72
V105	vboro	1	Wheat	3	22.4	1	2004	17	68
V105	vboro	1	Wheat	3	22.4	2	2004	15	60
V105	vboro	1	Wheat	3	22.4	3	2005	16	64
V105	vboro	1	Wheat	3	22.4	4	2005	16	64
V106	vboro	1	Wheat	2	0.00	1	2004	18	72
V106	vboro	1	Wheat	2	0.00	2	2004	14	56
V106	vboro	1	Wheat	2	0.00	3	2005	17	68
V106	vboro	1	Wheat	2	0.00	4	2005	15	60
V108	vboro	1	Rye	1	0.00	1	2004	12	48
V108	vboro	1	Rye	1	0.00	2	2004	12	48
V108	vboro	1	Rye	1	0.00	3	2005	14	56
V108	vboro	1	Rye	1	0.00	4	2005	16	64
V109	vboro	1	Rye	3	22.4	1	2004	17	68

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V109	vboro	1	Rye	3	22.4	2	2004	20	80
V109	vboro	1	Rye	3	22.4	3	2005	19	76
V109	vboro	1	Rye	3	22.4	4	2005	19	76
V110	vboro	1	Rye	2	22.4	1	2004	18	72
V110	vboro	1	Rye	2	22.4	2	2004	19	76
V110	vboro	1	Rye	2	22.4	3	2005	16	64
V110	vboro	1	Rye	2	22.4	4	2005	19	76
V111	vboro	1	Trit.	3	0.00	1	2004	15	60
V111	vboro	1	Trit.	3	0.00	2	2004	17	68
V111	vboro	1	Trit.	3	0.00	3	2005	16	64
V111	vboro	1	Trit.	3	0.00	4	2005	16	64
V112	vboro	1	Trit.	1	0.00	1	2004	12	48
V112	vboro	1	Trit.	1	0.00	2	2004	11	44
V112	vboro	1	Trit.	1	0.00	3	2005	12	48
V112	vboro	1	Trit.	1	0.00	4	2005	12	48
V113	vboro	1	Trit.	2	22.4	1	2004	18	72
V113	vboro	1	Trit.	2	22.4	2	2004	17	68
V113	vboro	1	Trit.	2	22.4	3	2005	18	72

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V113	vboro	1	Trit.	2	22.4	4	2005	16	64
V114	vboro	1	Wheat	1	0.00	1	2004	12	48
V114	vboro	1	Wheat	1	0.00	2	2004	12	48
V114	vboro	1	Wheat	1	0.00	3	2005	12	48
V114	vboro	1	Wheat	1	0.00	4	2005	7	28
V115	vboro	1	Wheat	2	22.4	1	2004	14	56
V115	vboro	1	Wheat	2	22.4	2	2004	10	40
V115	vboro	1	Wheat	2	22.4	3	2005	18	72
V115	vboro	1	Wheat	2	22.4	4	2005	13	52
V116	vboro	1	Wheat	1	22.4	1	2004	11	44
V116	vboro	1	Wheat	1	22.4	2	2004	9	36
V116	vboro	1	Wheat	1	22.4	3	2005	14	56
V116	vboro	1	Wheat	1	22.4	4	2005	14	56
V118	vboro	1	Rye	3	0.00	1	2004	17	68
V118	vboro	1	Rye	3	0.00	2	2004	17	68
V118	vboro	1	Rye	3	0.00	3	2005	18	72
V118	vboro	1	Rye	3	0.00	4	2005	16	64
V119	vboro	1	Rye	1	22.4	1	2004	15	60

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V119	vboro	1	Rye	1	22.4	2	2004	18	72
V119	vboro	1	Rye	1	22.4	3	2005	18	72
V119	vboro	1	Rye	1	22.4	4	2005	16	64
V120	vboro	1	Rye	2	0.00	1	2004	18	72
V120	vboro	1	Rye	2	0.00	2	2004	17	68
V120	vboro	1	Rye	2	0.00	3	2005	12	48
V120	vboro	1	Rye	2	0.00	4	2005	14	56
V202	vboro	2	Rye	2	0.00	1	2004	16	64
V202	vboro	2	Rye	2	0.00	2	2004	18	72
V202	vboro	2	Rye	2	0.00	3	2005	12	48
V202	vboro	2	Rye	2	0.00	4	2005	14	56
V203	vboro	2	Rye	1	22.4	1	2004	13	52
V203	vboro	2	Rye	1	22.4	2	2004	11	44
V203	vboro	2	Rye	1	22.4	3	2005	18	72
V203	vboro	2	Rye	1	22.4	4	2005	16	64
V204	vboro	2	Rye	3	22.4	1	2004	17	68
V204	vboro	2	Rye	3	22.4	2	2004	17	68
V204	vboro	2	Rye	3	22.4	3	2005	18	72

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V204	vboro	2	Rye	3	22.4	4	2005	19	76
V205	vboro	2	Wheat	3	0.00	1	2004	10	40
V205	vboro	2	Wheat	3	0.00	2	2004	14	56
V205	vboro	2	Wheat	3	0.00	3	2005	11	44
V205	vboro	2	Wheat	3	0.00	4	2005	13	52
V206	vboro	2	Wheat	2	22.4	1	2004	15	60
V206	vboro	2	Wheat	2	22.4	2	2004	13	52
V206	vboro	2	Wheat	2	22.4	3	2005	13	52
V206	vboro	2	Wheat	2	22.4	4	2005	13	52
V207	vboro	2	Wheat	2	0.00	1	2004	7	28
V207	vboro	2	Wheat	2	0.00	2	2004	10	40
V207	vboro	2	Wheat	2	0.00	3	2005	12	48
V207	vboro	2	Wheat	2	0.00	4	2005	8	32
V208	vboro	2	Trit.	1	22.4	1	2004	15	60
V208	vboro	2	Trit.	1	22.4	2	2004	13	52
V208	vboro	2	Trit.	1	22.4	3	2005	18	72
V208	vboro	2	Trit.	1	22.4	4	2005	13	52
V209	vboro	2	Trit.	2	22.4	1	2004	15	60

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V209	vboro	2	Trit.	2	22.4	2	2004	15	60
V209	vboro	2	Trit.	2	22.4	3	2005	16	64
V209	vboro	2	Trit.	2	22.4	4	2005	15	60
V210	vboro	2	Trit.	3	22.4	1	2004	19	76
V210	vboro	2	Trit.	3	22.4	2	2004	21	84
V210	vboro	2	Trit.	3	22.4	3	2005	13	52
V210	vboro	2	Trit.	3	22.4	4	2005	12	48
V212	vboro	2	Rye	3	0.00	1	2004	15	60
V212	vboro	2	Rye	3	0.00	2	2004	15	60
V212	vboro	2	Rye	3	0.00	3	2005	18	72
V212	vboro	2	Rye	3	0.00	4	2005	17	68
V213	vboro	2	Rye	2	22.4	1	2004	12	48
V213	vboro	2	Rye	2	22.4	2	2004	14	56
V213	vboro	2	Rye	2	22.4	3	2005	16	64
V213	vboro	2	Rye	2	22.4	4	2005	19	76
V214	vboro	2	Rye	1	0.00	1	2004	15	60
V214	vboro	2	Rye	1	0.00	2	2004	16	64
V214	vboro	2	Rye	1	0.00	3	2005	18	72

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V214	vboro	2	Rye	1	0.00	4	2005	16	64
V215	vboro	2	Wheat	1	22.4	1	2004	17	68
V215	vboro	2	Wheat	1	22.4	2	2004	13	52
V215	vboro	2	Wheat	1	22.4	3	2005	15	60
V215	vboro	2	Wheat	1	22.4	4	2005	14	56
V216	vboro	2	Wheat	1	0.00	1	2004	13	52
V216	vboro	2	Wheat	1	0.00	2	2004	12	48
V216	vboro	2	Wheat	1	0.00	3	2005	11	44
V216	vboro	2	Wheat	1	0.00	4	2005	8	32
V217	vboro	2	Wheat	3	22.4	1	2004	18	72
V217	vboro	2	Wheat	3	22.4	2	2004	15	60
V217	vboro	2	Wheat	3	22.4	3	2005	19	76
V217	vboro	2	Wheat	3	22.4	4	2005	14	56
V218	vboro	2	Trit.	1	0.00	1	2004	11	44
V218	vboro	2	Trit.	1	0.00	2	2004	13	52
V218	vboro	2	Trit.	1	0.00	3	2005	12	48
V218	vboro	2	Trit.	1	0.00	4	2005	11	44
V219	vboro	2	Trit.	3	0.00	1	2004	14	56

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V219	vboro	2	Trit.	3	0.00	2	2004	17	68
V219	vboro	2	Trit.	3	0.00	3	2005	14	56
V219	vboro	2	Trit.	3	0.00	4	2005	15	60
V220	vboro	2	Trit.	2	0.00	1	2004	13	52
V220	vboro	2	Trit.	2	0.00	2	2004	11	44
V220	vboro	2	Trit.	2	0.00	3	2005	9	36
V220	vboro	2	Trit.	2	0.00	4	2005	11	44
V301	vboro	3	Wheat	2	22.4	1	2004	21	84
V301	vboro	3	Wheat	2	22.4	2	2004	22	88
V301	vboro	3	Wheat	2	22.4	3	2005	17	68
V301	vboro	3	Wheat	2	22.4	4	2005	15	60
V302	vboro	3	Wheat	1	0.00	1	2004	15	60
V302	vboro	3	Wheat	1	0.00	2	2004	13	52
V302	vboro	3	Wheat	1	0.00	3	2005	12	48
V302	vboro	3	Wheat	1	0.00	4	2005	12	48
V303	vboro	3	Wheat	3	22.4	1	2004	20	80
V303	vboro	3	Wheat	3	22.4	2	2004	20	80
V303	vboro	3	Wheat	3	22.4	3	2005	15	60

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V303	vboro	3	Wheat	3	22.4	4	2005	17	68
V305	vboro	3	Trit.	1	22.4	1	2004	20	80
V305	vboro	3	Trit.	1	22.4	2	2004	21	84
V305	vboro	3	Trit.	1	22.4	3	2005	15	60
V305	vboro	3	Trit.	1	22.4	4	2005	13	52
V306	vboro	3	Trit.	2	0.00	1	2004	11	44
V306	vboro	3	Trit.	2	0.00	2	2004	14	56
V306	vboro	3	Trit.	2	0.00	3	2005	17	68
V306	vboro	3	Trit.	2	0.00	4	2005	19	76
V307	vboro	3	Trit.	3	22.4	1	2004	19	76
V307	vboro	3	Trit.	3	22.4	2	2004	21	84
V307	vboro	3	Trit.	3	22.4	3	2005	19	76
V307	vboro	3	Trit.	3	22.4	4	2005	21	84
V308	vboro	3	Rye	3	0.00	1	2004	14	56
V308	vboro	3	Rye	3	0.00	2	2004	13	52
V308	vboro	3	Rye	3	0.00	3	2005	18	72
V308	vboro	3	Rye	3	0.00	4	2005	20	80
V309	vboro	3	Rye	1	22.4	1	2004	20	80

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V309	vboro	3	Rye	1	22.4	2	2004	18	72
V309	vboro	3	Rye	1	22.4	3	2005	19	76
V309	vboro	3	Rye	1	22.4	4	2005	17	68
V310	vboro	3	Rye	1	0.00	1	2004	12	48
V310	vboro	3	Rye	1	0.00	2	2004	12	48
V310	vboro	3	Rye	1	0.00	3	2005	6	24
V310	vboro	3	Rye	1	0.00	4	2005	6	24
V311	vboro	3	Wheat	1	22.4	1	2004	12	48
V311	vboro	3	Wheat	1	22.4	2	2004	15	60
V311	vboro	3	Wheat	1	22.4	3	2005	11	44
V311	vboro	3	Wheat	1	22.4	4	2005	9	36
V312	vboro	3	Wheat	3	0.00	1	2004	12	48
V312	vboro	3	Wheat	3	0.00	2	2004	16	64
V312	vboro	3	Wheat	3	0.00	3	2005	10	40
V312	vboro	3	Wheat	3	0.00	4	2005	11	44
V313	vboro	3	Wheat	2	0.00	1	2004	15	60
V313	vboro	3	Wheat	2	0.00	2	2004	16	64
V313	vboro	3	Wheat	2	0.00	3	2005	16	64

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V313	vboro	3	Wheat	2	0.00	4	2005	14	56
V315	vboro	3	Trit.	2	22.4	1	2004	15	60
V315	vboro	3	Trit.	2	22.4	2	2004	14	56
V315	vboro	3	Trit.	2	22.4	3	2005	16	64
V315	vboro	3	Trit.	2	22.4	4	2005	17	68
V316	vboro	3	Trit.	1	0.00	1	2004	11	44
V316	vboro	3	Trit.	1	0.00	2	2004	11	44
V316	vboro	3	Trit.	1	0.00	3	2005	12	48
V316	vboro	3	Trit.	1	0.00	4	2005	13	52
V317	vboro	3	Trit.	3	0.00	1	2004	13	52
V317	vboro	3	Trit.	3	0.00	2	2004	15	60
V317	vboro	3	Trit.	3	0.00	3	2005	13	52
V317	vboro	3	Trit.	3	0.00	4	2005	16	64
V318	vboro	3	Rye	2	0.00	1	2004	10	40
V318	vboro	3	Rye	2	0.00	2	2004	11	44
V318	vboro	3	Rye	2	0.00	3	2005	16	64
V318	vboro	3	Rye	2	0.00	4	2005	15	60
V319	vboro	3	Rye	2	22.4	1	2004	15	60

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V319	vboro	3	Rye	2	22.4	2	2004	15	60
V319	vboro	3	Rye	2	22.4	3	2005	18	72
V319	vboro	3	Rye	2	22.4	4	2005	19	76
V320	vboro	3	Rye	3	22.4	1	2004	17	68
V320	vboro	3	Rye	3	22.4	2	2004	16	64
V320	vboro	3	Rye	3	22.4	3	2005	15	60
V320	vboro	3	Rye	3	22.4	4	2005	19	76
V401	vboro	4	Rye	2	22.4	1	2004	19	76
V401	vboro	4	Rye	2	22.4	2	2004	20	80
V401	vboro	4	Rye	2	22.4	3	2005	20	80
V401	vboro	4	Rye	2	22.4	4	2005	19	76
V402	vboro	4	Rye	3	22.4	1	2004	22	88
V402	vboro	4	Rye	3	22.4	2	2004	20	80
V402	vboro	4	Rye	3	22.4	3	2005	24	96
V402	vboro	4	Rye	3	22.4	4	2005	23	92
V403	vboro	4	Rye	2	0.00	1	2004	15	60
V403	vboro	4	Rye	2	0.00	2	2004	16	64
V403	vboro	4	Rye	2	0.00	3	2005	18	72

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V403	vboro	4	Rye	2	0.00	4	2005	18	72
V404	vboro	4	Trit.	3	0.00	1	2004	14	56
V404	vboro	4	Trit.	3	0.00	2	2004	13	52
V404	vboro	4	Trit.	3	0.00	3	2005	15	60
V404	vboro	4	Trit.	3	0.00	4	2005	16	64
V405	vboro	4	Trit.	1	22.4	1	2004	16	64
V405	vboro	4	Trit.	1	22.4	2	2004	12	48
V405	vboro	4	Trit.	1	22.4	3	2005	15	60
V405	vboro	4	Trit.	1	22.4	4	2005	14	56
V406	vboro	4	Trit.	2	22.4	1	2004	16	64
V406	vboro	4	Trit.	2	22.4	2	2004	17	68
V406	vboro	4	Trit.	2	22.4	3	2005	16	64
V406	vboro	4	Trit.	2	22.4	4	2005	16	64
V407	vboro	4	Wheat	1	0.00	1	2004	10	40
V407	vboro	4	Wheat	1	0.00	2	2004	10	40
V407	vboro	4	Wheat	1	0.00	3	2005	10	40
V407	vboro	4	Wheat	1	0.00	4	2005	11	44
V408	vboro	4	Wheat	3	0.00	1	2004	14	56

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V408	vboro	4	Wheat	3	0.00	2	2004	12	48
V408	vboro	4	Wheat	3	0.00	3	2005	14	56
V408	vboro	4	Wheat	3	0.00	4	2005	13	52
V409	vboro	4	Wheat	3	22.4	1	2004	17	68
V409	vboro	4	Wheat	3	22.4	2	2004	15	60
V409	vboro	4	Wheat	3	22.4	3	2005	17	68
V409	vboro	4	Wheat	3	22.4	4	2005	14	56
V411	vboro	4	Rye	3	0.00	1	2004	14	56
V411	vboro	4	Rye	3	0.00	2	2004	16	64
V411	vboro	4	Rye	3	0.00	3	2005	19	76
V411	vboro	4	Rye	3	0.00	4	2005	20	80
V412	vboro	4	Rye	1	0.00	1	2004	14	56
V412	vboro	4	Rye	1	0.00	2	2004	12	48
V412	vboro	4	Rye	1	0.00	3	2005	12	48
V412	vboro	4	Rye	1	0.00	4	2005	12	48
V413	vboro	4	Rye	1	22.4	1	2004	14	56
V413	vboro	4	Rye	1	22.4	2	2004	11	44
V413	vboro	4	Rye	1	22.4	3	2005	18	72

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V413	vboro	4	Rye	1	22.4	4	2005	16	64
V414	vboro	4	Trit.	1	0.00	1	2004	8	32
V414	vboro	4	Trit.	1	0.00	2	2004	10	40
V414	vboro	4	Trit.	1	0.00	3	2005	11	44
V414	vboro	4	Trit.	1	0.00	4	2005	12	48
V415	vboro	4	Trit.	2	0.00	1	2004	11	44
V415	vboro	4	Trit.	2	0.00	2	2004	13	52
V415	vboro	4	Trit.	2	0.00	3	2005	11	44
V415	vboro	4	Trit.	2	0.00	4	2005	15	60
V416	vboro	4	Trit.	3	22.4	1	2004	9	36
V416	vboro	4	Trit.	3	22.4	2	2004	12	48
V416	vboro	4	Trit.	3	22.4	3	2005	19	76
V416	vboro	4	Trit.	3	22.4	4	2005	21	84
V417	vboro	4	Wheat	2	0.00	1	2004	7	28
V417	vboro	4	Wheat	2	0.00	2	2004	9	36
V417	vboro	4	Wheat	2	0.00	3	2005	15	60
V417	vboro	4	Wheat	2	0.00	4	2005	18	72
V418	vboro	4	Wheat	1	22.4	1	2004	8	32

(*Table B4*, continued)

Plot	Location	Block	Cover	Seeding Rate	Nitrogen Fertilization (kg ha^{-1})	Sample No.	Year	Residue Cover per 7.6 m	Residue Cover (%)
V418	vboro	4	Wheat	1	22.4	2	2004	8	32
V418	vboro	4	Wheat	1	22.4	3	2005	10	40
V418	vboro	4	Wheat	1	22.4	4	2005	13	52
V419	vboro	4	Wheat	2	22.4	1	2004	12	48
V419	vboro	4	Wheat	2	22.4	2	2004	11	44
V419	vboro	4	Wheat	2	22.4	3	2005	14	56
V419	vboro	4	Wheat	2	22.4	4	2005	14	56

Table B5. Cover crop biomass oven-dry weights by retrieval dates as determined by remaining cover residues within mesh bags placed into corresponding small grain cover crop within the rows of cotton plots on May 18, 2004 and May 25, 2005. (Retrieval 1, 2, 3, 4 and 5 represents 1, 2, 4, 8 and 16 weeks after placement, respectively.

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
H120	2004	ftbarn	1	R	1	HR2 1-1	5.60			5.60
H202	2004	ftbarn	2	R	1	HR2-1-2	5.80			5.80
H318	2004	ftbarn	3	R	1	HR2-1-3	5.85			5.85
H403	2004	ftbarn	4	R	1	HR2-1-4	5.64			5.64
H120	2004	ftbarn	1	R	2	HR2-2-1	5.56			5.56
H202	2004	ftbarn	2	R	2	HR2-2-2	5.12			5.12
H318	2004	ftbarn	3	R	2	HR2-2-3	5.17			5.17
H403	2004	ftbarn	4	R	2	HR2-2-4	5.15			5.15
H202	2004	ftbarn	2	R	2	HR2-2-2	5.12			5.12

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
H318	2004	ftbarn	3	R	2	HR2-2-3	5.17			5.17
H403	2004	ftbarn	4	R	2	HR2-2-4	5.15			5.15
H120	2004	ftbarn	1	R	3	HR2-3-1	3.74			3.74
H202	2004	ftbarn	2	R	3	HR2-3-2	2.67			2.67
H318	2004	ftbarn	3	R	3	HR2-3-3	3.34			3.34
H403	2004	ftbarn	4	R	3	HR2-3-4	3.57			3.57
H120	2004	ftbarn	1	R	4	HR2-4-1	1.50			1.50
H202	2004	ftbarn	2	R	4	HR2-4-2	1.33			1.33
H318	2004	ftbarn	3	R	4	HR2-4-3	1.51			1.51
H403	2004	ftbarn	4	R	4	HR2-4-4	1.69			1.69
H120	2004	ftbarn	1	R	5	HR2-5-1	1.26			1.26
H202	2004	ftbarn	2	R	5	HR2-5-2	2.02			2.02
H318	2004	ftbarn	3	R	5	HR2-5-3	1.56			1.56
H403	2004	ftbarn	4	R	5	HR2-5-4	*			*
H101	2004	ftbarn	1	T	1	HT2 1-1	6.48			6.48
H220	2004	ftbarn	2	T	1	HT2-1-2	6.45			6.45
H306	2004	ftbarn	3	T	1	HT2-1-3	6.05			6.05
H415	2004	ftbarn	4	T	1	HT2-1-4	6.30			6.30
H101	2004	ftbarn	1	T	2	HT2-2-1	5.97			5.97
H220	2004	ftbarn	2	T	2	HT2-2-2	6.42			6.42
H306	2004	ftbarn	3	T	2	HT2-2-3	5.99			5.99
H415	2004	ftbarn	4	T	2	HT2-2-4	6.32			6.32
H101	2004	ftbarn	1	T	3	HT2-3-1	3.92			3.92

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
H220	2004	ftbarn	2	T	3	HT2-3-2	4.15			4.15
H306	2004	ftbarn	3	T	3	HT2-3-3	4.38			4.38
H415	2004	ftbarn	4	T	3	HT2-3-4	4.44			4.44
H101	2004	ftbarn	1	T	4	HT2-4-1	2.39			2.39
H220	2004	ftbarn	2	T	4	HT2-4-2	2.62			2.62
H306	2004	ftbarn	3	T	4	HT2-4-3	2.35			2.35
H415	2004	ftbarn	4	T	4	HT2-4-4	3.01			3.01
H101	2004	ftbarn	1	T	5	HT2-5-1	2.46			2.46
H220	2004	ftbarn	2	T	5	HT2-5-2	2.75			2.75
H306	2004	ftbarn	3	T	5	HT2-5-3	1.84			1.84
H415	2004	ftbarn	4	T	5	HT2-5-4	*			*
H106	2004	ftbarn	1	W	1	HW2 1-1	6.13			6.13
H207	2004	ftbarn	2	W	1	HW2-1-2	6.55			6.55
H313	2004	ftbarn	3	W	1	HW2-1-3	6.11			6.11
H417	2004	ftbarn	4	W	1	HW2-1-4	6.18			6.18
H106	2004	ftbarn	1	W	2	HW2-2-1	5.25			5.25
H207	2004	ftbarn	2	W	2	HW2-2-2	5.98			5.98
H313	2004	ftbarn	3	W	2	HW2-2-3	5.09			5.09
H417	2004	ftbarn	4	W	2	HW2-2-4	5.46			5.46
H106	2004	ftbarn	1	W	3	HW2-3-1	3.70			3.70
H207	2004	ftbarn	2	W	3	HW2-3-2	4.00			4.00
H313	2004	ftbarn	3	W	3	HW2-3-3	3.68			3.68
H417	2004	ftbarn	4	W	3	HW2-3-4	3.97			3.97

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
H106	2004	ftbarn	1	W	4	HW2-4-1	2.49			2.49
H207	2004	ftbarn	2	W	4	HW2-4-2	2.78			2.78
H313	2004	ftbarn	3	W	4	HW2-4-3	2.08			2.08
H417	2004	ftbarn	4	W	4	HW2-4-4	1.90			1.90
H106	2004	ftbarn	1	W	5	HW2-5-1	1.19			1.19
H207	2004	ftbarn	2	W	5	HW2-5-2	1.40			1.40
H313	2004	ftbarn	3	W	5	HW2-5-3	1.89			1.89
H417	2004	ftbarn	4	W	5	HW2-5-4	*			*
V120	2004	vboro	1	R	1	VR2 1-1	5.82			5.82
V202	2004	vboro	2	R	1	VR2-1-2	5.56			5.56
V318	2004	vboro	3	R	1	VR2-1-3	5.55			5.55
V403	2004	vboro	4	R	1	VR2-1-4	5.69			5.69
V120	2004	vboro	1	R	2	VR2-2-1	5.88			5.88
V202	2004	vboro	2	R	2	VR2-2-2	6.14			6.14
V318	2004	vboro	3	R	2	VR2-2-3	5.87			5.87
V403	2004	vboro	4	R	2	VR2-2-4	5.35			5.35
V120	2004	vboro	1	R	3	VR2-3-1	3.33			3.33
V202	2004	vboro	2	R	3	VR2-3-2	3.59			3.59
V318	2004	vboro	3	R	3	VR2-3-3	3.40			3.40
V403	2004	vboro	4	R	3	VR2-3-4	3.37			3.37
V120	2004	vboro	1	R	4	VR2-4-1	1.45			1.45
V202	2004	vboro	2	R	4	VR2-4-2	1.97			1.97
V318	2004	vboro	3	R	4	VR2-4-3	1.61			1.61

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
V403	2004	vboro	4	R	4	VR2-4-4	1.59			1.59
V120	2004	vboro	1	R	5	VR2-5-1	2.54			2.54
V202	2004	vboro	2	R	5	VR2-5-2	1.22			1.22
V318	2004	vboro	3	R	5	VR2-5-3	0.87			0.87
V403	2004	vboro	4	R	5	VR2-5-4	1.95			1.95
V120	2004	vboro	1	T	1	VT2 1-1	5.95			5.95
V202	2004	vboro	2	T	1	VT2-1-2	6.20			6.20
V318	2004	vboro	3	T	1	VT2-1-3	5.66			5.66
V403	2004	vboro	4	T	1	VT2-1-4	5.88			5.88
V120	2004	vboro	1	T	1	VT2 1-1	5.95			5.95
V202	2004	vboro	2	T	1	VT2-1-2	6.20			6.20
V318	2004	vboro	3	T	1	VT2-1-3	5.66			5.66
V403	2004	vboro	4	T	1	VT2-1-4	5.88			5.88
V120	2004	vboro	1	T	2	VT2-2-1	6.13			6.13
V202	2004	vboro	2	T	2	VT2-2-2	6.54			6.54
V318	2004	vboro	3	T	2	VT2-2-3	6.09			6.09
V403	2004	vboro	4	T	2	VT2-2-4	5.84			5.84
V120	2004	vboro	1	T	3	VT2-3-1	4.42			4.42
V202	2004	vboro	2	T	3	VT2-3-2	4.80			4.80
V318	2004	vboro	3	T	3	VT2-3-3	3.90			3.90
V403	2004	vboro	4	T	3	VT2-3-4	4.50			4.50
V120	2004	vboro	1	T	4	VT2-4-1	3.65			3.65
V202	2004	vboro	2	T	4	VT2-4-2	3.26			3.26

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
V318	2004	vboro	3	T	4	VT2-4-3	2.65			2.65
V403	2004	vboro	4	T	4	VT2-4-4	2.97			2.97
V120	2004	vboro	1	T	5	VT2-5-1	1.30			1.30
V202	2004	vboro	2	T	5	VT2-5-2	1.81			1.81
V318	2004	vboro	3	T	5	VT2-5-3	1.55			1.55
V403	2004	vboro	4	T	5	VT2-5-4	1.60			1.60
V120	2004	vboro	1	W	1	VW2 1-1	6.21			6.21
V202	2004	vboro	2	W	1	VW2-1-2	5.90			5.90
V318	2004	vboro	3	W	1	VW2-1-3	6.13			6.13
V403	2004	vboro	4	W	1	VW2-1-4	6.18			6.18
V120	2004	vboro	1	W	2	VW2-2-1	6.44			6.44
V202	2004	vboro	2	W	2	VW2-2-2	5.80			5.80
V318	2004	vboro	3	W	2	VW2-2-3	6.53			6.53
V403	2004	vboro	4	W	2	VW2-2-4	5.05			5.05
V120	2004	vboro	1	W	3	VW2-3-1	3.81			3.81
V202	2004	vboro	2	W	3	VW2-3-2	3.88			3.88
V318	2004	vboro	3	W	3	VW2-3-3	3.96			3.96
V403	2004	vboro	4	W	3	VW2-3-4	4.19			4.19
V120	2004	vboro	1	W	4	VW2-4-1	3.53			3.53
V202	2004	vboro	2	W	4	VW2-4-2	2.32			2.32
V318	2004	vboro	3	W	4	VW2-4-3	2.20			2.20
V403	2004	vboro	4	W	4	VW2-4-4	2.70			2.70
V120	2004	vboro	1	W	5	VW2-5-1	0.83			0.83

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
V202	2004	vboro	2	W	5	VW2-5-2	1.14			1.14
V318	2004	vboro	3	W	5	VW2-5-3	1.91			1.91
V403	2004	vboro	4	W	5	VW2-5-4	*			*
H120	2005	ftbarn	1	R	1	HR2 1-1	5.78			5.78
H202	2005	ftbarn	2	R	1	HR2-1-2	5.61			5.61
H318	2005	ftbarn	3	R	1	HR2-1-3	5.84			5.84
H403	2005	ftbarn	4	R	1	HR2-1-4	5.67			5.67
H120	2005	ftbarn	1	R	2	HR2-2-1	4.86			4.86
H202	2005	ftbarn	2	R	2	HR2-2-2	4.50			4.50
H318	2005	ftbarn	3	R	2	HR2-2-3	4.31			4.31
H403	2005	ftbarn	4	R	2	HR2-2-4	3.74			3.74
H120	2005	ftbarn	1	R	3	HR2-3-1	3.87			3.87
H202	2005	ftbarn	2	R	3	HR2-3-2	3.43			3.43
H318	2005	ftbarn	3	R	3	HR2-3-3	3.29			3.29
H403	2005	ftbarn	4	R	3	HR2-3-4	4.65			4.65
H120	2005	ftbarn	1	R	4	HR2-4-1	2.34			2.34
H202	2005	ftbarn	2	R	4	HR2-4-2	1.88			1.88
H318	2005	ftbarn	3	R	4	HR2-4-3	2.57			2.57
H403	2005	ftbarn	4	R	4	HR2-4-4	2.45			2.45
H120	2005	ftbarn	1	R	5	HR2-5-1	2.10			2.10
H202	2005	ftbarn	2	R	5	HR2-5-2	1.80			1.80
H318	2005	ftbarn	3	R	5	HR2-5-3	1.77			1.77
H403	2005	ftbarn	4	R	5	HR2-5-4	2.02			2.02

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible + oven dry residue wt (g)	Net Weight (g)
H101	2005	ftbarn	1	T	1	HT2 1-1	5.68			5.68
H220	2005	ftbarn	2	T	1	HT2-1-2	5.56			5.56
H306	2005	ftbarn	3	T	1	HT2-1-3	5.88			5.88
H415	2005	ftbarn	4	T	1	HT2-1-4	5.44			5.44
H101	2005	ftbarn	1	T	2	HT2-2-1	5.25			5.25
H220	2005	ftbarn	2	T	2	HT2-2-2	5.35			5.35
H306	2005	ftbarn	3	T	2	HT2-2-3	5.20			5.20
H415	2005	ftbarn	4	T	2	HT2-2-4	4.93			4.93
H101	2005	ftbarn	1	T	3	HT2-3-1	3.97			3.97
H220	2005	ftbarn	2	T	3	HT2-3-2	4.43			4.43
H306	2005	ftbarn	3	T	3	HT2-3-3	3.64			3.64
H415	2005	ftbarn	4	T	3	HT2-3-4	3.93			3.93
H101	2005	ftbarn	1	T	4	HT2-4-1	4.26			4.26
H220	2005	ftbarn	2	T	4	HT2-4-2	3.82			3.82
H306	2005	ftbarn	3	T	4	HT2-4-3	4.66			4.66
H415	2005	ftbarn	4	T	4	HT2-4-4	3.63			3.63
H101	2005	ftbarn	1	T	5	HT2-5-1	2.46			2.46
H220	2005	ftbarn	2	T	4	HT2-4-2	3.82			3.82
H306	2005	ftbarn	3	T	4	HT2-4-3	4.66			4.66
H415	2005	ftbarn	4	T	4	HT2-4-4	3.63			3.63
H101	2005	ftbarn	1	T	5	HT2-5-1	2.46			2.46
H220	2005	ftbarn	2	T	5	HT2-5-2	2.71	46.17	46.66	3.20
H306	2005	ftbarn	3	T	5	HT2-5-3	2.69			2.69

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
H415	2005	ftbarn	4	T	5	HT2-5-4	2.79			2.79
H106	2005	ftbarn	1	W	1	HW2 1-1	5.77			5.77
H207	2005	ftbarn	2	W	1	HW2-1-2	5.69			5.69
H313	2005	ftbarn	3	W	1	HW2-1-3	5.81			5.81
H417	2005	ftbarn	4	W	1	HW2-1-4	5.71			5.71
H106	2005	ftbarn	1	W	2	HW2-2-1	4.57			4.57
H207	2005	ftbarn	2	W	2	HW2-2-2	4.84			4.84
H313	2005	ftbarn	3	W	2	HW2-2-3	4.99			4.99
H417	2005	ftbarn	4	W	2	HW2-2-4	5.08			5.08
H106	2005	ftbarn	1	W	3	HW2-3-1	3.53			3.53
H207	2005	ftbarn	2	W	3	HW2-3-2	4.01			4.01
H313	2005	ftbarn	3	W	3	HW2-3-3	4.53			4.53
H417	2005	ftbarn	4	W	3	HW2-3-4	4.66			4.66
H106	2005	ftbarn	1	W	4	HW2-4-1	3.39			3.39
H207	2005	ftbarn	2	W	4	HW2-4-2	2.42			2.42
H313	2005	ftbarn	3	W	4	HW2-4-3	2.79			2.79
H417	2005	ftbarn	4	W	4	HW2-4-4	3.67			3.67
H106	2005	ftbarn	1	W	5	HW2-5-1	2.43			2.43
H207	2005	ftbarn	2	W	5	HW2-5-2	2.75			2.75
H313	2005	ftbarn	3	W	5	HW2-5-3	2.97			2.97
H417	2005	ftbarn	4	W	5	HW2-5-4	1.92	46.4	46.5	2.02
V120	2005	vboro	1	R	1	VR2 1-1	4.98			4.98
V202	2005	vboro	2	R	1	VR2-1-2	6.86			6.86

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
V318	2005	vboro	3	R	1	VR2-1-3	6.50			6.50
V403	2005	vboro	4	R	1	VR2-1-4	5.87			5.87
V120	2005	vboro	1	R	2	VR2-2-1	3.62			3.62
V318	2005	vboro	3	R	2	VR2-2-3	4.12			4.12
V403	2005	vboro	4	R	2	VR2-2-4	3.84			3.84
V120	2005	vboro	1	R	3	VR2-3-1	1.85			1.85
V202	2005	vboro	2	R	3	VR2-3-2	2.60			2.60
V318	2005	vboro	3	R	3	VR2-3-3	2.60			2.60
V403	2005	vboro	4	R	3	VR2-3-4	1.92			1.92
V120	2005	vboro	1	R	4	VR2-4-1	1.55			1.55
V202	2005	vboro	2	R	4	VR2-4-2	1.43			1.43
V318	2005	vboro	3	R	4	VR2-4-3	1.55			1.55
V403	2005	vboro	4	R	4	VR2-4-4	1.32			1.32
V120	2005	vboro	1	R	5	VR2-5-1	1.09			1.09
V202	2005	vboro	2	R	5	VR2-5-2	0.77	45.09	45.45	1.13
V318	2005	vboro	3	R	5	VR2-5-3	1.60			1.60
V403	2005	vboro	4	R	5	VR2-5-4	0.58	43.30	43.52	0.80
V120	2005	vboro	1	T	1	VT2 1-1	5.67			5.67
V202	2005	vboro	2	T	1	VT2-1-2	5.62			5.62
V318	2005	vboro	3	T	1	VT2-1-3	6.88			6.88
V403	2005	vboro	4	T	1	VT2-1-4	6.50			6.50
V120	2005	vboro	1	T	2	VT2-2-1	4.76			4.76
V202	2005	vboro	2	T	2	VT2-2-2	4.76			4.76

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
V318	2005	vboro	3	T	2	VT2-2-3	4.62			4.62
V403	2005	vboro	4	T	2	VT2-2-4	4.66			4.66
V202	2005	vboro	2	T	2	VT2-2-2	4.76			4.76
V202	2005	vboro	2	T	2	VT2-2-2	4.76			4.76
V318	2005	vboro	3	T	2	VT2-2-3	4.62			4.62
V403	2005	vboro	4	T	2	VT2-2-4	4.66			4.66
V120	2005	vboro	1	T	3	VT2-3-1	3.37			3.37
V202	2005	vboro	2	T	3	VT2-3-2	3.60			3.60
V318	2005	vboro	3	T	3	VT2-3-3	3.49			3.49
V403	2005	vboro	4	T	3	VT2-3-4	3.57			3.57
V120	2005	vboro	1	T	4	VT2-4-1	2.65	40.50	40.66	2.81
V202	2005	vboro	2	T	4	VT2-4-2	3.38			3.38
V318	2005	vboro	3	T	4	VT2-4-3	2.80	39.48	39.53	2.85
V403	2005	vboro	4	T	4	VT2-4-4	2.21			2.21
V120	2005	vboro	1	T	5	VT2-5-1	2.48	42.82	43.06	2.72
V202	2005	vboro	2	T	5	VT2-5-2	3.11			3.11
V318	2005	vboro	3	T	5	VT2-5-3	2.41	42.87	43.02	2.56
V403	2005	vboro	4	T	5	VT2-5-4	1.25	42.68	42.79	1.36
V120	2005	vboro	1	W	1	VW2 1-1	5.29			5.29
V202	2005	vboro	2	W	1	VW2-1-2	5.29			5.29
V318	2005	vboro	3	W	1	VW2-1-3	6.37			6.37
V403	2005	vboro	4	W	1	VW2-1-4	6.38			6.38
V120	2005	vboro	1	W	2	VW2-2-1	4.11			4.11

(*Table B5*, continued)

Plot	Year	Location	Block	Cover	Retrieval	Field Code	Oven Dry Wt. (g)	Crucible Wt (g)	Crucible+ oven dry residue wt (g)	Net Weight (g)
V202	2005	vboro	2	W	2	VW2-2-2	4.27			4.27
V318	2005	vboro	3	W	2	VW2-2-3	4.26			4.26
V403	2005	vboro	4	W	2	VW2-2-4	4.37			4.37
V120	2005	vboro	1	W	2	VW2-2-1	4.11			4.11
V202	2005	vboro	2	W	2	VW2-2-2	4.27			4.27
V318	2005	vboro	3	W	2	VW2-2-3	4.26			4.26
V403	2005	vboro	4	W	2	VW2-2-4	4.37			4.37
V120	2005	vboro	1	W	3	VW2-3-1	2.79			2.79
V202	2005	vboro	2	W	3	VW2-3-2	2.90			2.90
V318	2005	vboro	3	W	3	VW2-3-3	2.60			2.60
V403	2005	vboro	4	W	3	VW2-3-4	2.65			2.65
V120	2005	vboro	1	W	4	VW2-4-1	1.77	47.28	47.44	1.93
V202	2005	vboro	2	W	4	VW2-4-2	2.30			2.30
V318	2005	vboro	3	W	4	VW2-4-3	0.94	46.54	46.58	0.98
V403	2005	vboro	4	W	4	VW2-4-4	2.27			2.27
V120	2005	vboro	1	W	5	VW2-5-1	1.55	41.53	42.25	2.27
V202	2005	vboro	2	W	5	VW2-5-2	1.39			1.39
V318	2005	vboro	3	W	5	VW2-5-3	0.88	45.35	45.41	0.94
V403	2005	vboro	4	W	5	VW2-5-4	1.87			1.87
H120	2004	ftbarn	1	R	3	HR2-3-1	3.74			3.74

Table B6. Initial inorganic soil nitrogen (NH_4 and NO_3) test results from samples taken at 0-20 (1), 21-40 (2) and 41-60 (3) cm depths prior to cover crop establishment in October 2003.										
No.	**Year**	**Location**	**Ref. No.**	**Replication**	**Code**	**Depth (cm)**	**NH_4 (mg L^{-1})**	**NO_3 (mg L^{-1})**	**Corrected NH_4 (mg L^{-1})**	**Corrected NO_3 (mg L^{-1})**
1	2004	vboro	410001	1	1	20	2.192659	-0.021178	2.10063	0.00991
2	2004	vboro	410002	1	1	40	1.654558	0.090166	1.56253	0.12125
3	2004	vboro	410003	1	1	60	1.430388	1.089015	1.33836	1.12010
4	2004	vboro	410004	1	2	20	1.792898	0.059157	1.70087	0.09024
5	2004	vboro	410005	1	2	40	1.132085	0.185309	1.04006	0.21639
6	2004	vboro	410006	1	2	60	1.07775-	0.933991	0.98572	0.96508
7	2004	vboro	410007	2	3	20	1.886497	-0.008969	1.79447	0.02212
8	2004	vboro	410008	2	3	40	1.138016	0.298276	1.04599	0.32936
9	2004	vboro	410009	2	3	60	1.020093	0.835905	0.92807	0.86699
10	2004	vboro	410010	2	4	20	2.373935	0.051088	2.28191	0.08217
11	2004	vboro	410011	2	4	40	1.284248	-0.021178	1.19222	0.00991
12	2004	vboro	410012	2	4	60	0.880977	1.099908	0.78895	1.13099
13	2004	vboro	410013	3	5	20	1.900907	-0.012206	1.80888	0.01888
14	2004	vboro	410014	3	5	40	0.792969	-0.021178	0.70094	0.00991
15	2004	vboro	410015	3	5	60	0.749210	0.629437	0.65718	0.66052
16	2004	vboro	410016	3	6	20	2.055502	0.058976	1.96347	0.09006
17	2004	vboro	410017	3	6	40	0.916065	-0.021178	0.82404	0.00991
18	2004	vboro	410018	3	6	60	0.652597	0.553419	0.56057	0.58450

(*Table B6*, continued)

No.	Year	Location	Ref. No.	Replication	Code	Depth (cm)	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
19	2004	vboro	410019	4	7	20	3.144089	-0.021178	3.05206	0.00991
20	2004	vboro	410020	4	7	40	0.729892	-0.021178	0.63786	0.00991
21	2004	vboro	410021	4	7	60	0.681400	0.401782	0.58937	0.43287
22	2004	vboro	410022	4	8	20	1.324624	-0.009693	1.23260	0.02139
23	2004	vboro	410023	4	8	40	0.766001	-0.021178	0.67397	0.00991
24	2004	vboro	410024	4	8	60	0.606269	0.286633	0.51424	0.31772
25	2004	ftbarn	410025	1	9	20	1.593020	-0.00787	1.50099	0.02321
26	2004	ftbarn	410026	1	9	40	1.008472	-0.008586	0.91644	0.02250
27	2004	ftbarn	410027	1	9	60	0.961556	-0.021178	0.86953	0.00991
28	2004	ftbarn	410028	1	10	20	1.231940	-0.003413	1.13991	0.02767
29	2004	ftbarn	410029	1	10	40	0.882998	-0.010374	0.79097	0.02071
30	2004	ftbarn	410030	1	10	60	1.254084	-0.021178	1.16206	0.00991
31	2004	ftbarn	410031	2	11	20	0.653564	-0.011862	0.56154	0.01922
32	2004	ftbarn	410032	2	11	40	0.441175	-0.021178	0.34915	0.00991
33	2004	ftbarn	410033	2	11	60	1.594845	0.020155	1.50282	0.05124
34	2004	ftbarn	410034	2	12	20	0.806990	0.027978	0.71496	0.05906
35	2004	ftbarn	410035	2	12	40	0.399003	0.029779	0.30698	0.06086
36	2004	ftbarn	410036	2	12	60	1.551377	-0.021178	1.45935	0.00991

(*Table 5*, continued)

No.	Year	Location	Ref. No.	Replication	Code	Depth (cm)	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
37	2004	ftbarn	410037	3	13	20	0.903373	-0.021178	0.81135	0.00991
38	2004	ftbarn	410038	3	13	40	0.639317	0.114296	0.54729	0.14538
39	2004	ftbarn	410039	3	13	60	1.155333	0.021461	1.06331	0.05255
40	2004	ftbarn	410040	3	14	20	0.443776	-0.021178	0.35175	0.00991
41	2004	ftbarn	410041	3	14	40	0.649652	0.281598	0.55762	0.31268
42	2004	ftbarn	410042	3	14	60	1.425957	-0.021178	1.33393	0.00991
43	2004	ftbarn	410043	4	14	20	0.645796	-0.011203	0.55377	0.01988
44	2004	ftbarn	410044	4	14	40	0.365212	0.017679	0.27318	0.04876
45	2004	ftbarn	410045	4	14	60	1.990674	-0.021178	1.89865	0.00991
46	2004	ftbarn	410046	4	16	20	1.227196	-0.01113	1.13517	0.01995
47	2004	ftbarn	410047	4	16	40	0.517236	0.015572	0.42521	0.04666
48	2004	ftbarn	410048	4	16	60	0.601878	0.2322	0.50985	0.26328

Table B7. Soil inorganic nitrogen (NH_4 and NO_3) test results from samples taken in November of each year at 0-20 (20), 21-40 (40) and 41-60 (60) cm depths from no cover (NC), rye (R), triticale (T) and wheat cover treatments with 0, 2, and 3 representing seeding rates of 0, 287 and 387m^{-2} and corrected for potential filter contamination. (*Nitrogen fertilization applied between February 28-March 1, 2004 and March 1 and March 2, 2005).*

Year	Location	Replication	Field Code	Depth (cm)	Cover	Seed Rate	Nitrogen Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	ftbarn	1	H101-1	20	T	2	0.00	0.370076	0.603834	0.278048	0.634918
2004	ftbarn	1	H101-2	40	T	2	0.00	1.717734	0.272427	1.625706	0.303511
2004	ftbarn	1	H101-3	60	T	2	0.00	0.926827	0.228117	0.834799	0.259201
2004	ftbarn	1	H103-1	20	T	3	22.4	0.393249	0.562015	0.301221	0.593099
2004	ftbarn	1	H103-2	40	T	3	222	1.324785	0.279253	1.232757	0.310337
2004	ftbarn	1	H103-3	60	T	3	22.4	0.813713	0.283050	0.721685	0.314134
2004	ftbarn	1	H107-1	20	NC	0	22.4	1.308511	0.315064	1.216483	0.346148
2004	ftbarn	1	H107-2	40	NC	0	22.4	0.808497	0.313935	0.716469	0.345019
2004	ftbarn	1	H107-3	60	NC	0	22.4	0.329451	0.546261	0.237423	0.577345
2004	ftbarn	1	H109-1	20	R	3	22.4	1.329632	0.347425	1.237604	0.378509
2004	ftbarn	1	H109-2	40	R	3	22.4	0.580317	0.349302	0.488289	0.380386
2004	ftbarn	1	H109-3	60	R	3	2.24	0.348541	0.558519	0.256513	0.589603
2004	ftbarn	1	H110-1	20	R	2	22.4	1.418307	0.319084	1.326279	0.350168
2004	ftbarn	1	H110-2	40	R	2	22.4	0.892776	0.379319	0.800748	0.410403
2004	ftbarn	1	H110-3	60	R	2	22.4	0.426088	0.280593	0.334060	0.311677

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	ftbarn	1	H111-1	20	T	3	0.00	1.629551	0.373652	1.537523	0.404736
2004	ftbarn	1	H111-2	40	T	3	0.00	0.893683	0.450797	0.801655	0.481881
2004	ftbarn	1	H111-3	60	T	3	0.00	0.397162	1.239501	0.305134	1.270585
2004	ftbarn	1	H113-1	20	T	2	22.4	1.573040	0.569445	1.481012	0.600529
2004	ftbarn	1	H113-2	40	T	2	22.4	0.680562	0.346193	0.588534	0.377277
2004	ftbarn	1	H113-3	60	T	2	22.4	0.408857	0.600115	0.316829	0.631199
2004	ftbarn	1	H117-1	20	NC	0	0.00	1.303385	0.300297	1.211357	0.331381
2004	ftbarn	1	H117-2	40	NC	0	0.00	0.527718	0.294202	0.435690	0.325286
2004	ftbarn	1	H117-3	60	NC	0	0.00	0.421898	0.507878	0.329870	0.538962
2004	ftbarn	1	H118-1	20	R	3	0.00	1.320270	0.310676	1.228242	0.341760
2004	ftbarn	1	H118-2	40	R	3	0.00	0.940249	0.335469	0.848221	0.366553
2004	ftbarn	1	H118-3	60	R	3	0.00	0.402756	0.367806	0.310728	0.398890
2004	ftbarn	1	H120-1	20	R	2	0.00	1.343701	0.380195	1.251673	0.411279
2004	ftbarn	1	H120-2	40	R	2	0.00	0.811547	0.212239	0.719519	0.243323
2004	ftbarn	1	H120-3	60	R	2	0.00	0.289205	0.539223	0.197177	0.570307

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer. (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	ftbarn	2	H201-1	20	NC	0	0.00	1.913805	0.314563	1.821777	0.345647
2004	ftbarn	2	H201-2	40	NC	0	0.00	1.134254	0.419405	1.042226	0.450489
2004	ftbarn	2	H201-3	60	NC	0	0.00	0.447854	0.800492	0.355826	0.831576
2004	ftbarn	2	H202-1	20	R	2	0.00	2.241933	0.408667	2.149905	0.439751
2004	ftbarn	2	H202-2	40	R	2	0.00	1.090599	0.596295	0.998571	0.627379
2004	ftbarn	2	H202-3	60	R	2	0.00	0.726281	0.383615	0.634253	0.414699
2004	ftbarn	2	H204-1	20	R	3	2.24	2.447527	0.505654	2.355499	0.536738
2004	ftbarn	2	H204-2	40	R	3	22.4	1.025611	0.285548	1.010985	0.074289
2004	ftbarn	2	H204-3	60	R	3	22.4	0.434883	0.397154	0.420257	0.185895
2004	ftbarn	2	H209-1	20	T	2	22.4	1.141223	0.416037	1.126597	0.204778
2004	ftbarn	2	H209-2	40	T	2	22.4	0.604312	0.223030	0.589686	0.011771
2004	ftbarn	2	H209-3	60	T	2	22.4	0.322189	0.327308	0.307563	0.116049
2004	ftbarn	2	H210-1	20	T	3	22.4	1.213024	0.332043	1.198398	0.120784
2004	ftbarn	2	H210-2	40	T	3	22.4	0.669904	0.281449	0.655278	0.070190
2004	ftbarn	2	H210-3	60	T	3	22.4	0.300533	0.290681	0.285907	0.079422

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	ftbarn	2	H211-1	20	NC	0	22.4	1.888939	1.327921	1.874313	1.116662
2004	ftbarn	2	H211-2	40	NC	0	22.4	1.128628	0.343509	1.114002	0.132250
2004	ftbarn	2	H211-3	60	NC	0	22.4	0.653397	0.363234	0.638771	0.151975
2004	ftbarn	2	H212-1	20	R	3	0.00	2.305494	0.295295	2.290868	0.084036
2004	ftbarn	2	H212-2	40	R	3	0.00	1.136221	0.293028	1.121595	0.081769
2004	ftbarn	2	H212-3	60	R	3	0.00	0.630393	0.492319	0.615767	0.281060
2004	ftbarn	2	H213-1	20	R	2	22.4	2.347371	0.287996	2.332745	0.076737
2004	ftbarn	2	H213-2	40	R	2	22.4	1.423664	0.389567	1.409038	0.178308
2004	ftbarn	2	H213-3	60	R	2	22.4	0.613496	0.608751	0.598870	0.397492
2004	ftbarn	2	H219-1	20	T	3	0.00	1.258251	0.306520	1.243625	0.095261
2004	ftbarn	2	H219-2	40	T	3	0.00	0.630587	0.603266	0.615961	0.392007
2004	ftbarn	2	H219-3	60	T	3	0.00	0.326189	0.359114	0.311563	0.147855
2004	ftbarn	2	H220-1	20	T	2	0.00	1.325541	0.576159	1.310915	0.364900
2004	ftbarn	2	H220-2	40	T	2	0.00	0.869564	0.344831	0.854938	0.133572
2004	ftbarn	2	H220-3	60	T	2	0.00	0.783147	0.262105	0.768521	0.050846

(*Table B7,* continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	ftbarn	3	H304-1	20	NC	0	22.4	1.386466	0.411674	1.371840	0.200415
2004	ftbarn	3	H304-2	40	NC	0	22.4	0.870296	0.354639	0.855670	0.143380
2004	ftbarn	3	H304-3	60	NC	0	22.4	0.493769	0.271013	0.479143	0.059754
2004	ftbarn	3	H306-1	20	T	2	22.4	0.780896	0.348009	0.766270	0.136750
2004	ftbarn	3	H306-2	40	T	2	0.00	1.518347	0.409962	1.503721	0.198703
2004	ftbarn	3	H306-3	60	T	2	0.00	0.340164	0.420057	0.325538	0.208798
2004	ftbarn	3	H307-1	20	T	3	22.4	1.380203	0.312207	1.365577	0.100948
2004	ftbarn	3	H307-2	40	T	3	22.4	0.790584	0.278025	0.775958	0.066766
2004	ftbarn	3	H307-3	60	T	3	22.4	0.286982	0.270940	0.272356	0.059681
2004	ftbarn	3	H308-1	20	R	3	0.00	1.247651	0.331366	1.233025	0.120107
2004	ftbarn	3	H308-2	40	R	3	0.00	0.684533	0.251382	0.669907	0.040123
2004	ftbarn	3	H308-3	60	R	3	0.00	0.287904	0.289374	0.273278	0.078115
2004	ftbarn	3	H314-1	20	NC	0	0.00	1.452919	0.374117	1.438293	0.162858
2004	ftbarn	3	H314-2	40	NC	0	0.00	1.033594	0.299525	1.018968	0.088266
2004	ftbarn	3	H314-3	60	NC	0	0.00	0.514858	0.571674	0.500232	0.360415

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	ftbarn	3	H315-1	20	T	2	22.4	1.49976	0.28044	1.48513	0.06918
2004	ftbarn	3	H315-2	40	T	2	22.4	0.55023	0.33525	0.53560	0.12399
2004	ftbarn	3	H315-3	60	T	2	22.4	0.35836	1.19372	0.34374	0.98246
2004	ftbarn	3	H317-1	20	T	3	0.00	1.11190	0.27333	1.09728	0.06207
2004	ftbarn	3	H317-2	40	T	3	0.00	0.30681	0.32522	0.29218	0.11396
2004	ftbarn	3	H317-3	60	T	3	0.00	0.37138	1.01950	0.35676	0.80824
2004	ftbarn	3	H318-1	20	R	2	0.00	1.40082	0.25655	1.38619	0.04529
2004	ftbarn	3	H318-2	40	R	2	0.00	0.53721	0.34759	0.52258	0.13633
2004	ftbarn	3	H318-3	60	R	2	0.00	0.66857	1.23923	0.65394	1.02797
2004	ftbarn	3	H319-1	20	R	2	22.4	1.16523	0.26284	1.15061	0.05158
2004	ftbarn	3	H319-2	40	R	2	22.4	0.33233	0.35604	0.31770	0.14478
2004	ftbarn	3	H319-3	60	R	2	22.4	0.40251	0.85405	0.38789	0.64279
2004	ftbarn	3	H320-1	20	R	3	22.4	1.40857	0.25741	1.39395	0.04615
2004	ftbarn	3	H320-2	40	R	3	22.4	0.76634	0.31513	0.75172	0.10387
2004	ftbarn	3	H320-3	60	R	3	22.4	0.35896	0.33580	0.34433	0.12455

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	ftbarn	4	H401-1	20	R	2	22.4	1.91000	0.48217	1.89537	0.27091
2004	ftbarn	4	H401-2	40	R	2	22.4	0.70285	0.90969	0.68822	0.69843
2004	ftbarn	4	H401-3	60	R	2	22.4	0.49054	1.45759	0.47591	1.2463
2004	ftbarn	4	H402-1	20	R	3	22.4	1.50536	0.28708	1.49073	0.07582
2004	ftbarn	4	H402-2	40	R	3	22.4	0.67675	0.39644	0.66213	0.18518
2004	ftbarn	4	H402-3	60	R	3	22.4	0.46865	0.92693	0.45402	0.71570
2004	ftbarn	4	H403-1	20	R	2	0.00	1.74742	0.3308	1.73280	0.11957
2004	ftbarn	4	H403-2	40	R	2	0.00	0.92287	0.28942	0.90824	0.07816
2004	ftbarn	4	H403-3	60	R	2	0.00	0.63769	1.30294	0.62306	1.09168
2004	ftbarn	4	H404-1	20	T	3	0.00	1.54671	0.18701	1.53208	0.02000
2004	ftbarn	4	H404-2	40	T	3	0.00	0.68341	0.43458	0.67188	0.29673
2004	ftbarn	4	H404-3	60	T	3	0.00	0.64579	1.22785	0.6342	1.09000
2004	ftbarn	4	H406-1	20	T	2	22.4	1.43421	0.56574	1.42264	0.42789
2004	ftbarn	4	H406-2	40	T	2	22.4	0.56128	0.57832	0.54975	0.44046
2004	ftbarn	4	H406-3	60	T	2	22.4	0.40923	1.12280	0.39777	0.98494

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	ftbarn	4	H410-1	20	NC	0	22.4	0.99143	1.03991	0.97990	0.90205
2004	ftbarn	4	H410-2	40	NC	0	22.4	0.53283	0.52143	0.52131	0.38357
2004	ftbarn	4	H410-3	60	NC	0	22.4	0.53051	0.91031	0.51898	0.77245
2004	ftbarn	4	H411-1	20	R	3	0.00	1.02884	0.24569	1.01731	0.10784
2004	ftbarn	4	H411-2	40	R	3	0.00	0.64453	0.98564	0.63300	0.84778
2004	ftbarn	4	H411-3	60	R	3	0.00	0.75114	0.73798	0.73961	0.60012
2004	ftbarn	4	H415-1	20	T	2	0.00	1.42273	0.34658	1.41121	0.20873
2004	ftbarn	4	H415-2	40	T	2	0.00	0.60823	0.50943	0.59670	0.37157
2004	ftbarn	4	H415-3	60	T	2	0.00	0.37468	0.86144	0.36315	0.72358
2004	ftbarn	4	H416-1	20	T	3	22.4	1.30645	0.61751	1.29493	0.47965
2004	ftbarn	4	H416-2	40	T	3	22.4	0.64168	0.46961	0.63015	0.33175
2004	ftbarn	4	H416-3	60	T	3	22.4	0.50091	1.13333	0.48939	0.99547
2004	ftbarn	4	H420-1	20	NC	0	0.00	1.30538	0.81647	1.29386	0.67861
2004	ftbarn	4	H420-2	40	NC	0	0.00	0.57874	0.31360	0.56722	0.17574
2004	ftbarn	4	H420-3	60	NC	0	0.00	0.59072	0.72023	0.57920	0.58237

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	vboro	1	V101-1	20	T	2	0.00	1.94428	0.29314	1.93276	0.15528
2004	vboro	1	V101-2	40	T	2	0.00	0.88513	1.15190	0.87360	1.01404
2004	vboro	1	V101-3	60	T	2	0.00	0.54295	1.37405	0.53142	1.23620
2004	vboro	1	V103-1	20	T	3	22.4	1.68172	0.53610	1.67020	0.39824
2004	vboro	1	V103-2	40	T	3	22.4	0.77942	1.18118	0.76789	1.04332
2004	vboro	1	V103-3	60	T	3	22.4	0.56028	1.56902	0.54875	1.43116
2004	vboro	1	V107-1	20	NC	0	22.4	1.42498	0.45793	1.41345	0.32007
2004	vboro	1	V107-2	40	NC	0	22.4	0.87886	1.49495	0.86734	1.35709
2004	vboro	1	V107-3	60	NC	0	22.4	0.51783	2.90195	0.50630	2.76409
2004	vboro	1	V109-1	20	R	3	22.4	1.59457	0.44827	1.58304	0.31041
2004	vboro	1	V109-2	40	R	3	22.4	0.82665	1.37631	0.81513	1.23845
2004	vboro	1	V109-3	60	R	3	22.4	0.49386	1.84345	0.48234	1.70560
2004	vboro	1	V110-1	20	R	2	22.4	1.63887	0.41382	1.62735	0.27596
2004	vboro	1	V110-2	40	R	2	22.4	0.57412	1.08987	0.56259	0.95202
2004	vboro	1	V110-3	60	R	2	22.4	0.52668	1.20056	0.51515	1.06270

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	vboro	1	V111-1	20	T	3	0.00	1.89085	0.43065	1.87932	0.29279
2004	vboro	1	V111-2	40	T	3	0.00	0.70158	1.28214	0.69006	1.14428
2004	vboro	1	V111-3	60	T	3	0.00	0.38007	1.41319	0.36855	1.27533
2004	vboro	1	V113-1	20	T	2	22.4	1.87868	0.47431	1.86715	0.33646
2004	vboro	1	V113-2	40	T	2	22.4	0.70852	1.43373	0.69699	1.29587
2004	vboro	1	V113-3	60	T	2	22.4	0.50675	1.22639	0.49522	1.08853
2004	vboro	1	V117-1	20	NC	0	0.00	1.52300	0.51154	1.51147	0.37368
2004	vboro	1	V117-2	40	NC	0	0.00	0.84136	1.47320	0.82983	1.33535
2004	vboro	1	V117-3	60	NC	0	0.00	0.48289	2.37981	0.47137	2.24196
2004	vboro	1	V118-1	20	R	3	0.00	1.48025	0.33942	1.46873	0.20156
2004	vboro	1	V118-2	40	R	3	0.00	0.73798	0.79065	0.72645	0.65279
2004	vboro	1	V118-3	60	R	3	0.00	0.57473	1.15750	0.56320	1.01964
2004	vboro	1	V120-1	20	R	2	0.00	1.75505	0.33769	1.74352	0.19983
2004	vboro	1	V120-2	40	R	2	0.00	0.76017	0.98336	0.74864	0.84550
2004	vboro	1	V120-3	60	R	2	0.00	0.46426	1.32247	0.45273	1.18462

Table B7, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	vboro	2	V201-1	20	NC	0	0.00	1.89792	0.47589	1.88640	0.33803
2004	vboro	2	V201-2	40	NC	0	0.00	0.76946	1.34779	0.75793	1.20994
2004	vboro	2	V201-3	60	NC	0	0.00	0.52882	2.35189	0.51729	2.21403
2004	vboro	2	V202-1	20	R	2	0.00	1.52923	0.37271	1.51771	0.23485
2004	vboro	2	V202-2	40	R	2	0.00	0.80084	1.12276	0.7893	0.98490
2004	vboro	2	V202-3	60	R	2	0.00	0.41810	1.30730	0.40654	1.16945
2004	vboro	2	V204-1	20	R	3	22.4	1.66795	0.35325	1.65642	0.21540
2004	vboro	2	V204-2	40	R	3	22.4	0.89990	1.10423	0.88837	0.96637
2004	vboro	2	V204-3	60	R	3	22.4	0.41486	2.27841	0.40333	2.14055
2004	vboro	2	V209-1	20	T	2	22.4	1.50937	0.41120	1.49784	0.27335
2004	vboro	2	V209-2	40	T	2	22.4	0.52674	0.37273	0.51521	0.23488
2004	vboro	2	V209-3	60	T	2	22.4	0.50119	1.71298	0.48967	1.57512
2004	vboro	2	V210-1	20	T	3	22.4	1.70878	0.32134	1.69726	0.18348
2004	vboro	2	V210-2	40	T	3	22.4	0.71523	0.49706	0.70370	0.35920
2004	vboro	2	V210-3	60	T	3	22.4	0.41171	1.19685	0.40018	1.05899

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	vboro	2	V211-1	20	NC	0	22.4	1.66334	0.59837	1.65181	0.46051
2004	vboro	2	V211-2	40	NC	0	22.4	0.75653	1.10864	0.74500	0.97079
2004	vboro	2	V211-3	60	NC	0	22.4	0.48226	2.43868	0.47073	2.30083
2004	vboro	2	V212-1	20	R	3	0.00	1.69571	0.35947	1.68418	0.2216
2004	vboro	2	V212-2	40	R	3	0.00	0.80355	0.53238	0.79202	0.39452
2004	vboro	2	V212-3	60	R	3	0.00	0.51627	1.15520	0.50474	1.01734
2004	vboro	2	V213-1	20	R	2	22.4	1.90859	0.41806	1.89706	0.28020
2004	vboro	2	V213-2	40	R	2	22.4	0.75936	0.74745	0.74784	0.60959
2004	vboro	2	V213-3	60	R	2	22.4	0.53981	1.31045	0.52828	1.17260
2004	vboro	2	V219-1	20	T	3	0.00	1.27055	0.36412	1.25902	0.22626
2004	vboro	2	V219-2	40	T	3	0.00	0.55877	0.37478	0.55203	0.16264
2004	vboro	2	V219-3	60	T	3	0.00	0.47565	1.12228	0.46892	0.91014
2004	vboro	2	V220-1	20	T	2	0.00	1.64508	0.33775	1.63835	0.12561
2004	vboro	2	V220-2	40	T	2	0.00	0.86768	0.6360	0.86095	0.42394
2004	vboro	2	V220-3	60	T	2	0.00	0.56562	1.71127	0.55889	1.49913

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	vboro	3	V304-1	20	NC	0	22.4	2.79245	0.89366	2.78572	0.68152
2004	vboro	3	V304-2	40	NC	0	22.4	0.87438	1.15015	0.86765	0.93801
2004	vboro	3	V304-3	60	NC	0	22.4	0.5106	0.91473	0.50395	0.70259
2004	vboro	3	V306-1	20	T	2	22.4	2.20241	0.52254	2.19575	0.31040
2004	vboro	3	V306-2	40	T	2	0.00	0.92502	0.45653	0.91834	0.24438
2004	vboro	3	V306-3	60	T	2	0.00	0.43288	1.17909	0.42612	0.96695
2004	vboro	3	V307-1	20	T	3	22.4	1.9382	0.35268	1.93149	0.14054
2004	vboro	3	V307-2	40	T	3	22.4	0.71166	0.89338	0.70496	0.68124
2004	vboro	3	V307-3	60	T	3	22.4	0.56209	1.27433	0.55536	1.06218
2004	vboro	3	V308-1	20	R	3	0.00	1.31524	0.38319	1.30851	0.17104
2004	vboro	3	V308-2	40	R	3	0.00	0.64946	0.51767	0.64273	0.30553
2004	vboro	3	V308-3	60	R	3	0.00	0.50031	1.53573	0.49358	1.32359
2004	vboro	3	V314-1	20	NC	0	0.00	1.85442	0.58489	1.84769	0.37274
2004	vboro	3	V314-2	40	NC	0	0.00	0.85600	0.49893	0.84927	0.28679
2004	vboro	3	V314-3	60	NC	0	0.00	0.56710	1.07819	0.56037	0.86605

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	vboro	3	V315-2	40	T	2	22.4	0.79307	0.44252	0.78634	0.23038
2004	vboro	3	V315-3	60	T	2	22.4	0.49775	0.77203	0.49102	0.55988
2004	vboro	3	V317-1	20	T	3	0.00	1.92662	0.37091	1.91989	0.15877
2004	vboro	3	V317-2	40	T	3	0.00	0.85249	0.41575	0.84576	0.20361
2004	vboro	3	V317-2	60	T	3	0.00	0.32336	1.13678	0.31663	0.92464
2004	vboro	3	V318-1	20	R	2	0.00	1.76048	0.35880	1.75375	0.14666
2004	vboro	3	V318-2	40	R	2	0.00	0.80288	0.60468	0.79614	0.39253
2004	vboro	3	V318-3	60	R	2	0.00	0.53763	0.68240	0.53090	0.47026
2004	vboro	3	V319-1	20	R	2	22.4	1.30029	0.42050	1.29356	0.20836
2004	vboro	3	V319-2	40	R	2	22.4	0.51604	0.35262	0.50931	0.14048
2004	vboro	3	V319-3	60	R	2	22.4	0.48904	1.02487	0.48231	0.81273
2004	vboro	3	V320-1	20	R	3	22.4	1.25422	0.37283	1.24748	0.16069
2004	vboro	3	V320-2	40	R	3	22.4	0.54922	0.40479	0.54249	0.19265
2004	vboro	3	V320-3	60	R	3	22.4	0.57977	1.33780	0.57304	1.12565

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	vboro	4	V401-1	20	R	2	22.4	2.10789	0.37774	2.10116	0.16559
2004	vboro	4	V401-2	40	R	2	22.4	0.88731	0.38898	0.88058	0.17684
2004	vboro	4	V401-3	60	R	2	22.4	0.39595	0.78283	0.38921	0.57069
2004	vboro	4	V402-1	20	R	3	22.4	1.86589	0.30396	1.85916	0.09182
2004	vboro	4	V402-2	40	R	3	22.4	1.15931	0.24133	1.15258	0.02919
2004	vboro	4	V402-3	60	R	3	22.4	0.41628	0.75598	0.40955	0.54384
2004	vboro	4	V403-1	20	R	2	0.00	1.49936	0.36381	1.49262	0.15167
2004	vboro	4	V403-2	40	R	2	0.00	0.80681	0.34284	0.80008	0.13070
2004	vboro	4	V403-3	60	R	2	0.00	0.36037	0.30954	0.35364	0.09740
2004	vboro	4	V404-1	20	T	3	0.00	1.53478	0.37449	1.52805	0.16235
2004	vboro	4	V404-2	40	T	3	0.00	0.71295	0.34859	0.70622	0.13645
2004	vboro	4	V404-3	60	T	3	0.00	0.25380	0.51886	0.24707	0.30671
2004	vboro	4	V406-1	20	T	2	22.4	1.65623	0.37376	1.64950	0.16162
2004	vboro	4	V406-2	40	T	2	22.4	0.84961	0.67133	0.84287	0.45919
2004	vboro	4	V406-3	60	T	2	22.4	0.43575	1.80021	0.42902	1.58807

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2004	vboro	4	V410-1	20	NC	0	22.4	1.79783	0.42842	1.79110	0.21628
2004	vboro	4	V410-2	40	NC	0	22.4	1.09668	0.35860	1.0995	0.14646
2004	vboro	4	V410-3	60	NC	0	22.4	0.68757	1.03155	0.68084	0.81940
2004	vboro	4	V411-1	20	R	3	0.00	1.69069	0.31185	1.68395	0.09971
2004	vboro	4	V411-2	40	R	3	0.00	0.42545	0.30531	0.41871	0.09317
2004	vboro	4	V411-3	60	R	3	0.00	0.47364	0.37270	0.46691	0.16056
2004	vboro	4	V415-1	20	T	2	0.00	1.68073	0.50587	1.67400	0.29373
2004	vboro	4	V415-2	40	T	2	0.00	1.03520	0.47584	1.02847	0.26370
2004	vboro	4	V415-3	60	T	2	0.00	0.46409	0.67964	0.45735	0.46750
2004	vboro	4	V416-1	20	T	3	22.4	1.83165	0.28346	1.82492	0.07132
2004	vboro	4	V416-2	40	T	3	22.4	1.28598	0.36851	1.27925	0.15637
2004	vboro	4	V416-3	60	T	3	22.4	0.78123	0.45874	0.77450	0.246606
2004	vboro	4	V420-1	20	NC	0	0.00	1.82594	0.34172	1.81921	0.129581
2004	vboro	4	V420-2	40	NC	0	0.00	0.83907	0.37967	0.83267	0.167529
2004	vboro	4	V420-3	60	NC	0	0.00	0.50499	1.04022	0.49826	0.828087

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	1	V101-1	20	T	2	0.00	1.57406	0.33596	1.56733	0.12381
2005	vboro	1	V101-2	40	T	2	0.00	0.87427	0.47257	0.86753	0.26043
2005	vboro	1	V101-3	60	T	2	0.00	0.70667	1.19870	0.69994	0.98656
2005	vboro	1	V103-1	20	T	3	22.4	1.50875	0.34598	1.50202	0.13384
2005	vboro	1	V103-2	40	T	3	22.4	0.66043	0.80441	0.65370	0.59227
2005	vboro	1	V103-3	60	T	3	22.4	0.65552	0.72295	0.64879	0.51081
2005	vboro	1	V107-1	20	NC	0	22.4	1.30504	0.34896	1.29830	0.13681
2005	vboro	1	V107-2	40	NC	0	22.4	1.08541	0.91041	1.07868	0.6982
2005	vboro	1	V107-3	60	NC	0	22.4	0.78068	1.11001	0.77394	0.89787
2005	vboro	1	V109-1	20	R	3	22.4	1.62110	0.37426	1.61437	0.16212
2005	vboro	1	V109-2	40	R	3	22.4	0.93537	0.57793	0.92863	0.36577
2005	vboro	1	V109-3	60	R	3	22.4	0.68191	1.51601	0.67518	1.30387
2005	vboro	1	V110-1	20	R	2	22.4	1.23672	0.54424	1.22999	0.33210
2005	vboro	1	V110-2	40	R	2	22.4	0.92990	0.67956	0.92317	0.46742
2005	vboro	1	V110-3	60	R	2	22.4	0.66272	1.49031	0.65599	1.27817

(*Table B7,* continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	1	V111-1	20	T	3	0.00	1.87575	0.35245	1.86902	0.14031
2005	vboro	1	V111-2	40	T	3	0.00	1.04089	0.77573	1.03416	0.56359
2005	vboro	1	V111-3	60	T	3	0.00	0.47992	1.25024	0.47319	1.03810
2005	vboro	1	V113-1	20	T	2	22.4	1.64765	0.38113	1.64091	0.16898
2005	vboro	1	V113-2	40	T	2	22.4	0.81670	0.86314	0.80997	0.65100
2005	vboro	1	V113-3	60	T	2	22.4	0.49096	1.26669	0.48423	1.05455
2005	vboro	1	V117-1	20	NC	0	0.00	1.88400	0.33826	1.87727	0.12612
2005	vboro	1	V117-2	40	NC	0	0.00	0.95198	0.44620	0.94525	0.23405
2005	vboro	1	V117-3	60	NC	0	0.00	0.73760	1.64104	0.73087	1.42889
2005	vboro	1	V118-1	20	R	3	0.00	1.63999	0.33677	1.63326	0.12463
2005	vboro	1	V118-2	40	R	3	0.00	0.89698	0.43214	0.89025	0.22000
2005	vboro	1	V118-3	60	R	3	0.00	0.76309	1.38667	0.75636	1.17453
2005	vboro	1	V120-1	20	R	2	0.00	1.49935	0.34300	1.49262	0.13086
2005	vboro	1	V120-2	40	R	2	0.00	1.02481	0.43028	1.01808	0.21814
2005	vboro	1	V120-3	60	R	2	0.00	0.74289	1.23392	0.73616	1.02178

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	2	V201-1	20	NC	0	0.00	1.63458	0.35899	1.62785	0.14684
2005	vboro	2	V201-2	40	NC	0	0.00	1.02721	0.51572	1.02048	0.30358
2005	vboro	2	V201-3	60	NC	0	0.00	0.58881	1.29255	0.58208	1.08041
2005	vboro	2	V202-1	20	R	2	0.00	1.60661	0.39101	1.59988	0.17887
2005	vboro	2	V202-2	40	R	2	0.00	0.97713	1.34508	0.97040	1.13294
2005	vboro	2	V202-3	60	R	2	0.00	0.61674	1.53900	0.61000	1.32686
2005	vboro	2	V204-1	20	R	3	22.4	1.95295	0.40495	1.94622	0.19281
2005	vboro	2	V204-2	40	R	3	22.4	1.10870	0.71459	1.10197	0.50245
2005	vboro	2	V204-3	60	R	3	22.4	0.48495	1.53153	0.47822	1.31938
2005	vboro	2	V209-1	20	T	2	22.4	1.59063	0.31254	1.58390	0.10040
2005	vboro	2	V209-2	40	T	2	22.4	0.75855	0.62094	0.75182	0.40880
2005	vboro	2	V209-3	60	T	2	22.4	0.58654	1.00919	0.57981	0.79704
2005	vboro	2	V210-1	20	T	3	22.4	1.80033	0.66424	1.79359	0.45209
2005	vboro	2	V210-2	40	T	3	22.4	0.68705	0.30790	0.68032	0.09576
2005	vboro	2	V210-3	60	T	3	22.4	0.603804	0.698969	0.59707	0.48682

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	2	V211-1	20	NC	0	22.4	1.90382	0.34355	1.89709	0.13140
2005	vboro	2	V211-2	40	NC	0	22.4	0.89096	0.81459	0.88423	0.60244
2005	vboro	2	V211-3	60	NC	0	22.4	0.52360	1.71529	0.51687	1.50315
2005	vboro	2	V212-1	20	R	3	0.00	1.52401	0.35533	1.51728	0.14319
2005	vboro	2	V212-2	40	R	3	0.00	0.99338	0.43913	0.98665	0.22699
2005	vboro	2	V212-3	60	R	3	0.00	0.67467	0.94720	0.66794	0.73506
2005	vboro	2	V213-1	20	R	2	22.4	1.72603	0.34819	1.71930	0.13605
2005	vboro	2	V213-2	40	R	2	22.4	0.71057	0.59739	0.70384	0.38525
2005	vboro	2	V213-3	60	R	2	22.4	0.68976	1.56519	0.68303	1.35305
2005	vboro	2	V219-1	20	T	3	0.00	1.21235	0.32325	1.20562	0.11111
2005	vboro	2	V219-2	40	T	3	0.00	0.73362	0.35560	0.72689	0.14346
2005	vboro	2	V219-3	60	T	3	0.00	0.54577	0.96437	0.53904	0.75223
2005	vboro	2	V220-1	20	T	2	0.00	1.22601	0.32855	1.21927	0.11641
2005	vboro	2	V220-2	40	T	2	0.00	1.00737	0.52302	1.00064	0.31088
2005	vboro	2	V220-3	60	T	2	0.00	0.75667	1.49425	0.74994	1.28211

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	3	V304-1	20	NC	0	22.4	1.57266	0.34511	1.56593	0.13297
2005	vboro	3	V304-2	40	NC	0	22.4	0.90793	0.35236	0.90120	0.14022
2005	vboro	3	V304-3	60	NC	0	22.4	0.57273	0.84668	0.56600	0.63454
2005	vboro	3	V306-1	20	T	2	0.00	1.76321	0.37491	1.75647	0.16277
2005	vboro	3	V306-2	40	T	2	0.00	0.83465	0.37954	0.82792	0.16740
2005	vboro	3	V306-3	60	T	2	0.00	0.45012	0.93158	0.44339	0.71944
2005	vboro	3	V307-1	20	T	3	22.4	1.44689	0.32434	1.44016	0.11219
2005	vboro	3	V307-2	40	T	3	22.4	0.72863	0.38610	0.72189	0.17396
2005	vboro	3	V307-3	60	T	3	22.4	0.53279	0.95015	0.52606	0.73801
2005	vboro	3	V308-1	20	R	3	0.00	1.35931	0.34802	1.35258	0.13587
2005	vboro	3	V308-2	40	R	3	0.00	0.56478	0.38225	0.55805	0.17011
2005	vboro	3	V308-3	60	R	3	0.00	0.58719	1.10215	0.58046	0.89001
2005	vboro	3	V314-1	20	NC	0	0.00	1.41683	0.35102	1.41010	0.13888
2005	vboro	3	V314-2	40	NC	0	0.00	0.36982	0.73744	0.36308	0.52530
2005	vboro	3	V314-3	60	NC	0	0.00	0.71642	0.42179	0.70969	0.20965

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	3	V315-1	20	T	2	22.4	2.16792	0.86589	2.16119	0.65375
2005	vboro	3	V315-2	40	T	2	22.4	0.81355	0.83947	0.80681	0.62733
2005	vboro	3	V315-3	60	T	2	22.4	0.52864	1.17731	0.52191	0.96517
2005	vboro	3	V317-1	20	T	3	0.00	1.48676	0.38962	1.48003	0.17748
2005	vboro	3	V317-2	40	T	3	0.00	0.79246	0.36120	0.78573	0.14906
2005	vboro	3	V317-3	60	T	3	0.00	0.45017	0.78032	0.44344	0.56818
2005	vboro	3	V318-1	20	R	2	0.00	1.41517	0.33919	1.40844	0.12705
2005	vboro	3	V318-2	40	R	2	0.00	0.66017	0.35425	0.65343	0.14210
2005	vboro	3	V318-3	60	R	2	0.00	0.61066	1.14002	0.60393	0.92788
2005	vboro	3	V319-1	20	R	2	22.4	1.25889	0.35160	1.25216	0.13946
2005	vboro	3	V319-2	40	R	2	22.4	0.64965	0.56332	0.64292	0.35118
2005	vboro	3	V319-3	60	R	2	22.4	0.69743	1.23594	0.69069	1.02379
2005	vboro	3	V320-1	20	R	3	22.4	1.06127	0.31834	1.05454	0.10619
2005	vboro	3	V320-2	40	R	3	22.4	0.82266	0.79634	0.81593	0.58419
2005	vboro	3	V320-3	60	R	3	22.4	0.70581	1.65362	0.69908	1.44148

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg $^{-L}$)	NO_3 (mg $^{-L}$)	Corrected NH_4 (mg $^{-L}$)	Corrected NO_3 (mg $^{-L}$)
2005	vboro	4	V401-1	20	R	2	22.4	1.80795	0.38534	1.80121	0.17320
2005	vboro	4	V401-2	40	R	2	22.4	1.04241	0.48209	1.03568	0.26995
2005	vboro	4	V401-3	60	R	2	22.4	0.54709	1.25420	0.54036	1.04206
2005	vboro	4	V402-1	20	R	3	22.4	1.55645	0.35156	1.54972	0.13942
2005	vboro	4	V402-2	40	R	3	22.4	0.90531	0.43437	0.89858	0.22223
2005	vboro	4	V402-3	60	R	3	22.4	0.5866	1.40049	0.57991	1.18835
2005	vboro	4	V403-1	20	R	2	0.00	1.58382	0.40327	1.57708	0.19112
2005	vboro	4	V403-2	40	R	2	0.00	0.80525	0.41168	0.79852	0.19953
2005	vboro	4	V403-3	60	R	2	0.00	0.62381	1.42793	0.61707	1.21578
2005	vboro	4	V404-1	20	T	3	0.00	1.53254	0.36627	1.52581	0.15413
2005	vboro	4	V404-2	40	T	3	0.00	0.74424	0.37007	0.73751	0.15793
2005	vboro	4	V404-3	60	T	3	0.00	0.61101	1.07530	0.60428	0.86315
2005	vboro	4	V406-1	20	T	2	22.4	1.65919	0.35631	1.65246	0.14417
2005	vboro	4	V406-2	40	T	2	22.4	0.58298	0.53855	0.57625	0.32641
2005	vboro	4	V406-3	60	T	2	22.4	0.52537	0.87082	0.51863	0.65868

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	4	V410-1	20	NC	0	22.4	1.18025	0.34740	1.17352	0.13525
2005	vboro	4	V410-2	40	NC	0	22.4	0.72101	0.33711	0.71427	0.12497
2005	vboro	4	V410-3	60	NC	0	22.4	0.55635	0.58274	0.54961	0.37059
2005	vboro	4	V411-1	20	R	3	0.00	2.24722	0.38931	2.24049	0.17717
2005	vboro	4	V411-2	40	R	3	0.00	0.83618	0.44532	0.82945	0.23318
2005	vboro	4	V411-3	60	R	3	0.00	0.75741	1.47581	0.75270	1.34654
2005	vboro	4	V415-1	20	T	2	0.00	1.52435	0.34052	1.51964	0.21125
2005	vboro	4	V415-2	40	T	2	0.00	0.79703	0.47436	0.79232	0.34510
2005	vboro	4	V415-3	60	T	2	0.00	0.60836	1.36521	0.60365	1.23595
2005	vboro	4	V416-1	20	T	3	22.4	1.16167	0.36162	1.15696	0.23235
2005	vboro	4	V416-2	40	T	3	22.4	0.83950	0.37356	0.83479	0.24430
2005	vboro	4	V416-3	60	T	3	22.4	0.57437	1.16424	0.56966	1.03497
2005	vboro	4	V420-1	20	NC	0	0.00	1.24905	0.35857	1.24434	0.22930
2005	vboro	4	V420-2	40	NC	0	0.00	0.77170	0.34105	0.76699	0.21178
2005	vboro	4	V420-3	60	NC	0	0.00	0.70139	0.85216	0.69668	0.72289

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	ftbarn	1	H101-1	20	T	2	0.00	1.42985	0.30905	1.42514	0.17978
2005	ftbarn	1	H101-2	40	T	2	0.00	0.96101	0.37200	0.95630	0.24274
2005	ftbarn	1	H101-3	60	T	2	0.00	0.52412	0.54531	0.51941	0.41604
2005	ftbarn	1	H103-1	20	T	3	22.4	1.73666	0.61604	1.73195	0.48677
2005	ftbarn	1	H103-2	40	T	3	22.4	0.93572	0.31595	0.93101	0.18668
2005	ftbarn	1	H103-3	60	T	3	22.4	0.56256	0.35765	0.55785	0.22838
2005	ftbarn	1	H107-1	20	NC	0	22.4	1.14286	0.30997	1.13815	0.18071
2005	ftbarn	1	H107-2	40	NC	0	22.4	0.72396	0.36416	0.71925	0.23489
2005	ftbarn	1	H107-3	60	NC	0	22.4	0.37736	0.30952	0.37265	0.18026
2005	ftbarn	1	H109-1	20	R	0	22.4	1.20108	0.32213	1.19637	0.19287
2005	ftbarn	1	H109-2	40	R	3	22.4	0.79785	0.34766	0.79314	0.21840
2005	ftbarn	1	H109-3	60	R	3	22.4	0.54798	0.38109	0.54327	0.25183
2005	ftbarn	1	H110-1	20	R	2	22.4	1.25183	0.32376	1.24712	0.19449
2005	ftbarn	1	H110-2	40	R	2	22.4	0.69180	0.31828	0.68709	0.18901
2005	ftbarn	1	H110-3	60	R	2	22.4	0.57834	0.43500	0.57363	0.30573

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	ftbarn	1	H111-1	20	T	3	0.00	1.96622	0.37416	1.96151	0.24489
2005	ftbarn	1	H111-2	40	T	3	0.00	1.04954	0.35055	1.04483	0.22129
2005	ftbarn	1	H111-3	60	T	3	0.00	0.62979	0.62164	0.62508	0.49238
2005	ftbarn	1	H113-1	20	T	2	22.4	1.57477	0.35471	1.57006	0.22544
2005	ftbarn	1	H113-2	40	T	2	22.4	1.13910	0.31391	1.13439	0.18464
2005	ftbarn	1	H113-3	60	T	2	22.4	0.61341	0.38376	0.60870	0.25449
2005	ftbarn	1	H117-1	20	NC	0	0.00	1.09084	0.27735	1.08613	0.14809
2005	ftbarn	1	H117-2	40	NC	0	0.00	0.83803	0.28562	0.83332	0.15635
2005	ftbarn	1	H117-3	60	NC	0	0.00	0.67784	0.34120	0.67313	0.21194
2005	ftbarn	1	H118-1	20	R	3	0.00	1.02679	0.30780	1.02208	0.17854
2005	ftbarn	1	H118-2	40	R	3	0.00	0.62657	0.28904	0.62186	0.15977
2005	ftbarn	1	H118-3	60	R	3	0.00	0.61148	0.32303	0.60677	0.19377
2005	ftbarn	1	H120-1	20	R	2	0.00	1.21210	0.30238	1.20739	0.17311
2005	ftbarn	1	H120-2	40	R	2	0.00	1.09270	0.28937	1.08799	0.16011
2005	ftbarn	1	H120-3	60	R	2	0.00	0.36331	0.33058	0.35860	0.20131

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	ftbarn	2	H201-1	20	NC	0	0.00	1.58958	0.34859	1.58487	0.21932
2005	ftbarn	2	H201-2	40	NC	0	0.00	1.17296	0.32324	1.16825	0.19397
2005	ftbarn	2	H201-3	60	NC	0	0.00	0.47072	0.32988	0.46601	0.20062
2005	ftbarn	2	H202-1	20	R	2	0.00	1.98255	0.36179	1.97784	0.23253
2005	ftbarn	2	H202-2	40	R	2	0.00	1.63994	0.33944	1.63523	0.21017
2005	ftbarn	2	H202-3	60	R	2	0.00	0.62432	0.32213	0.61961	0.19286
2005	ftbarn	2	H204-1	20	R	3	22.4	1.78524	0.27779	1.78053	0.14852
2005	ftbarn	2	H204-2	40	R	3	22.4	1.04031	0.32231	1.03560	0.19304
2005	ftbarn	2	H204-3	60	R	3	22.4	0.39479	0.31827	0.39008	0.18901
2005	ftbarn	2	H209-1	20	T	2	22.4	0.99976	0.31398	0.99505	0.18472
2005	ftbarn	2	H209-2	40	T	2	22.4	0.75884	0.94359	0.75413	0.81432
2005	ftbarn	2	H209-3	60	T	2	22.4	0.51419	0.25536	0.50948	0.12609
2005	ftbarn	2	H210-1	20	T	3	22.4	1.05118	0.26931	1.04647	0.14004
2005	ftbarn	2	H210-2	40	T	3	22.4	0.65668	0.25297	0.65197	0.12371
2005	ftbarn	2	H210-3	60	T	3	22.4	0.50400	0.25308	0.49929	0.12382

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	ftbarn	2	H211-1	20	NC	0	22.4	1.64989	0.62335	1.64518	0.49408
2005	ftbarn	2	H211-2	40	NC	0	22.4	0.94274	0.30795	0.93803	0.17869
2005	ftbarn	2	H211-3	60	NC	0	22.4	0.36747	0.26237	0.36276	0.13311
2005	ftbarn	2	H212-1	20	R	3	0.00	1.73036	0.29002	1.72565	0.16076
2005	ftbarn	2	H212-2	40	R	3	0.00	1.19820	0.57708	1.19349	0.44782
2005	ftbarn	2	H212-3	60	R	3	0.00	0.32031	0.19071	0.31560	0.06144
2005	ftbarn	2	H213-1	20	R	2	22.4	1.63394	0.25533	1.62923	0.12606
2005	ftbarn	2	H213-2	40	R	2	22.4	1.06463	0.29199	1.05992	0.16272
2005	ftbarn	2	H213-3	60	R	2	22.4	0.47568	0.34354	0.47097	0.21428
2005	ftbarn	2	H219-1	20	T	3	0.00	0.82757	0.30220	0.82286	0.17293
2005	ftbarn	2	H219-2	40	T	3	0.00	1.29038	0.66169	1.28567	0.53242
2005	ftbarn	2	H219-3	60	T	3	0.00	0.43503	0.33811	0.43032	0.20885
2005	ftbarn	2	H220-1	20	T	2	0.00	1.28287	0.31793	1.27816	0.18866
2005	ftbarn	2	H220-2	40	T	2	0.00	0.81404	0.37469	0.80933	0.24543
2005	ftbarn	2	H220-3	60	T	2	0.00	0.41176	0.30950	0.40705	0.18023

(*Table B7,* continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	ftbarn	3	H304-1	20	NC	0	22.4	1.28869	0.32764	1.28398	0.19837
2005	ftbarn	3	H304-2	40	NC	0	22.4	0.75121	0.23723	0.74650	0.10796
2005	ftbarn	3	H304-3	60	NC	0	22.4	0.44527	0.30227	0.44056	0.17301
2005	ftbarn	3	H306-1	20	T	2	0.00	1.54951	0.34211	1.54480	0.21284
2005	ftbarn	3	H306-2	40	T	2	0.00	0.68840	0.26438	0.68369	0.13511
2005	ftbarn	3	H306-3	60	T	2	0.00	0.39054	0.30737	0.37640	0.09352
2005	ftbarn	3	H307-1	20	T	3	22.4	1.46157	0.32448	1.44743	0.11063
2005	ftbarn	3	H307-2	40	T	3	22.4	0.90311	0.31737	0.88897	0.10352
2005	ftbarn	3	H307-3	60	T	3	22.4	0.49654	0.29327	0.48240	0.07942
2005	ftbarn	3	H308-1	20	R	3	0.00	1.05243	0.28903	1.03830	0.07518
2005	ftbarn	3	H308-2	40	R	3	0.00	0.66675	0.29794	0.65261	0.08410
2005	ftbarn	3	H308-3	60	R	3	0.00	0.34892	0.30407	0.33478	0.09023
2005	ftbarn	3	H314-1	20	NC	0	0.00	1.25722	0.63959	1.24309	0.42574
2005	ftbarn	3	H314-2	40	NC	0	0.00	0.91051	0.71896	0.89638	0.50511
2005	ftbarn	3	H314-3	60	NC	0	0.00	0.49571	0.29205	0.48157	0.07820

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	ftbarn	3	H315-1	20	T	2	22.4	1.15286	0.26704	1.13872	0.05319
2005	ftbarn	3	H315-2	40	T	2	22.4	0.87363	0.33693	0.85949	0.12308
2005	ftbarn	3	H315-3	60	T	2	22.4	0.75765	1.15191	0.74351	0.93806
2005	ftbarn	3	H317-1	20	T	3	0.00	1.12570	0.26176	1.11156	0.04791
2005	ftbarn	3	H317-2	40	T	3	0.00	0.39458	0.29063	0.38044	0.07678
2005	ftbarn	3	H317-2	60	T	3	0.00	0.54198	0.57139	0.52784	0.35754
2005	ftbarn	3	H318-1	20	R	2	0.00	1.00788	0.24961	0.99375	0.03576
2005	ftbarn	3	H318-2	40	R	2	0.00	0.64351	0.23588	0.62937	0.02204
2005	ftbarn	3	H318-3	60	R	2	0.00	0.52925	0.54286	0.51511	0.32901
2005	ftbarn	3	H319-1	20	R	2	22.4	1.06558	0.24195	1.05145	0.02810
2005	ftbarn	3	H319-2	40	R	2	22.4	0.72358	0.25824	0.70945	0.04439
2005	ftbarn	3	H319-3	60	R	2	22.4	0.64534	0.49857	0.63120	0.28472
2005	ftbarn	3	H320-1	20	R	3	22.4	1.15116	0.24900	1.13703	0.03515
2005	ftbarn	3	H320-2	40	R	3	22.4	0.70917	0.31672	0.69503	0.10287
2005	ftbarn	3	H320-3	60	R	3	22.4	0.61458	0.40706	0.60044	0.19321

(*Table B7*, continued)

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	ftbarn	4	H401-1	20	R	2	22.4	1.55728	0.25770	1.54314	0.04385
2005	ftbarn	4	H401-2	40	R	2	22.4	0.95284	0.30175	0.93870	0.08791
2005	ftbarn	4	H401-3	60	R	2	22.4	0.70130	0.36301	0.68717	0.14916
2005	ftbarn	4	H402-1	20	R	3	22.4	1.28172	0.26012	1.26758	0.04627
2005	ftbarn	4	H402-2	40	R	3	22.4	1.01399	0.26005	0.99985	0.04621
2005	ftbarn	4	H402-3	60	R	3	22.4	0.62489	0.30239	0.61076	0.08854
2005	ftbarn	4	H403-1	20	R	2	0.00	1.13328	0.30120	1.11914	0.08735
2005	ftbarn	4	H403-2	40	R	2	0.00	0.80175	0.26435	0.78761	0.05051
2005	ftbarn	4	H403-3	60	R	2	0.00	0.50653	0.62286	0.49239	0.40901
2005	ftbarn	4	H404-1	20	T	3	0.00	1.20393	0.26273	1.18979	0.04889
2005	ftbarn	4	H404-2	40	T	3	0.00	0.77487	0.31851	0.76073	0.10466
2005	ftbarn	4	H404-3	60	T	3	0.00	0.32858	0.25789	0.31444	0.04404
2005	ftbarn	4	H406-1	20	T	2	22.4	1.71354	0.25978	1.69940	0.04593
2005	ftbarn	4	H406-2	40	T	2	22.4	0.85063	0.31124	0.83649	0.09739
2005	ftbarn	4	H406-3	60	T	2	22.4	0.726173	0.485775	0.712036	0.271927

(*Table B7*, continued

Year	Location	Replication	Code	Depth (cm)	Cover	Seed Rate	Fertilizer (kg ha^{-1})	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	ftbarn	4	H410-1	20	NC	0	22.4	1.18526	0.28045	1.17113	0.06660
2005	ftbarn	4	H410-2	40	NC	0	22.4	0.85017	0.40664	0.83603	0.19279
2005	ftbarn	4	H410-3	60	NC	0	22.4	0.65119	0.80476	0.63705	0.59091
2005	ftbarn	4	H411-1	20	R	3	0.00	1.47066	0.26048	1.45652	0.04663
2005	ftbarn	4	H411-2	40	R	3	0.00	0.57980	0.26600	0.56566	0.05215
2005	ftbarn	4	H411-3	60	R	3	0.00	0.51887	0.65794	0.50473	0.44409
2005	ftbarn	4	H415-1	20	T	2	0.00	1.59509	0.31299	1.58095	0.09914
2005	ftbarn	4	H415-2	40	T	2	0.00	0.97897	0.30452	0.96483	0.09068
2005	ftbarn	4	H415-3	60	T	2	0.00	0.59595	0.34809	0.58181	0.13424
2005	ftbarn	4	H416-1	20	T	3	22.4	1.16527	0.24927	1.15113	0.03542
2005	ftbarn	4	H416-2	40	T	3	22.4	1.00605	0.22650	0.99192	0.01265
2005	ftbarn	4	H416-3	60	T	3	22.4	0.59929	0.30702	0.58515	0.09317
2005	ftbarn	4	H420-1	20	NC	0	0.00	1.45623	0.29272	1.44209	0.07887
2005	ftbarn	4	H420-2	40	NC	0	0.00	0.74779	0.28691	0.73365	0.07306
2005	ftbarn	4	H420-3	60	NC	0	0.00	0.53334	0.33761	0.519204	0.12376

Table B8. Mid-Season Inorganic Soil N (NO_3 and NH_4) sample results from samples taken 0-15 cm (15) and 15-30 cm depths (30) on July 10, 2005, from NC (no cover), rye (R), triticale (T), and wheat (W) cover treatments with 0, 2 and 3 representing seeding rates of 0, 287 and 387 plants m^{-2} and corrected for potential filter contamination.

Year	Location	Block	Plot	Depth (cm.)	Soil Cover	Seed Rate	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	ftbarn	1	101	15	T	2	2.572397	0.26442	2.55826	0.05057
2005	ftbarn	1	101	30	T	2	2.84478	0.73447	2.83064	0.52062
2005	ftbarn	1	106	15	W	2	1.583728	0.31266	1.56959	0.09882
2005	ftbarn	1	106	30	W	2	1.343488	0.77330	1.32935	0.55946
2005	ftbarn	1	107	15	NC	0	2.885957	1.10107	2.88718	0.88723
2005	ftbarn	1	107	30	NC	0	1.23870	0.75365	1.22456	0.53980
2005	ftbarn	1	110	15	R	2	1.308691	0.24009	1.29455	0.02625
2005	ftbarn	1	110	30	R	2	1.182625	0.51662	1.16489	0.30278
2005	ftbarn	1	113	15	T	2	1.655961	0.70130	1.64182	0.48745
2005	ftbarn	1	113	30	T	2	1.542755	0.60004	1.52862	0.38620
2005	ftbarn	1	115	15	W	2	2.020531	0.65994	2.00639	0.44610
2005	ftbarn	1	115	30	W	2	1.134004	0.40246	1.11987	0.18862
2005	ftbarn	1	117	15	NC	0	1.252294	0.50785	1.23816	0.29401
2005	ftbarn	1	117	30	NC	0	1.142435	0.57852	1.12830	0.36468
2005	ftbarn	1	120	15	R	2	4.647716	0.56418	4.63358	0.35034
2005	ftbarn	1	120	30	R	2	1.192593	0.55168	1.18000	0.34000

(*Table B8*, continued)

Year	Location	Block	Plot	Depth (cm.)	Soil Cover	Seed Rate	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	ftbarn	2	201	15	NC	0	2.29745	0.565871	2.28331	0.35202
2005	ftbarn	2	201	30	NC	0	1.531051	1.262031	1.51691	1.04818
2005	ftbarn	2	202	15	R	2	2.416761	1.278832	2.400262	1.06498
2005	ftbarn	2	202	30	R	2	2.040756	0.79822	2.03473	0.59355
2005	ftbarn	2	206	15	W	2	1.289885	0.33340	1.28386	0.12873
2005	ftbarn	2	206	30	W	2	0.943352	0.526163	0.93733	0.32149
2005	ftbarn	2	207	15	W	2	1.392966	0.444461	1.38694	0.23979
2005	ftbarn	2	207	30	W	2	1.630993	0.835738	1.62497	0.66106
2005	ftbarn	2	209	15	T	2	1.262980	0.274013	1.25969	0.06934
2005	ftbarn	2	209	30	T	2	0.953167	0.800548	0.94714	0.59587
2005	ftbarn	2	211	15	NC	0	2.550714	0.795048	2.54469	0.59037
2005	ftbarn	2	211	30	NC	0	1.361655	1.356735	1.35563	1.15206
2005	ftbarn	2	213	15	R	2	2.374614	0.348144	2.36859	0.14347
2005	ftbarn	2	213	30	R	2	1.903860	0.670902	1.89784	0.46623
2005	ftbarn	2	220	15	T	2	1.576254	0.979086	1.57023	0.77441
2005	ftbarn	2	220	30	T	2	1.130511	0.529802	1.12000	0.33000

(*Table B8*, continued)

Year	Location	Block	Plot	Depth (cm.)	Soil Cover	Seed Rate	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3(mg L^{-1})
2005	ftbarn	3	301	15	W	2	2.12779	1.74827	2.12177	1.54359
2005	ftbarn	3	301	30	W	2	1.24272	1.08430	1.23669	0.87963
2005	ftbarn	3	304	15	NC	0	1.58997	0.81630	1.58395	0.61163
2005	ftbarn	3	304	30	NC	0	0.90190	0.81829	0.89588	0.61362
2005	ftbarn	3	306	15	T	2	1.67793	0.34109	1.67191	0.13964
2005	ftbarn	3	306	30	T	2	1.10955	0.96732	1.10352	0.76265
2005	ftbarn	3	313	15	W	2	1.89772	1.02066	1.89170	0.81598
2005	ftbarn	3	313	30	W	2	0.82703	1.13636	0.82101	0.93168
2005	ftbarn	3	314	15	NC	0	1.84893	0.65086	1.84290	0.44618
2005	ftbarn	3	314	30	NC	0	0.93690	0.56631	0.93088	0.36163
2005	ftbarn	3	315	15	T	2	1.80758	0.36398	1.80156	0.15931
2005	ftbarn	3	315	30	T	2	0.96132	0.67674	0.95529	0.47207
2005	ftbarn	3	318	15	R	2	1.48081	0.26824	1.47478	0.06359
2005	ftbarn	3	318	30	R	2	1.29096	0.54684	1.28493	0.34217
2005	ftbarn	4	319	15	R	2	1.81445	0.24259	1.80843	0.03792
2005	ftbarn	4	319	30	R	2	0.87238	0.51388	0.87	0.31

(*Table B8*, continued)

Year	Location	Block	Plot	Depth (cm.)	Soil Cover	Seed Rate	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3(mg L^{-1})
2005	ftbarn	4	401	15	R	2	2.99772	0.33586	2.99169	0.13118
2005	ftbarn	4	401	30	R	2	3.29156	1.13998	3.28554	0.93531
2005	ftbarn	4	403	15	R	2	1.46246	0.53313	1.45643	0.33846
2005	ftbarn	4	403	30	R	2	2.24623	0.64647	2.24020	0.44180
2005	ftbarn	4	406	15	T	2	1.67502	0.35819	1.66899	0.15352
2005	ftbarn	4	406	30	T	2	2.16998	0.66626	2.16395	0.46158
2005	ftbarn	4	410	15	NC	0	3.64174	0.65584	3.63751	0.45117
2005	ftbarn	4	410	30	NC	0	1.81590	1.00548	1.80988	0.80080
2005	ftbarn	4	415	15	T	2	2.60649	0.87638	2.60047	0.67171
2005	ftbarn	4	415	30	T	2	1.70817	0.47702	1.70217	0.27235
2005	ftbarn	4	417	15	W	2	2.68145	0.58791	2.68542	0.38324
2005	ftbarn	4	417	30	W	2	2.85492	0.84122	2.84899	0.63565
2005	ftbarn	4	419	15	W	2	2.33581	0.43226	2.32978	0.22758
2005	ftbarn	4	419	30	W	2	1.77121	0.79990	1.76518	0.59523
2005	ftbarn	4	420	15	NC	0	2.28776	0.39736	2.28173	0.19270
2005	ftbarn	4	420	30	NC	0	1.7335	0.629386	1.73000	0.42000

(*Table B8*, continued)

Year	Location	Block	Plot	Depth (cm.)	Soil Cover	Seed Rate	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	1	101	15	T	2	2.39433	0.98269	2.38830	0.78802
2005	vboro	1	101	30	T	2	1.92659	0.78734	1.92057	0.58267
2005	vboro	1	106	15	W	2	2.04194	1.43262	2.03592	1.22795
2005	vboro	1	106	30	W	2	2.34735	0.66282	2.34132	0.45815
2005	vboro	1	107	15	NC	0	2.16031	1.44695	2.15428	1.24227
2005	vboro	1	107	30	NC	0	1.64857	1.05853	1.64255	0.85386
2005	vboro	1	110	15	R	2	2.25376	0.82236	2.24774	0.61768
2005	vboro	1	110	30	R	2	1.87330	0.67367	1.86727	0.46900
2005	vboro	1	113	15	T	2	2.76559	0.82260	2.75957	0.61768
2005	vboro	1	113	30	T	2	1.24318	0.65070	1.23715	0.46900
2005	vboro	1	115	15	W	2	2.18803	1.16847	2.18200	0.96380
2005	vboro	1	115	30	W	2	1.69175	0.88032	1.68573	0.67565
2005	vboro	1	117	15	NC	0	1.70988	1.42384	1.700386	1.21917
2005	vboro	1	117	30	NC	0	1.46887	0.78328	1.46284	0.57861
2005	vboro	1	120	15	R	2	1.68941	1.54779	1.68339	1.34312
2005	vboro	1	120	30	R	2	1.451792	0.52595	1.45577	0.32128

(*Table B8*, continued)

Year	Location	Block	Plot	Depth (cm.)	Soil Cover	Seed Rate	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	2	201	15	NC	0	2.30038	1.40539	2.29435	1.20072
2005	vboro	2	201	30	NC	0	1.71904	0.99324	1.71302	0.78857
2005	vboro	2	202	15	R	2	1.95285	0.87789	1.94683	0.67322
2005	vboro	2	202	30	R	2	1.18580	0.69289	1.17978	0.48872
2005	vboro	2	206	15	W	2	2.00841	2.02791	2.00238	1.82234
2005	vboro	2	206	30	W	2	1.19947	0.60066	1.19345	0.39598
2005	vboro	2	207	15	W	2	2.04125	1.06139	2.03522	0.85672
2005	vboro	2	207	30	W	2	1.14821	0.44900	1.14218	0.24433
2005	vboro	2	209	15	T	2	3.20506	1.79643	3.19904	1.59175
2005	vboro	2	209	30	T	2	2.18632	0.84238	2.18030	0.63771
2005	vboro	2	211	15	NC	0	1.87743	1.28809	1.87141	1.08341
2005	vboro	2	211	30	NC	0	1.44948	1.03312	1.44343	0.82845
2005	vboro	2	213	15	R	2	2.70068	1.53524	2.69466	1.33057
2005	vboro	2	213	30	R	2	1.44761	0.70373	1.44159	0.49906

(*Table B8*, continued)

Year	Location	Block	Plot	Depth (cm.)	Soil Cover	Seed Rate	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	2	220	15	T	2	1.33855	1.63394	1.33253	1.42926
2005	vboro	2	220	30	T	2	6.09851	0.79671	6.09248	0.59204
2005	vboro	3	301	15	W	2	3.44768	1.19462	3.44166	0.99995
2005	vboro	3	301	30	W	2	1.24096	0.43489	1.23494	0.23022
2005	vboro	3	304	15	NC	0	2.33187	1.22073	2.32858	1.01606
2005	vboro	3	304	30	NC	0	2.58231	1.15711	2.57629	0.95244
2005	vboro	3	306	15	T	2	1.94926	1.55458	1.94323	1.34991
2005	vboro	3	306	30	T	2	2.09201	0.37313	2.08599	0.16846
2005	vboro	3	313	15	W	2	1.79622	1.74695	1.79020	1.54227
2005	vboro	3	313	30	W	2	2.49282	0.46354	2.48680	0.25888
2005	vboro	3	314	15	NC	0	2.14179	3.04950	2.131577	2.84483
2005	vboro	3	314	30	NC	0	2.13286	0.40244	2.12683	0.19777
2005	vboro	3	315	15	T	2	3.04915	1.96459	3.04311	1.75992
2005	vboro	3	315	30	T	2	1.32100	0.46911	1.31498	0.26444
2005	vboro	3	318	15	R	2	1.12935	0.44537	1.12333	0.24070
2005	vboro	3	318	30	R	2	2.21232	0.68640	2.20692	0.48173

(*Table B8*, continued)

Year	Location	Block	Plot	Depth (cm.)	Soil Cover	Seed Rate	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	4	319	15	R	2	1.90989	0.94675	1.90386	0.74207
2005	vboro	4	319	30	R	2	1.79813	0.73959	1.79211	0.53491
2005	vboro	4	401	15	R	2	2.86053	1.5865	2.85451	1.38187
2005	vboro	4	401	30	R	2	1.81077	1.32987	1.80475	1.12520
2005	vboro	4	403	15	R	2	2.23272	0.56414	2.22670	0.35946
2005	vboro	4	403	30	R	2	2.00469	0.39957	1.99867	0.19489
2005	vboro	4	406	15	T	2	2.41313	1.19085	2.40711	0.98616
2005	vboro	4	406	30	T	2	1.51131	0.60240	1.50582	0.39773
2005	vboro	4	410	15	NC	0	1.84528	1.43996	1.83926	1.23529
2005	vboro	4	410	30	NC	0	1.86993	0.51553	1.86391	0.31086
2005	vboro	4	415	15	T	2	2.02769	1.29509	2.02166	1.09042
2005	vboro	4	415	30	T	2	1.40523	0.43744	1.39920	0.23278
2005	vboro	4	417	15	W	2	2.54663	0.96492	2.54060	0.76025
2005	vboro	4	417	30	W	2	1.61482	0.35576	1.60879	0.15109

(*Table B8*, continued)

Year	Location	Block	Plot	Depth (cm.)	Soil Cover	Seed Rate	NH_4 (mg L^{-1})	NO_3 (mg L^{-1})	Corrected NH_4 (mg L^{-1})	Corrected NO_3 (mg L^{-1})
2005	vboro	4	419	15	W	2	1.72984	0.59510	1.72381	0.39042
2005	vboro	4	419	30	W	2	2.03601	0.45254	2.03007	0.24787
2005	vboro	4	420	15	NC	0	2.18272	2.10077	2.17670	1.89609
2005	vboro	4	420	30	NC	0	1.97066	0.93734	1.96463	0.73266

Table B9. Cotton leaf nutrient content and cotton petiole nitrogen data as reported by the North Carolina Department of Agriculture and Consumer Services Agronomic Division from samples of the most recently mature, fully expanded cotton leaves from the no cover (NC), rye (R), triticale (T) and wheat (W) cover treatments planted at zero (0), 129 (1), 258 (2) and 387 (3) plants m^{-2}, respectively with and without spring applied 22.4 kg ha^{-1} nitrogen applied from February 28- March 1, 2004 and February 28- March 3, 2005.

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Ftbarn	H101	H101	1	T	2	0.00	50921	9400	4437	14280
2004	10-Jul-04	Ftbarn	H102	H102	1	T	1	22.4	47703	6000	6022	15587
2004	10-Jul-04	Ftbarn	H103	H103	1	T	3	22.4	46123	5650	5665	17639
2004	10-Jul-04	Ftbarn	H104	H104	1	W	3	0.00	51575	7410	5315	19321
2004	10-Jul-04	Ftbarn	H105	H105	1	W	3	22.4	55792	12900	5735	15921
2004	10-Jul-04	Ftbarn	H106	H106	1	W	2	0.00	55804	7340	5436	12719
2004	10-Jul-04	Ftbarn	H107	H107	1	NC	0	22.4	50901	6870	5485	13532
2004	10-Jul-04	Ftbarn	H108	H108	1	R	1	0.00	54160	6960	4962	14043
2004	10-Jul-04	Ftbarn	H109	H109	1	R	3	22.4	52596	5520	5960	16945
2004	10-Jul-04	Ftbarn	H110	H110	1	R	2	22.4	54105	7710	6828	12713
2004	10-Jul-04	Ftbarn	H111	H111	1	T	3	0.00	50883	6840	5799	18354
2004	10-Jul-04	Ftbarn	H112	H112	1	T	1	0.00	48931	6450	4819	16176
2004	10-Jul-04	Ftbarn	H113	H113	1	T	2	22.4	44128	4670	4589	15356
2004	10-Jul-04	Ftbarn	H114	H114	1	W	1	0.00	44154	5140	4688	15089
2004	10-Jul-04	Ftbarn	H115	H115	1	W	2	22.4	50647	7880	5418	15278

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Ftbarn	H116	H116	1	W	1	22.4	50554	5810	5384	11870
2004	10-Jul-04	Ftbarn	H117	H117	1	NC	0	0.00	46429	5730	5830	12437
2004	10-Jul-04	Ftbarn	H118	H118	1	R	3	0.00	47635	5920	5383	11310
2004	10-Jul-04	Ftbarn	H119	H119	1	R	1	22.4	51682	6000	4984	11749
2004	10-Jul-04	Ftbarn	H120	H120	1	R	2	0.00	52317	6420	4350	9180
2004	10-Jul-04	Ftbarn	H201	H201	2	NC	0	0.00	50660	14300	4729	16363
2004	10-Jul-04	Ftbarn	H202	H202	2	R	2	0.00	47014	10500	6054	16455
2004	10-Jul-04	Ftbarn	H203	H203	2	R	1	22.4	39590	9400	6366	15966
2004	10-Jul-04	Ftbarn	H204	H204	2	R	3	22.4	38018	2220	6509	15705
2004	10-Jul-04	Ftbarn	H205	H205	2	W	3	0.00	43092	4160	5824	14263
2004	10-Jul-04	Ftbarn	H206	H206	2	W	2	22.4	42026	3000	6828	12596
2004	10-Jul-04	Ftbarn	H207	H207	2	W	2	0.00	43210	4830	5096	10360
2004	10-Jul-04	Ftbarn	H208	H208	2	T	1	22.4	41155	4270	5577	12007
2004	10-Jul-04	Ftbarn	H209	H209	2	T	2	22.4	41597	3860	5746	13148
2004	10-Jul-04	Ftbarn	H210	H210	2	T	3	22.4	49270	7340	5908	13239

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Ftbarn	H211	H211	2	NC	0	22.4	45135	9500	5460	16033
2004	10-Jul-04	Ftbarn	H212	H212	2	R	3	0.00	43682	6990	5803	17772
2004	10-Jul-04	Ftbarn	H213	H213	2	R	2	22.4	43325	5260	7080	17596
2004	10-Jul-04	Ftbarn	H214	H214	2	R	1	0.00	40755	4990	6332	16768
2004	10-Jul-04	Ftbarn	H215	H215	2	W	1	22.4	40800	3020	6045	17304
2004	10-Jul-04	Ftbarn	H216	H216	2	W	1	0.00	47016	4400	4999	15059
2004	10-Jul-04	Ftbarn	H217	H217	2	W	3	22.4	49320	8510	4919	13610
2004	10-Jul-04	Ftbarn	H218	H218	2	T	1	0.00	53023	9700	4971	13634
2004	10-Jul-04	Ftbarn	H219	H219	2	T	3	0.00	53907	5800	5054	14213
2004	10-Jul-04	Ftbarn	H220	H220	2	T	2	0.00	51790	7620	5823	12103
2004	10-Jul-04	Ftbarn	H301	H301	3	W	2	22.4	45938	8020	6108	18265
2004	10-Jul-04	Ftbarn	H302	H302	3	W	1	0.00	44237	5130	5236	13851
2004	10-Jul-04	Ftbarn	H303	H303	3	W	3	22.4	31422	1300	6052	15694
2004	10-Jul-04	Ftbarn	H304	H304	3	NC	0	22.4	38332	2770	6010	15117
2004	10-Jul-04	Ftbarn	H305	H305	3	T	1	22.4	37334	990	5564	14676

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Ftbarn	H306	H306	3	T	2	0.00	40518	4360	6738	15700
2004	10-Jul-04	Ftbarn	H307	H307	3	T	3	22.4	44303	4590	5353	13981
2004	10-Jul-04	Ftbarn	H308	H308	3	R	3	0.00	47506	3900	4901	12664
2004	10-Jul-04	Ftbarn	H309	H309	3	R	1	22.4	44140	3250	5664	12717
2004	10-Jul-04	Ftbarn	H310	H310	3	R	1	0.00	53602	11500	5769	11901
2004	10-Jul-04	Ftbarn	H311	H311	3	W	1	22.4	38476	3170	5047	13597
2004	10-Jul-04	Ftbarn	H312	H312	3	W	3	0.00	44834	5490	5732	15296
2004	10-Jul-04	Ftbarn	H313	H313	3	W	2	0.00	40816	6480	6194	15152
2004	10-Jul-04	Ftbarn	H314	H314	3	NC	0	0.00	45831	7330	5139	15605
2004	10-Jul-04	Ftbarn	H315	H315	3	T	2	22.4	38188	3830	4705	14257
2004	10-Jul-04	Ftbarn	H316	H316	3	T	1	0.00	41343	5420	4793	13568
2004	10-Jul-04	Ftbarn	H317	H317	3	T	3	0.00	43155	4810	5155	15280
2004	10-Jul-04	Ftbarn	H318	H318	3	R	2	0.00	36753	2810	3182	9102
2004	10-Jul-04	Ftbarn	H319	H319	3	R	2	22.4	40956	3790	4411	13600
2004	10-Jul-04	Ftbarn	H320	H320	3	R	3	22.4	49562	9800	5497	13894

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Ftbarn	H401	H401	4	R	2	22.4	48786	6480	5633	16482
2004	10-Jul-04	Ftbarn	H402	H402	4	R	3	22.4	49569	5900	5481	15691
2004	10-Jul-04	Ftbarn	H403	H403	4	R	2	0.00	43572	4200	7422	19731
2004	10-Jul-04	Ftbarn	H404	H404	4	T	3	0.00	41291	4320	5683	15725
2004	10-Jul-04	Ftbarn	H405	H405	4	T	1	22.4	41507	4360	5835	14271
2004	10-Jul-04	Ftbarn	H406	H406	4	T	2	22.4	45597	3660	5013	13980
2004	10-Jul-04	Ftbarn	H407	H407	4	W	1	0.00	44608	6830	5493	17624
2004	10-Jul-04	Ftbarn	H408	H408	4	W	3	0.00	33890	1670	5350	18075
2004	10-Jul-04	Ftbarn	H409	H409	4	W	3	22.4	39427	3750	5470	17779
2004	10-Jul-04	Ftbarn	H410	H410	4	NC	0	22.4	48943	8160	5633	17905
2004	10-Jul-04	Ftbarn	H411	H411	4	R	3	0.00	46234	7420	6775	15157
2004	10-Jul-04	Ftbarn	H412	H412	4	R	1	0.00	48325	10100	5681	17901
2004	10-Jul-04	Ftbarn	H413	H413	4	R	1	22.4	41871	14900	5210	14259
2004	10-Jul-04	Ftbarn	H414	H414	4	T	1	0.00	42920	3750	6435	17276
2004	10-Jul-04	Ftbarn	H415	H415	4	T	2	0.00	48823	9000	6215	18342

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Ftbarn	H416	H416	4	T	3	22.4	41127	4020	7254	21367
2004	10-Jul-04	Ftbarn	H417	H417	4	W	2	0.00	45724	4990	6928	18255
2004	10-Jul-04	Ftbarn	H418	H418	4	W	1	22.4	39494	3280	6020	17667
2004	10-Jul-04	Ftbarn	H419	H419	4	W	2	22.4	43587	6230	6937	21641
2004	10-Jul-04	Ftbarn	H420	H420	4	NC	0	0.00	50268	7890	6414	18934
2004	10-Jul-04	Vboro	V101	V101	1	T	2	0.00	46494	12200	4290	14417
2004	10-Jul-04	Vboro	V102	V102	1	T	1	22.4	43180	12000	5662	20317
2004	10-Jul-04	Vboro	V103	V103	1	T	3	22.4	37738	8230	5433	19048
2004	10-Jul-04	Vboro	V104	V104	1	W	3	0.00	43674	12600	5239	19008
2004	10-Jul-04	Vboro	V105	V105	1	W	3	22.4	46910	12200	5453	19777
2004	10-Jul-04	Vboro	V106	V106	1	W	2	0.00	44424	13600	5032	17481
2004	10-Jul-04	Vboro	V107	V107	1	NC	0	22.4	46322	14000	5472	18687
2004	10-Jul-04	Vboro	V108	V108	1	R	1	0.00	42110	9800	4839	17585
2004	10-Jul-04	Vboro	V109	V109	1	R	3	22.4	42571	11000	5140	18959
2004	10-Jul-04	Vboro	V110	V110	1	R	2	22.4	49084	12700	4979	17620

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Vboro	V111	V111	1	T	3	0.00	49201	12200	4763	16445
2004	10-Jul-04	Vboro	V112	V112	1	T	1	0.00	51696	14100	4899	16298
2004	10-Jul-04	Vboro	V113	V113	1	T	2	22.4	45054	11100	5789	20401
2004	10-Jul-04	Vboro	V114	V114	1	W	1	0.00	44765	12700	6078	21829
2004	10-Jul-04	Vboro	V115	V115	1	W	2	22.4	47027	9500	5910	19939
2004	10-Jul-04	Vboro	V116	V116	1	W	1	22.4	47284	10600	5324	16475
2004	10-Jul-04	Vboro	V117	V117	1	NC	0	0.00	52048	14800	5512	17670
2004	10-Jul-04	Vboro	V118	V118	1	R	3	0.00	49793	11100	6169	20767
2004	10-Jul-04	Vboro	V119	V119	1	R	1	22.4	50302	12400	5718	20878
2004	10-Jul-04	Vboro	V120	V120	1	R	2	0.00	51316	17900	5807	20819
2004	10-Jul-04	Vboro	V201	V201	2	NC	0	0.00	53581	14100	5745	17961
2004	10-Jul-04	Vboro	V202	V202	2	R	2	0.00	53348	13800	6206	21108
2004	10-Jul-04	Vboro	V203	V203	2	R	1	22.4	45570	6890	6003	17930
2004	10-Jul-04	Vboro	V204	V204	2	R	3	22.4	47356	8230	5892	17170
2004	10-Jul-04	Vboro	V205	V205	2	W	3	0.00	52388	8920	5809	17413

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Vboro	V206	V206	2	W	2	22.4	47585	6660	5505	17852
2004	10-Jul-04	Vboro	V207	V207	2	W	2	0.00	50183	9100	5239	18325
2004	10-Jul-04	Vboro	V208	V208	2	T	1	22.4	45918	11100	5510	18029
2004	10-Jul-04	Vboro	V209	V209	2	T	2	22.4	52608	9500	7332	21151
2004	10-Jul-04	Vboro	V210	V210	2	T	3	22.4	51570	11500	6238	18807
2004	10-Jul-04	Vboro	V211	V211	2	NC	0	22.4	54411	17400	5457	20116
2004	10-Jul-04	Vboro	V212	V212	2	R	3	0.00	53786	11400	5922	19374
2004	10-Jul-04	Vboro	V213	V213	2	R	2	22.4	49132	11100	5708	17958
2004	10-Jul-04	Vboro	V214	V214	2	R	1	0.00	52026	10500	4219	16126
2004	10-Jul-04	Vboro	V215	V215	2	W	1	22.4	49766	8480	4648	19472
2004	10-Jul-04	Vboro	V216	V216	2	W	1	0.00	52687	14800	5196	18753
2004	10-Jul-04	Vboro	V217	V217	2	W	3	22.4	52708	12200	5288	20060
2004	10-Jul-04	Vboro	V218	V218	2	T	1	0.00	54759	11600	4153	19099
2004	10-Jul-04	Vboro	V219	V219	2	T	3	0.00	59045	17600	5075	19137
2004	10-Jul-04	Vboro	V220	V220	2	T	2	0.00	59442	13400	4837	20033

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Vboro	V301	V301	3	W	2	22.4	58198	12700	4696	19413
2004	10-Jul-04	Vboro	V302	V302	3	W	1	0.00	56840	11300	4971	17413
2004	10-Jul-04	Vboro	V303	V303	3	W	3	22.4	58134	9200	5192	18032
2004	10-Jul-04	Vboro	V304	V304	3	NC	0	22.4	54904	12900	4751	21877
2004	10-Jul-04	Vboro	V305	V305	3	T	1	22.4	47510	8960	4260	16755
2004	10-Jul-04	Vboro	V306	V306	3	T	2	0.00	54784	12400	4893	18170
2004	10-Jul-04	Vboro	V307	V307	3	T	3	22.4	54872	11700	5062	18978
2004	10-Jul-04	Vboro	V308	V308	3	R	3	0.00	48983	11000	5236	19985
2004	10-Jul-04	Vboro	V309	V309	3	R	1	22.4	50947	12600	4671	15607
2004	10-Jul-04	Vboro	V310	V310	3	R	1	0.00	51687	10400	5278	15607
2004	10-Jul-04	Vboro	V311	V311	3	W	1	22.4	46665	14200	4233	17973
2004	10-Jul-04	Vboro	V312	V312	3	W	3	0.00	47626	11900	4344	17245
2004	10-Jul-04	Vboro	V313	V313	3	W	2	0.00	51097	17500	5125	18692
2004	10-Jul-04	Vboro	V314	V314	3	NC	0	0.00	51157	16600	5145	18643
2004	10-Jul-04	Vboro	V315	V315	3	T	2	22.4	48945	12400	5324	19449

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Vboro	V316	V316	3	T	1	0.00	53105	15300	5145	20216
2004	10-Jul-04	Vboro	V317	V317	3	T	3	0.00	53547	15500	5347	20224
2004	10-Jul-04	Vboro	V318	V318	3	R	2	0.00	48588	11600	5149	19179
2004	10-Jul-04	Vboro	V319	V319	3	R	2	22.4	49715	11800	4862	17976
2004	10-Jul-04	Vboro	V320	V320	3	R	3	22.4	45893	8960	4745	17461
2004	10-Jul-04	Vboro	V401	V401	4	R	2	22.4	49116	11600	4612	18971
2004	10-Jul-04	Vboro	V402	V402	4	R	3	22.4	50859	13600	6115	23173
2004	10-Jul-04	Vboro	V403	V403	4	R	2	0.00	52725	19100	5658	20855
2004	10-Jul-04	Vboro	V404	V404	4	T	3	0.00	51000	14800	5062	17743
2004	10-Jul-04	Vboro	V405	V405	4	T	1	22.4	46715	9200	5408	18030
2004	10-Jul-04	Vboro	V406	V406	4	T	2	22.4	50643	12100	5309	19711
2004	10-Jul-04	Vboro	V407	V407	4	W	1	0.00	51601	10600	5936	18345
2004	10-Jul-04	Vboro	V408	V408	4	W	3	0.00	51941	11300	4995	17388
2004	10-Jul-04	Vboro	V409	V409	4	W	3	22.4	49976	12600	5685	16906
2004	10-Jul-04	Vboro	V410	V410	4	NC	0	22.4	51636	11300	5449	15955

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1}).	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	10-Jul-04	Vboro	V411	V411	4	R	3	0.00	52181	15600	4903	17084
2004	10-Jul-04	Vboro	V412	V412	4	R	1	0.00	49116	14100	4816	18494
2004	10-Jul-04	Vboro	V413	V413	4	R	1	22.4	51191	14200	4585	17256
2004	10-Jul-04	Vboro	V414	V414	4	T	1	0.00	52469	15800	4541	18547
2004	10-Jul-04	Vboro	V415	V415	4	T	2	0.00	47843	11500	5516	20875
2004	10-Jul-04	Vboro	V416	V416	4	T	3	22.4	47661	11200	4483	15807
2004	10-Jul-04	Vboro	V417	V417	4	W	2	0.00	47653	11500	4051	13058
2004	10-Jul-04	Vboro	V418	V418	4	W	1	22.4	47281	9000	4206	17388
2004	10-Jul-04	Vboro	V419	V419	4	W	2	22.4	50842	12900	4537	15089
2004	10-Jul-04	Vboro	V420	V420	4	NC	0	0.00	50065	12000	4684	15389
2004	3-Aug-04	Vboro	V101	V101	1	T	2	0.00	34791	950	2205	12040
2004	3-Aug-04	Vboro	V102	V102	1	T	1	22.4	32255	240	2412	9882
2004	3-Aug-04	Vboro	V103	V103	1	T	3	22.4	32404	220	3070	12099
2004	3-Aug-04	Vboro	V104	V104	1	W	3	0.00	33960	420	2662	11763
2004	3-Aug-04	Vboro	V105	V105	1	W	3	22.4	35598	250	2353	13629

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Vboro	V106	V106	1	W	2	0.00	35366	330	2408	11331
2004	3-Aug-04	Vboro	V107	V107	1	NC	0	22.4	41044	840	2077	12208
2004	3-Aug-04	Vboro	V108	V108	1	R	1	0.00	31207	260	2648	15669
2004	3-Aug-04	Vboro	V109	V109	1	R	3	22.4	29530	200	2621	10787
2004	3-Aug-04	Vboro	V110	V110	1	R	2	22.4	31373	390	2807	13158
2004	3-Aug-04	Vboro	V111	V111	1	T	3	0.00	34372	320	2585	10613
2004	3-Aug-04	Vboro	V112	V112	1	T	1	0.00	33310	350	2506	11346
2004	3-Aug-04	Vboro	V113	V113	1	T	2	22.4	33802	220	3071	11911
2004	3-Aug-04	Vboro	V114	V114	1	W	1	0.00	32919	210	2380	10819
2004	3-Aug-04	Vboro	V115	V115	1	W	2	22.4	38313	450	2382	11532
2004	3-Aug-04	Vboro	V116	V116	1	W	1	22.4	35433	420	2650	13617
2004	3-Aug-04	Vboro	V117	V117	1	NC	0	0.00	43975	1220	2254	13584
2004	3-Aug-04	Vboro	V118	V118	1	R	3	0.00	29984	130	2802	12918
2004	3-Aug-04	Vboro	V119	V119	1	R	1	22.4	29899	130	3258	13209
2004	3-Aug-04	Vboro	V120	V120	1	R	2	0.00	33027	150	3095	12863

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Vboro	V201	V201	2	NC	0	0.00	40417	440	2512	12669
2004	3-Aug-04	Vboro	V202	V202	2	R	2	0.00	32453	300	2540	12091
2004	3-Aug-04	Vboro	V203	V203	2	R	1	22.4	34617	230	3236	11383
2004	3-Aug-04	Vboro	V204	V204	2	R	3	22.4	31646	200	2656	9238
2004	3-Aug-04	Vboro	V205	V205	2	W	3	0.00	34122	210	3164	16390
2004	3-Aug-04	Vboro	V206	V206	2	W	2	22.4	34241	220	3380	13017
2004	3-Aug-04	Vboro	V207	V207	2	W	2	0.00	34953	310	2671	13164
2004	3-Aug-04	Vboro	V208	V208	2	T	1	22.4	34712	320	2799	11880
2004	3-Aug-04	Vboro	V209	V209	2	T	2	22.4	35940	300	2785	12906
2004	3-Aug-04	Vboro	V210	V210	2	T	3	22.4	36735	230	3109	12799
2004	3-Aug-04	Vboro	V211	V211	2	NC	0	22.4	36872	340	2707	14261
2004	3-Aug-04	Vboro	V212	V212	2	R	3	0.00	31595	220	2169	10045
2004	3-Aug-04	Vboro	V213	V213	2	R	2	22.4	35074	240	2736	12846
2004	3-Aug-04	Vboro	V214	V214	2	R	1	0.00	32049	230	3331	12494
2004	3-Aug-04	Vboro	V215	V215	2	W	1	22.4	31446	230	3367	16221

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Vboro	V216	V216	2	W	1	0.00	33838	220	2389	10974
2004	3-Aug-04	Vboro	V217	V217	2	W	3	22.4	35036	240	2484	14881
2004	3-Aug-04	Vboro	V218	V218	2	T	1	0.00	33226	240	2567	12538
2004	3-Aug-04	Vboro	V219	V219	2	T	3	0.00	30749	140	2362	11253
2004	3-Aug-04	Vboro	V220	V220	2	T	2	0.00	34058	230	1986	11639
2004	3-Aug-04	Vboro	V301	V301	3	W	2	22.4	31202	170	3467	14705
2004	3-Aug-04	Vboro	V302	V302	3	W	1	0.00	32039	180	3085	12412
2004	3-Aug-04	Vboro	V303	V303	3	W	3	22.4	33431	230	4049	11280
2004	3-Aug-04	Vboro	V304	V304	3	NC	0	22.4	36044	340	3416	12943
2004	3-Aug-04	Vboro	V305	V305	3	T	1	22.4	33394	230	4021	11940
2004	3-Aug-04	Vboro	V306	V306	3	T	2	0.00	29327	230	2784	11959
2004	3-Aug-04	Vboro	V307	V307	3	T	3	22.4	36497	190	2407	11276
2004	3-Aug-04	Vboro	V308	V308	3	R	3	0.00	33604	200	2956	14736
2004	3-Aug-04	Vboro	V309	V309	3	R	1	22.4	34248	180	2550	11875
2004	3-Aug-04	Vboro	V310	V310	3	R	1	0.00	35196	210	2960	13225

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Vboro	V311	V311	3	W	1	22.4	34156	220	2942	11749
2004	3-Aug-04	Vboro	V312	V312	3	W	3	0.00	28621	220	3052	12972
2004	3-Aug-04	Vboro	V313	V313	3	W	2	0.00	31082	210	3247	11850
2004	3-Aug-04	Vboro	V314	V314	3	NC	0	0.00	33660	200	2824	11027
2004	3-Aug-04	Vboro	V315	V315	3	T	2	22.4	34989	210	3383	11856
2004	3-Aug-04	Vboro	V316	V316	3	T	1	0.00	31738	150	2692	12763
2004	3-Aug-04	Vboro	V317	V317	3	T	3	0.00	34152	190	2746	13250
2004	3-Aug-04	Vboro	V318	V318	3	R	2	0.00	32933	190	2717	10869
2004	3-Aug-04	Vboro	V319	V319	3	R	2	22.4	33944	150	2694	12917
2004	3-Aug-04	Vboro	V320	V320	3	R	3	22.4	35928	150	3022	13458
2004	3-Aug-04	Vboro	V401	V401	4	R	2	22.4	32160	140	3135	13115
2004	3-Aug-04	Vboro	V402	V402	4	R	3	22.4	34652	160	3371	12827
2004	3-Aug-04	Vboro	V403	V403	4	R	2	0.00	32142	220	3236	9387
2004	3-Aug-04	Vboro	V404	V404	4	T	3	0.00	34392	140	3529	12384
2004	3-Aug-04	Vboro	V405	V405	4	T	1	22.4	34305	190	3292	11796

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer. (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Vboro	V406	V406	4	T	2	22.4	30321	160	2852	13714
2004	3-Aug-04	Vboro	V407	V407	4	W	1	0.00	35600	180	2421	11423
2004	3-Aug-04	Vboro	V408	V408	4	W	3	0.00	35787	140	2740	12581
2004	3-Aug-04	Vboro	V409	V409	4	W	3	22.4	36258	250	2822	12430
2004	3-Aug-04	Vboro	V410	V410	4	NC	0	22.4	39848	690	2470	11378
2004	3-Aug-04	Vboro	V411	V411	4	R	3	0.00	33355	110	2559	10830
2004	3-Aug-04	Vboro	V412	V412	4	R	1	0.00	33955	240	2759	12210
2004	3-Aug-04	Vboro	V413	V413	4	R	1	22.4	37075	160	3363	11758
2004	3-Aug-04	Vboro	V414	V414	4	T	1	0.00	36361	130	3029	14022
2004	3-Aug-04	Vboro	V415	V415	4	T	2	0.00	34557	140	3567	11927
2004	3-Aug-04	Vboro	V416	V416	4	T	3	22.4	34001	170	3072	14212
2004	3-Aug-04	Vboro	V417	V417	4	W	2	0.00	37482	130	2728	11933
2004	3-Aug-04	Vboro	V418	V418	4	W	1	22.4	38618	170	2808	13640
2004	3-Aug-04	Vboro	V419	V419	4	W	2	22.4	41274	160	3337	12380
2004	3-Aug-04	Vboro	V420	V420	4	NC	0	0.00	40037	140	2450	10694

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer. (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Ftbarn	H101	H101	1	T	2	0.00	38731	120	2600	9675
2004	3-Aug-04	Ftbarn	H102	H102	1	T	1	22.4	35353	100	3559	17884
2004	3-Aug-04	Ftbarn	H103	H103	1	T	3	22.4	40292	100	3697	16078
2004	3-Aug-04	Ftbarn	H104	H104	1	W	3	0.00	38133	200	2769	17071
2004	3-Aug-04	Ftbarn	H105	H105	1	W	3	22.4	41361	100	3196	9785
2004	3-Aug-04	Ftbarn	H106	H106	1	W	2	0.00	34005	100	2623	7553
2004	3-Aug-04	Ftbarn	H107	H107	1	NC	0	22.4	36967	100	2600	5335
2004	3-Aug-04	Ftbarn	H108	H108	1	R	1	0.00	38185	120	2271	6079
2004	3-Aug-04	Ftbarn	H109	H109	1	R	3	22.4	38617	100	2634	7110
2004	3-Aug-04	Ftbarn	H110	H110	1	R	2	22.4	38152	430	3155	5357
2004	3-Aug-04	Ftbarn	H111	H111	1	T	3	0.00	50090	250	2694	9554
2004	3-Aug-04	Ftbarn	H112	H112	1	T	1	0.00	41058	300	2796	14699
2004	3-Aug-04	Ftbarn	H113	H113	1	T	2	22.4	46174	120	3521	16217
2004	3-Aug-04	Ftbarn	H114	H114	1	W	1	0.00	41780	110	2970	15257
2004	3-Aug-04	Ftbarn	H115	H115	1	W	2	22.4	44842	100	2863	12587

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Ftbarn	H116	H116	1	W	1	22.4	38733	100	3237	6608
2004	3-Aug-04	Ftbarn	H117	H117	1	NC	0	0.00	50175	100	2530	5349
2004	3-Aug-04	Ftbarn	H118	H118	1	R	3	0.00	45924	100	2128	4407
2004	3-Aug-04	Ftbarn	H119	H119	1	R	1	22.4.	29535	100	2393	5870
2004	3-Aug-04	Ftbarn	H120	H120	1	R	2	0.00	29287	200	2512	3875
2004	3-Aug-04	Ftbarn	H201	H201	2	NC	0	0.00	40441	100	2550	15307
2004	3-Aug-04	Ftbarn	H202	H202	2	R	2	0.00	40525	110	3941	17009
2004	3-Aug-04	Ftbarn	H203	H203	2	R	1	22.4	42602	160	4917	21181
2004	3-Aug-04	Ftbarn	H204	H204	2	R	3	22.4	34833	100	3805	16779
2004	3-Aug-04	Ftbarn	H205	H205	2	W	3	0.00	31130	100	2735	8282
2004	3-Aug-04	Ftbarn	H206	H206	2	W	2	22.4	30425	100	2954	6415
2004	3-Aug-04	Ftbarn	H207	H207	2	W	2	0.00	29914	100	2152	4842
2004	3-Aug-04	Ftbarn	H208	H208	2	T	1	22.4	34710	100	2769	5189
2004	3-Aug-04	Ftbarn	H209	H209	2	T	2	22.4	31267	100	2647	7822
2004	3-Aug-04	Ftbarn	H210	H210	2	T	3	22.4	32245	100	2452	4327

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Ftbarn	H211	H211	2	NC	0	22.4	37596	110	2841	14055
2004	3-Aug-04	Ftbarn	H212	H212	2	R	3	0.00	29902	100	2507	14113
2004	3-Aug-04	Ftbarn	H213	H213	2	R	2	22.4	38057	110	4572	15515
2004	3-Aug-04	Ftbarn	H214	H214	2	R	1	0.00	33172	100	3709	16092
2004	3-Aug-04	Ftbarn	H215	H215	2	W	1	22.4	31925	100	3806	12139
2004	3-Aug-04	Ftbarn	H216	H216	2	W	1	0.00	31552	110	2949	6914
2004	3-Aug-04	Ftbarn	H217	H217	2	W	3	22.4	30848	100	2649	7513
2004	3-Aug-04	Ftbarn	H218	H218	2	T	1	0.00	33849	100	2647	6711
2004	3-Aug-04	Ftbarn	H219	H219	2	T	3	0.00	34973	100	2816	7983
2004	3-Aug-04	Ftbarn	H220	H220	2	T	2	0.00	31474	100	2332	4188
2004	3-Aug-04	Ftbarn	H301	H301	3	W	2	22.4	32838	100	3223	16587
2004	3-Aug-04	Ftbarn	H302	H302	3	W	1	0.00	31203	120	2594	10418
2004	3-Aug-04	Ftbarn	H303	H303	3	W	3	22.4	32993	100	4417	14343
2004	3-Aug-04	Ftbarn	H304	H304	3	NC	0	22.4	31413	100	2775	13989
2004	3-Aug-04	Ftbarn	H305	H305	3	T	1	22.4	29374	440	3912	15539

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Ftbarn	H306	H306	3	T	2	0.00	31592	400	2559	6415
2004	3-Aug-04	Ftbarn	H307	H307	3	T	3	22.4	28480	200	2306	7859
2004	3-Aug-04	Ftbarn	H308	H308	3	R	3	0.00	32994	120	2539	5312
2004	3-Aug-04	Ftbarn	H309	H309	3	R	1	22.4	28404	100	2703	9235
2004	3-Aug-04	Ftbarn	H310	H310	3	R	1	0.00	32009	100	2603	4101
2004	3-Aug-04	Ftbarn	H311	H311	3	W	1	22.4	31852	100	3288	14709
2004	3-Aug-04	Ftbarn	H312	H312	3	W	3	0.00	32807	400	2820	13545
2004	3-Aug-04	Ftbarn	H313	H313	3	W	2	0.00	31150	200	2711	14806
2004	3-Aug-04	Ftbarn	H314	H314	3	NC	0	0.00	31959	300	2157	12117
2004	3-Aug-04	Ftbarn	H315	H315	3	T	2	22.4	29691	100	2358	14649
2004	3-Aug-04	Ftbarn	H316	H316	3	T	1	0.00	30464	100	2293	9860
2004	3-Aug-04	Ftbarn	H317	H317	3	T	3	0.00	31737	100	2134	8445
2004	3-Aug-04	Ftbarn	H318	H318	3	R	2	0.00	26184	200	2482	17032
2004	3-Aug-04	Ftbarn	H319	H319	3	R	2	22.4	30644	120	2628	11658
2004	3-Aug-04	Ftbarn	H320	H320	3	R	3	22.4	34385	200	2518	6144

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Ftbarn	H401	H401	4	R	2	22.4	39954	150	2733	12953
2004	3-Aug-04	Ftbarn	H402	H402	4	R	3	22.4	33628	100	2442	15150
2004	3-Aug-04	Ftbarn	H403	H403	4	R	2	0.00	35616	100	2660	15072
2004	3-Aug-04	Ftbarn	H404	H404	4	T	3	0.00	28748	100	2315	12583
2004	3-Aug-04	Ftbarn	H405	H405	4	T	1	22.4	29904	100	1818	6025
2004	3-Aug-04	Ftbarn	H406	H406	4	T	2	22.4	31164	100	2506	13392
2004	3-Aug-04	Ftbarn	H407	H407	4	W	1	0.00	30325	150	2279	12242
2004	3-Aug-04	Ftbarn	H408	H408	4	W	3	0.00	27346	400	2112	13267
2004	3-Aug-04	Ftbarn	H409	H409	4	W	3	22.4	28839	300	2262	12365
2004	3-Aug-04	Ftbarn	H410	H410	4	NC	0	22.4	28881	100	2148	12708
2004	3-Aug-04	Ftbarn	H411	H411	4	R	3	0.00	34520	200	2906	8466
2004	3-Aug-04	Ftbarn	H412	H412	4	R	1	0.00	28144	100	1764	8818
2004	3-Aug-04	Ftbarn	H413	H413	4	R	1	22.4	30021	200	2228	10122
2004	3-Aug-04	Ftbarn	H414	H414	4	T	1	0.00	25130	200	2416	11278
2004	3-Aug-04	Ftbarn	H415	H415	4	T	2	0.00	33026	200	2488	13488

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2004	3-Aug-04	Ftbarn	H416	H416	4	T	3	22.4	31732	100	2715	13385
2004	3-Aug-04	Ftbarn	H417	H417	4	W	2	0.00	28058	300	2450	12187
2004	3-Aug-04	Ftbarn	H418	H418	4	W	1	22.4	27259	100	2468	16197
2004	3-Aug-04	Ftbarn	H419	H419	4	W	2	22.4	28004	300	2112	11606
2004	3-Aug-04	Ftbarn	H420	H420	4	NC	0	0.00	26267	100	1862	12871
2005	14-Jul-05	Ftbarn	H51101	H101	1	T	2	0.00	45856	7260	3010	12013
2005	14-Jul-05	Ftbarn	H51102	H102	1	T	1	22.4	43787	7030	3138	10155
2005	14-Jul-05	Ftbarn	H51103	H103	1	T	3	22.4	42973	6370	3183	11844
2005	14-Jul-05	Ftbarn	H51104	H104	1	W	3	0.00	41837	5300	3401	12528
2005	14-Jul-05	Ftbarn	H51105	H105	1	W	3	22.4	45603	7990	3484	9772
2005	14-Jul-05	Ftbarn	H51106	H106	1	W	2	0.00	46366	6560	3493	11620
2005	14-Jul-05	Ftbarn	H51107	H107	1	NC	0	22.4	45903	6170	3839	11363
2005	14-Jul-05	Ftbarn	H51108	H108	1	R	1	0.00	47482	7360	3597	14754
2005	14-Jul-05	Ftbarn	H51109	H109	1	R	3	22.4	44954	6950	3691	14194
2005	14-Jul-05	Ftbarn	H51110	H110	1	R	2	22.4	45327	5240	3341	11225

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	14-Jul-05	Ftbarn	H51111	H111	1	T	3	0.00	49304	8810	3222	15602
2005	14-Jul-05	Ftbarn	H51112	H112	1	T	1	0.00	48790	9100	3432	16255
2005	14-Jul-05	Ftbarn	H51113	H113	1	T	2	22.4	46229	7570	3175	15771
2005	14-Jul-05	Ftbarn	H51114	H114	1	W	1	0.00	43980	5900	3368	14446
2005	14-Jul-05	Ftbarn	H51115	H115	1	W	2	22.4	48106	8330	3806	12286
2005	14-Jul-05	Ftbarn	H51116	H116	1	W	1	22.4	44995	5770	3358	9843
2005	14-Jul-05	Ftbarn	H51117	H117	1	NC	0	0.00	49321	7570	3269	13877
2005	14-Jul-05	Ftbarn	H51118	H118	1	R	3	0.00	46863	5240	3861	12819
2005	14-Jul-05	Ftbarn	H51119	H119	1	R	1	22.4	49840	6210	3817	13824
2005	14-Jul-05	Ftbarn	H51120	H120	1	R	2	0.00	46672	4520	4111	9032
2005	14-Jul-05	Ftbarn	H51201	H201	2	NC	0	0.00	44229	6730	3493	14866
2005	14-Jul-05	Ftbarn	H51202	H202	2	R	2	0.00	40894	4730	3601	13709
2005	14-Jul-05	Ftbarn	H51203	H203	2	R	1	22.4	45924	5800	3631	13873
2005	14-Jul-05	Ftbarn	H51204	H204	2	R	3	22.4	43220	4750	3613	14189
2005	14-Jul-05	Ftbarn	H51205	H205	2	W	3	0.00	48534	6900	3558	10539

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	14-Jul-05	Ftbarn	H51206	H206	2	W	2	22.4	44957	5260	3523	12358
2005	14-Jul-05	Ftbarn	H51207	H207	2	W	2	0.00	48008	5990	3712	11306
2005	14-Jul-05	Ftbarn	H51208	H208	2	T	1	22.4	43515	4110	3462	10329
2005	14-Jul-05	Ftbarn	H51209	H209	2	T	2	22.4	46436	6560	3815	13338
2005	14-Jul-05	Ftbarn	H51210	H210	2	T	3	22.4	47680	4580	3600	9359
2005	14-Jul-05	Ftbarn	H51211	H211	2	NC	0	22.4	49441	8240	3121	14113
2005	14-Jul-05	Ftbarn	H51212	H212	2	R	3	0.00	45330	5090	3350	11986
2005	14-Jul-05	Ftbarn	H51213	H213	2	R	2	22.4	45149	7410	3132	11733
2005	14-Jul-05	Ftbarn	H51214	H214	2	R	1	0.00	43097	4580	3764	13207
2005	14-Jul-05	Ftbarn	H51215	H215	2	W	1	22.4	46828	8750	3213	11476
2005	14-Jul-05	Ftbarn	H51216	H216	2	W	1	0.00	45565	5670	3490	12833
2005	14-Jul-05	Ftbarn	H51217	H217	2	W	3	22.4	49444	5710	3755	11731
2005	14-Jul-05	Ftbarn	H51218	H218	2	T	1	0.00	49285	6440	3649	11850
2005	14-Jul-05	Ftbarn	H51219	H219	2	T	3	0.00	48235	6730	3639	13457
2005	14-Jul-05	Ftbarn	H51220	H220	2	T	2	0.00	52414	7410	4147	8018

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	14-Jul-05	Ftbarn	H51301	H301	3	W	2	22.4	51868	7650	3492	14935
2005	14-Jul-05	Ftbarn	H51302	H302	3	W	1	0.00	48241	7050	3409	13922
2005	14-Jul-05	Ftbarn	H51303	H303	3	W	3	22.4	43255	7180	3766	16376
2005	14-Jul-05	Ftbarn	H51304	H304	3	NC	0	22.4	45866	7360	3536	14979
2005	14-Jul-05	Ftbarn	H51305	H305	3	T	1	22.4	44113	7680	3143	10691
2005	14-Jul-05	Ftbarn	H51306	H306	3	T	2	0.00	43477	4450	3950	13186
2005	14-Jul-05	Ftbarn	H51307	H307	3	T	3	22.4	45737	5950	3468	11604
2005	14-Jul-05	Ftbarn	H51308	H308	3	R	3	0.00	43668	5260	4072	12785
2005	14-Jul-05	Ftbarn	H51309	H309	3	R	1	22.4	46559	6750	3317	15376
2005	14-Jul-05	Ftbarn	H51310	H310	3	R	1	0.00	49613	5460	4040	10468
2005	14-Jul-05	Ftbarn	H51311	H311	3	W	1	22.4	43677	4900	3460	14018
2005	14-Jul-05	Ftbarn	H51312	H312	3	W	3	0.00	47576	6980	3424	16257
2005	14-Jul-05	Ftbarn	H51313	H313	3	W	2	0.00	48080	6540	3375	15240
2005	14-Jul-05	Ftbarn	H51314	H314	3	NC	0	0.00	44017	7130	3190	15057
2005	14-Jul-05	Ftbarn	H51315	H315	3	T	2	22.4	48533	7960	3247	11788

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	14-Jul-05	Ftbarn	H51316	H316	3	T	1	0.00	48777	7000	3464	13898
2005	14-Jul-05	Ftbarn	H51317	H317	3	T	3	0.00	48017	7080	3368	13255
2005	14-Jul-05	Ftbarn	H51318	H318	3	R	2	0.00	48742	7030	3524	14904
2005	14-Jul-05	Ftbarn	H51319	H319	3	R	2	22.4	49052	7280	3105	13763
2005	14-Jul-05	Ftbarn	H51320	H320	3	R	3	22.4	47219	5840	3461	13191
2005	14-Jul-05	Ftbarn	H51401	H401	4	R	2	22.4	44391	7230	3053	14841
2005	14-Jul-05	Ftbarn	H51402	H402	4	R	3	22.4	45553	8020	3242	15983
2005	14-Jul-05	Ftbarn	H51403	H403	4	R	2	0.00	44778	5650	3273	13287
2005	14-Jul-05	Ftbarn	H51404	H404	4	T	3	0.00	46728	7100	3190	14045
2005	14-Jul-05	Ftbarn	H51405	H405	4	T	1	22.4	45215	7680	3068	9832
2005	14-Jul-05	Ftbarn	H51406	H406	4	T	2	22.4	45009	6440	3014	14060
2005	14-Jul-05	Ftbarn	H51407	H407	4	W	1	0.00	47672	7550	3204	14933
2005	14-Jul-05	Ftbarn	H51408	H408	4	W	3	0.00	49171	6540	3362	17058
2005	14-Jul-05	Ftbarn	H51409	H409	4	W	3	22.4	49134	8130	3282	17028
2005	14-Jul-05	Ftbarn	H51410	H410	4	NC	0	22.4	50619	8970	3731	17220

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	14-Jul-05	Ftbarn	H51411	H411	4	R	3	0.00	48955	7600	4010	15663
2005	14-Jul-05	Ftbarn	H51412	H412	4	R	1	0.00	48931	8270	3424	17312
2005	14-Jul-05	Ftbarn	H51413	H413	4	R	1	22.4	48021	6930	3202	15969
2005	14-Jul-05	Ftbarn	H51414	H414	4	T	1	0.00	49701	7820	3312	14725
2005	14-Jul-05	Ftbarn	H51415	H415	4	T	2	0.00	47781	6660	3216	12950
2005	14-Jul-05	Ftbarn	H51416	H416	4	T	3	22.4	45304	7000	3069	13948
2005	14-Jul-05	Ftbarn	H51417	H417	4	W	2	0.00	46108	7200	3002	14272
2005	14-Jul-05	Ftbarn	H51418	H418	4	W	1	22.4	44550	7360	3086	16505
2005	14-Jul-05	Ftbarn	H51419	H419	4	W	2	22.4	54500	7200	3004	17039
2005	14-Jul-05	Ftbarn	H51420	H420	4	NC	0	0.00	46828	6930	3209	14774
2005	14-Jul-05	Vboro	V51101	V101	1	T	2	0.00	44064	5500	4187	13724
2005	14-Jul-05	Vboro	V51102	V102	1	T	1	22.4	45947	4750	4363	14693
2005	14-Jul-05	Vboro	V51103	V103	1	T	3	22.4	44332	5900	4484	14739
2005	14-Jul-05	Vboro	V51104	V104	1	W	3	0.00	44682	4680	4761	15640
2005	14-Jul-05	Vboro	V51105	V105	1	W	3	22.4	44803	5500	3920	14596

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	14-Jul-05	Vboro	V51106	V106	1	W	2	0.00	45297	6100	3856	13898
2005	14-Jul-05	Vboro	V51107	V107	1	NC	0	22.4	45431	4720	4118	15964
2005	14-Jul-05	Vboro	V51108	V108	1	R	1	0.00	44970	5360	4457	14557
2005	14-Jul-05	Vboro	V51109	V109	1	R	3	22.4	47435	5380	4507	14220
2005	14-Jul-05	Vboro	V51110	V110	1	R	2	22.4	46016	6210	4545	15251
2005	14-Jul-05	Vboro	V51111	V111	1	T	3	0.00	44689	4810	4944	13909
2005	14-Jul-05	Vboro	V51112	V112	1	T	1	0.00	44347	4920	4466	15462
2005	14-Jul-05	Vboro	V51113	V113	1	T	2	22.4	45924	5540	4954	14635
2005	14-Jul-05	Vboro	V51114	V114	1	W	1	0.00	43445	4900	4527	14863
2005	14-Jul-05	Vboro	V51115	V115	1	W	2	22.4	44265	4300	4178	13856
2005	14-Jul-05	Vboro	V51116	V116	1	W	1	22.4	43839	4860	4268	14236
2005	14-Jul-05	Vboro	V51117	V117	1	NC	0	0.00	41396	4520	3639	12618
2005	14-Jul-05	Vboro	V51118	V118	1	R	3	0.00	44169	5520	4271	12777
2005	14-Jul-05	Vboro	V51119	V119	1	R	1	22.4	45057	4750	3769	12401
2005	14-Jul-05	Vboro	V51120	V120	1	R	2	0.00	46479	5320	4782	14764

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	14-Jul-05	Vboro	V51201	V201	2	NC	0	0.00	44112	4610	4314	15252
2005	14-Jul-05	Vboro	V51202	V202	2	R	2	0.00	43282	4490	4045	15087
2005	14-Jul-05	Vboro	V51203	V203	2	R	1	22.4	45068	6100	4475	13107
2005	14-Jul-05	Vboro	V51204	V204	2	R	3	22.4	45707	5300	4688	14123
2005	14-Jul-05	Vboro	V51205	V205	2	W	3	0.00	45664	5500	4682	16431
2005	14-Jul-05	Vboro	V51206	V206	2	W	2	22.4	45152	5380	4386	14627
2005	14-Jul-05	Vboro	V51207	V207	2	W	2	0.00	45728	5360	4131	14314
2005	14-Jul-05	Vboro	V51208	V208	2	T	1	22.4	45963	5580	4418	14940
2005	14-Jul-05	Vboro	V51209	V209	2	T	2	22.4	45714	5900	4070	13313
2005	14-Jul-05	Vboro	V51210	V210	2	T	3	22.4	46038	5750	4230	13099
2005	14-Jul-05	Vboro	V51211	V211	2	NC	0	22.4	43634	4940	4833	15679
2005	14-Jul-05	Vboro	V51212	V212	2	R	3	0.00	45225	4720	4121	14366
2005	14-Jul-05	Vboro	V51213	V213	2	R	2	22.4	45617	5200	4234	12119
2005	14-Jul-05	Vboro	V51214	V214	2	R	1	0.00	46693	4990	5076	15062
2005	14-Jul-05	Vboro	V51215	V215	2	W	1	22.4	47025	5280	5052	15097

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	14-Jul-05	Vboro	V51216	V216	2	W	1	0.00	46655	5360	4699	15323
2005	14-Jul-05	Vboro	V51217	V217	2	W	3	22.4	44986	4730	3824	12110
2005	14-Jul-05	Vboro	V51218	V218	2	T	1	0.00	48782	5560	4203	14161
2005	14-Jul-05	Vboro	V51219	V219	2	T	3	0.00	44890	4120	4179	12931
2005	14-Jul-05	Vboro	V51220	V220	2	T	2	0.00	46492	4750	4010	13978
2005	14-Jul-05	Vboro	V51301	V301	3	W	2	22.4	46032	5280	4310	14273
2005	14-Jul-05	Vboro	V51302	V302	3	W	1	0.00	45093	4520	4475	12049
2005	14-Jul-05	Vboro	V51303	V303	3	W	3	22.4	57544	4220	4448	13769
2005	14-Jul-05	Vboro	V51304	V304	3	NC	0	22.4	46784	5540	4887	13453
2005	14-Jul-05	Vboro	V51305	V305	3	T	1	22.4	43337	4900	4799	13713
2005	14-Jul-05	Vboro	V51306	V306	3	T	2	0.00	47479	6210	4043	14098
2005	14-Jul-05	Vboro	V51307	V307	3	T	3	22.4	46434	4770	4007	14005
2005	14-Jul-05	Vboro	V51308	V308	3	R	3	0.00	43790	5200	4283	12991
2005	14-Jul-05	Vboro	V51309	V309	3	R	1	22.4	47394	4900	4033	11261
2005	14-Jul-05	Vboro	V51310	V310	3	R	1	0.00	47640	5150	4130	11952

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	14-Jul-05	Vboro	V51311	V311	3	W	1	22.4	44500	4790	4319	14002
2005	14-Jul-05	Vboro	V51312	V312	3	W	3	0.00	45693	5650	4450	13995
2005	14-Jul-05	Vboro	V51313	V313	3	W	2	0.00	44981	5820	4579	15657
2005	14-Jul-05	Vboro	V51314	V314	3	NC	0	0.00	46516	4970	4487	11621
2005	14-Jul-05	Vboro	V51315	V315	3	T	2	22.4	45497	5200	4265	12242
2005	14-Jul-05	Vboro	V51316	V316	3	T	1	0.00	45820	5260	3755	12569
2005	14-Jul-05	Vboro	V51317	V317	3	T	3	0.00	44633	5110	3525	12880
2005	14-Jul-05	Vboro	V51318	V318	3	R	2	0.00	42699	5630	4182	11710
2005	14-Jul-05	Vboro	V51319	V319	3	R	2	22.4	45040	4990	5064	14863
2005	14-Jul-05	Vboro	V51320	V320	3	R	3	22.4	47446	4110	4072	12290
2005	14-Jul-05	Vboro	V51401	V401	4	R	2	22.4	45540	4960	4310	15265
2005	14-Jul-05	Vboro	V51402	V402	4	R	3	22.4	44978	4540	4397	14477
2005	14-Jul-05	Vboro	V51403	V403	4	R	2	0.00	46382	5320	4469	14455
2005	14-Jul-05	Vboro	V51404	V404	4	T	3	0.00	46763	5950	4559	16046
2005	14-Jul-05	Vboro	V51405	V405	4	T	1	22.4	46667	5710	3630	11697

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	14-Jul-05	Vboro	V51406	V406	4	T	2	22.4	47166	5320	4014	14342
2005	14-Jul-05	Vboro	V51407	V407	4	W	1	0.00	42753	4970	3329	13608
2005	14-Jul-05	Vboro	V51408	V408	4	W	3	0.00	44213	5130	4060	12478
2005	14-Jul-05	Vboro	V51409	V409	4	W	3	22.4	45993	5500	3958	12118
2005	14-Jul-05	Vboro	V51410	V410	4	NC	0	22.4	47090	6260	3884	12912
2005	14-Jul-05	Vboro	V51411	V411	4	R	3	0.00	47358	5840	4813	15197
2005	14-Jul-05	Vboro	V51412	V412	4	R	1	0.00	46009	5150	4831	15139
2005	14-Jul-05	Vboro	V51413	V413	4	R	1	22.4	45457	5840	4611	14560
2005	14-Jul-05	Vboro	V51414	V414	4	T	1	0.00	47034	6350	4976	16182
2005	14-Jul-05	Vboro	V51415	V415	4	T	2	0.00	50143	6950	4316	14331
2005	14-Jul-05	Vboro	V51416	V416	4	T	3	22.4	49999	6680	4284	15568
2005	14-Jul-05	Vboro	V51417	V417	4	W	2	0.00	46648	5750	3781	13688
2005	14-Jul-05	Vboro	V51418	V418	4	W	1	22.4	48932	5130	4036	12432
2005	14-Jul-05	Vboro	V51419	V419	4	W	2	22.4	38412	6300	4300	12833
2005	14-Jul-05	Vboro	V51420	V420	4	NC	0	0.00	46938	5770	3929	14134

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Ftbarn	H52101	H101	1	T	2	0.00	37267	580	2937	10757
2005	10-Aug-05	Ftbarn	H52102	H102	1	T	1	22.4	32456	440	2880	12559
2005	10-Aug-05	Ftbarn	H52103	H103	1	T	3	22.4	31459	500	3703	13984
2005	10-Aug-05	Ftbarn	H52104	H104	1	W	3	0.00	34111	640	2738	15276
2005	10-Aug-05	Ftbarn	H52105	H105	1	W	3	22.4	38326	450	3804	10107
2005	10-Aug-05	Ftbarn	H52106	H106	1	W	2	0.00	27878	490	2454	9611
2005	10-Aug-05	Ftbarn	H52107	H107	1	NC	0	22.4	31953	370	2665	8576
2005	10-Aug-05	Ftbarn	H52108	H108	1	R	1	0.00	35074	570	2317	11864
2005	10-Aug-05	Ftbarn	H52109	H109	1	R	3	22.4	33951	450	2350	11801
2005	10-Aug-05	Ftbarn	H52110	H110	1	R	2	22.4	31151	350	2513	9926
2005	10-Aug-05	Ftbarn	H52111	H111	1	T	3	0.00	35675	680	2898	11721
2005	10-Aug-05	Ftbarn	H52112	H112	1	T	1	0.00	33880	600	3001	14668
2005	10-Aug-05	Ftbarn	H52113	H113	1	T	2	22.4	36325	630	3620	15112
2005	10-Aug-05	Ftbarn	H52114	H114	1	W	1	0.00	36363	640	3222	15431
2005	10-Aug-05	Ftbarn	H52115	H115	1	W	2	22.4	34933	420	2865	9936

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Ftbarn	H52116	H116	1	W	1	22.4	31123	440	2765	8954
2005	10-Aug-05	Ftbarn	H52117	H117	1	NC	0	0.00	26208	430	2159	9240
2005	10-Aug-05	Ftbarn	H52118	H118	1	R	3	0.00	35678	430	2471	7810
2005	10-Aug-05	Ftbarn	H52119	H119	1	R	1	22.4	34573	420	2624	9315
2005	10-Aug-05	Ftbarn	H52120	H120	1	R	2	0.00	35573	370	2833	5532
2005	10-Aug-05	Ftbarn	H52201	H201	2	NC	0	0.00	37777	870	2847	17472
2005	10-Aug-05	Ftbarn	H52202	H202	2	R	2	0.00	36893	730	3511	15408
2005	10-Aug-05	Ftbarn	H52203	H203	2	R	1	22.4	41502	730	4898	17305
2005	10-Aug-05	Ftbarn	H52204	H204	2	R	3	22.4	38466	630	4715	15367
2005	10-Aug-05	Ftbarn	H52205	H205	2	W	3	0.00	34400	370	2817	6095
2005	10-Aug-05	Ftbarn	H52206	H206	2	W	2	22.4	29595	430	2426	10914
2005	10-Aug-05	Ftbarn	H52207	H207	2	W	2	0.00	26566	430	2182	10391
2005	10-Aug-05	Ftbarn	H52208	H208	2	T	1	22.4	26628	340	2192	7750
2005	10-Aug-05	Ftbarn	H52209	H209	2	T	2	22.4	33379	430	2585	8971
2005	10-Aug-05	Ftbarn	H52210	H210	2	T	3	22.4	34572	400	3019	4295
2005	10-Aug-05	Ftbarn	H52211	H211	2	NC	0	22.4	38051	620	3004	16824

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Ftbarn	H52212	H212	2	R	3	0.00	37812	700	3164	14901
2005	10-Aug-05	Ftbarn	H52213	H213	2	R	2	22.4	35584	670	4466	14401
2005	10-Aug-05	Ftbarn	H52214	H214	2	R	1	0.00	34140	610	3424	12769
2005	10-Aug-05	Ftbarn	H52215	H215	2	W	1	22.4	36286	370	3680	8008
2005	10-Aug-05	Ftbarn	H52216	H216	2	W	1	0.00	32787	560	3019	12146
2005	10-Aug-05	Ftbarn	H52217	H217	2	W	3	22.4	31005	500	2899	11319
2005	10-Aug-05	Ftbarn	H52218	H218	2	T	1	0.00	34470	500	2386	7610
2005	10-Aug-05	Ftbarn	H52219	H219	2	T	3	0.00	33205	390	2994	10081
2005	10-Aug-05	Ftbarn	H52220	H220	2	T	2	0.00	37956	670	3126	3837
2005	10-Aug-05	Ftbarn	H52301	H301	3	W	2	22.4	35721	670	2652	10529
2005	10-Aug-05	Ftbarn	H52302	H302	3	W	1	0.00	30846	480	2654	10330
2005	10-Aug-05	Ftbarn	H52303	H303	3	W	3	22.4	36187	570	3755	13184
2005	10-Aug-05	Ftbarn	H52304	H304	3	NC	0	22.4	32945	580	2941	11706
2005	10-Aug-05	Ftbarn	H52305	H305	3	T	1	22.4	31962	370	2969	7696
2005	10-Aug-05	Ftbarn	H52306	H306	3	T	2	0.00	29699	420	2254	8916

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Ftbarn	H52307	H307	3	T	3	22.4	28188	380	2570	10424
2005	10-Aug-05	Ftbarn	H52308	H308	3	R	3	0.00	38817	490	2001	9654
2005	10-Aug-05	Ftbarn	H52309	H309	3	R	1	22.4	26263	400	2656	11874
2005	10-Aug-05	Ftbarn	H52310	H310	3	R	1	0.00	25707	560	3686	4448
2005	10-Aug-05	Ftbarn	H52311	H311	3	W	1	22.4	37525	460	3307	15371
2005	10-Aug-05	Ftbarn	H52312	H312	3	W	3	0.00	38867	580	2854	12760
2005	10-Aug-05	Ftbarn	H52313	H313	3	W	2	0.00	31218	590	2610	14210
2005	10-Aug-05	Ftbarn	H52314	H314	3	NC	0	0.00	29086	610	2359	11435
2005	10-Aug-05	Ftbarn	H52315	H315	3	T	2	22.4	31203	430	2795	9944
2005	10-Aug-05	Ftbarn	H52316	H316	3	T	1	0.00	31855	540	2319	12298
2005	10-Aug-05	Ftbarn	H52317	H317	3	T	3	0.00	24749	430	2117	12274
2005	10-Aug-05	Ftbarn	H52318	H318	3	R	2	0.00	30387	500	2121	14894
2005	10-Aug-05	Ftbarn	H52319	H319	3	R	2	22.4	30455	440	2926	16531
2005	10-Aug-05	Ftbarn	H52320	H320	3	R	3	22.4	33363	410	2763	8692
2005	10-Aug-05	Ftbarn	H52401	H401	4	R	2	22.4	37056	560	3052	16376

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Ftbarn	H52402	H402	4	R	3	22.4	28221	480	2494	11619
2005	10-Aug-05	Ftbarn	H52403	H403	4	R	2	0.00	33772	550	2656	15890
2005	10-Aug-05	Ftbarn	H52404	H404	4	T	3	0.00	30286	440	2610	10415
2005	10-Aug-05	Ftbarn	H52405	H405	4	T	1	22.4	31549	400	2668	6022
2005	10-Aug-05	Ftbarn	H52406	H406	4	T	2	22.4	30944	490	2535	11411
2005	10-Aug-05	Ftbarn	H52407	H407	4	W	1	0.00	33398	670	2701	16410
2005	10-Aug-05	Ftbarn	H52408	H408	4	W	3	0.00	35731	520	2659	14505
2005	10-Aug-05	Ftbarn	H52409	H409	4	W	3	22.4	37282	550	2463	13651
2005	10-Aug-05	Ftbarn	H52410	H410	4	NC	0	22.4	41612	680	2771	12397
2005	10-Aug-05	Ftbarn	H52411	H411	4	R	3	0.00	37075	130	2736	13743
2005	10-Aug-05	Ftbarn	H52412	H412	4	R	1	0.00	27381	150	2065	11282
2005	10-Aug-05	Ftbarn	H52413	H413	4	R	1	22.4	29489	180	2194	12278
2005	10-Aug-05	Ftbarn	H52414	H414	4	T	1	0.00	31729	800	2544	11176
2005	10-Aug-05	Ftbarn	H52415	H415	4	T	2	0.00	35786	150	3121	14765
2005	10-Aug-05	Ftbarn	H52416	H416	4	T	3	22.4	37920	270	3453	15366

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Ftbarn	H52417	H417	4	W	2	0.00	31398	230	2753	14194
2005	10-Aug-05	Ftbarn	H52418	H418	4	W	1	22.4	34193	160	2588	15183
2005	10-Aug-05	Ftbarn	H52419	H419	4	W	2	22.4	37131	240	2607	14936
2005	10-Aug-05	Ftbarn	H52420	H420	4	NC	0	0.00	40385	300	2823	13767
2005	10-Aug-05	Vboro	V52101	V101	1	T	2	0.00	36089	170	5646	14719
2005	10-Aug-05	Vboro	V52102	V102	1	T	1	22.4	34530	160	3536	12173
2005	10-Aug-05	Vboro	V52103	V103	1	T	3	22.4	41737	210	4432	13694
2005	10-Aug-05	Vboro	V52104	V104	1	W	3	0.00	32358	170	3332	13225
2005	10-Aug-05	Vboro	V52105	V105	1	W	3	22.4	39991	190	4194	13381
2005	10-Aug-05	Vboro	V52106	V106	1	W	2	0.00	39717	230	4199	13950
2005	10-Aug-05	Vboro	V52107	V107	1	NC	0	22.4	40337	220	3733	15485
2005	10-Aug-05	Vboro	V52108	V108	1	R	1	0.00	37736	100	4156	14120
2005	10-Aug-05	Vboro	V52109	V109	1	R	3	22.4	40709	180	4946	13257
2005	10-Aug-05	Vboro	V52110	V110	1	R	2	22.4	30448	240	3541	11383
2005	10-Aug-05	Vboro	V52111	V111	1	T	3	0.00	41529	200	6010	15747

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Vboro	V52112	V112	1	T	1	0.00	36799	210	6148	15279
2005	10-Aug-05	Vboro	V52113	V113	1	T	2	22.4	38225	240	4663	13809
2005	10-Aug-05	Vboro	V52114	V114	1	W	1	0.00	37482	160	3653	12714
2005	10-Aug-05	Vboro	V52115	V115	1	W	2	22.4	37443	210	4884	14105
2005	10-Aug-05	Vboro	V52116	V116	1	W	1	22.4	37051	180	4484	15504
2005	10-Aug-05	Vboro	V52117	V117	1	NC	0	0.00	38463	220	3232	13835
2005	10-Aug-05	Vboro	V52118	V118	1	R	3	0.00	37701	110	4709	13120
2005	10-Aug-05	Vboro	V52119	V119	1	R	1	22.4	37285	130	5336	14873
2005	10-Aug-05	Vboro	V52120	V120	1	R	2	0.00	38523	240	5746	14526
2005	10-Aug-05	Vboro	V52201	V201	2	NC	0	0.00	39703	220	4555	15085
2005	10-Aug-05	Vboro	V52202	V202	2	R	2	0.00	33537	140	3468	13318
2005	10-Aug-05	Vboro	V52203	V203	2	R	1	22.4	36249	130	4958	13682
2005	10-Aug-05	Vboro	V52204	V204	2	R	3	22.4	35478	190	4585	12872
2005	10-Aug-05	Vboro	V52205	V205	2	W	3	0.00	38350	220	4483	12490
2005	10-Aug-05	Vboro	V52206	V206	2	W	2	22.4	40118	220	4766	14051
2005	10-Aug-05	Vboro	V52207	V207	2	W	2	0.00	37732	180	4199	14416

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Vboro	V52208	V208	2	T	1	22.4	41599	150	4533	15474
2005	10-Aug-05	Vboro	V52209	V209	2	T	2	22.4	37955	190	4303	14625
2005	10-Aug-05	Vboro	V52210	V210	2	T	3	22.4	38755	180	4438	15418
2005	10-Aug-05	Vboro	V52211	V211	2	NC	0	22.4	41316	240	5360	15020
2005	10-Aug-05	Vboro	V52212	V212	2	R	3	0.00	37136	230	3918	13407
2005	10-Aug-05	Vboro	V52213	V213	2	R	2	22.4	40052	230	5171	12812
2005	10-Aug-05	Vboro	V52214	V214	2	R	1	0.00	33557	270	4810	12122
2005	10-Aug-05	Vboro	V52215	V215	2	W	1	22.4	37912	350	5495	12600
2005	10-Aug-05	Vboro	V52216	V216	2	W	1	0.00	34214	320	4647	13138
2005	10-Aug-05	Vboro	V52217	V217	2	W	3	22.4	32283	230	3868	12890
2005	10-Aug-05	Vboro	V52218	V218	2	T	1	0.00	31852	260	4245	13403
2005	10-Aug-05	Vboro	V52219	V219	2	T	3	0.00	32990	250	3754	13420
2005	10-Aug-05	Vboro	V52220	V220	2	T	2	0.00	33919	270	3369	14232
2005	10-Aug-05	Vboro	V52301	V301	3	W	2	22.4	31846	270	4837	11939
2005	10-Aug-05	Vboro	V52302	V302	3	W	1	0.00	31930	270	4417	12363
2005	10-Aug-05	Vboro	V52303	V303	3	W	3	22.4	33885	300	5791	13120

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Vboro	V52304	V304	3	NC	0	22.4	33084	320	5100	12541
2005	10-Aug-05	Vboro	V52305	V305	3	T	1	22.4	34788	300	6044	12724
2005	10-Aug-05	Vboro	V52306	V306	3	T	2	0.00	36148	310	5454	13249
2005	10-Aug-05	Vboro	V52307	V307	3	T	3	22.4	37333	300	4885	14720
2005	10-Aug-05	Vboro	V52308	V308	3	R	3	0.00	38309	240	3821	13320
2005	10-Aug-05	Vboro	V52309	V309	3	R	1	22.4	36498	280	4360	15030
2005	10-Aug-05	Vboro	V52310	V310	3	R	1	0.00	31246	120	3593	12951
2005	10-Aug-05	Vboro	V52311	V311	3	W	1	22.4	36862	310	5301	14562
2005	10-Aug-05	Vboro	V52312	V312	3	W	3	0.00	33244	350	4960	14578
2005	10-Aug-05	Vboro	V52313	V313	3	W	2	0.00	34685	400	5961	14094
2005	10-Aug-05	Vboro	V52314	V314	3	NC	0	0.00	30792	290	4697	13366
2005	10-Aug-05	Vboro	V52315	V315	3	T	2	22.4	28357	260	5263	16564
2005	10-Aug-05	Vboro	V52316	V316	3	T	1	0.00	30348	310	4969	16057
2005	10-Aug-05	Vboro	V52317	V317	3	T	3	0.00	35349	340	3747	12946
2005	10-Aug-05	Vboro	V52318	V318	3	R	2	0.00	33896	300	3917	13559
2005	10-Aug-05	Vboro	V52319	V319	3	R	2	22.4	37455	320	4382	15178
2005	10-Aug-05	Vboro	V52320	V320	3	R	3	22.4	38174	240	4696	16244

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Vboro	V52401	V401	4	R	2	22.4	34159	260	6110	15826
2005	10-Aug-05	Vboro	V52402	V402	4	R	3	22.4	32995	260	4904	13179
2005	10-Aug-05	Vboro	V52403	V403	4	R	2	0.00	32736	280	5519	13157
2005	10-Aug-05	Vboro	V52404	V404	4	T	3	0.00	30162	280	5048	13929
2005	10-Aug-05	Vboro	V52405	V405	4	T	1	22.4	32196	390	4806	12330
2005	10-Aug-05	Vboro	V52406	V406	4	T	2	22.4	33474	220	4584	12189
2005	10-Aug-05	Vboro	V52407	V407	4	W	1	0.00	27516	200	3454	13006
2005	10-Aug-05	Vboro	V52408	V408	4	W	3	0.00	34426	180	4189	13143
2005	10-Aug-05	Vboro	V52409	V409	4	W	3	22.4	35134	290	3868	12615
2005	10-Aug-05	Vboro	V52410	V410	4	NC	0	22.4	31568	370	3038	11033
2005	10-Aug-05	Vboro	V52411	V411	4	R	3	0.00	33094	270	5518	13510
2005	10-Aug-05	Vboro	V52412	V412	4	R	1	0.00	33506	300	5204	12264
2005	10-Aug-05	Vboro	V52413	V413	4	R	1	22.4	34507	310	5356	12432
2005	10-Aug-05	Vboro	V52414	V414	4	T	1	0.00	28910	380	4687	12197
2005	10-Aug-05	Vboro	V52415	V415	4	T	2	0.00	30233	290	5070	12472

(*Table B9*, continued)

Year	Sample Date	Site	Sample No.	Plot No.	Block	Cover Type	Seed Rate	Fertilizer (kg ha^{-1})	N (ppm)	Petiole (ppm)	P (ppm)	K (ppm)
2005	10-Aug-05	Vboro	V52416	V416	4	T	3	22.4	33544	280	4919	14184
2005	10-Aug-05	Vboro	V52417	V417	4	W	2	0.00	27000	270	3668	13850
2005	10-Aug-05	Vboro	V52418	V418	4	W	1	22.4	41379	220	4192	14747
2005	10-Aug-05	Vboro	V52419	V419	4	W	2	22.4	32043	280	4149	14383
2005	10-Aug-05	Vboro	V52420	V420	4	NC	0	0.00	28145	290	4267	14675

Table B10. Cotton lint yield data from no cover (NC, rye (R), triticale (T) and wheat (W) planted at zero (0), 127 (1), 258 (2) and 387 (3) plants m^{-2}, with and without spring applied nitrogen at 22.4 kg ha^{-1} applied February 28- March 3 as determined from hand harvest of 4.2 m of two adjacent rows at Vanceboro location and 4.5 m at the Fort Barnwell location from October 18-23, 2004 and October 21-25, 2005 and calculated by assuming 0.43 cotton lint weight of cotton field weights.

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2004	H101	ftbarn	1	T	2	0.00	1416.3	1363.1	586.13	1447.3
2004	H102	ftbarn	1	T	1	22.4	1482.4	1429.2	614.56	1517.4
2004	H103	ftbarn	1	T	3	22.4	1424.7	1371.5	589.75	1456.2
2004	H104	ftbarn	1	W	3	0.00	1896.4	1843.2	792.58	1957.0
2004	H105	ftbarn	1	W	3	22.4	1261.6	1208.4	519.61	1283.0
2004	H106	ftbarn	1	W	2	0.00	1176.0	1122.8	482.80	1192.1
2004	H107	ftbarn	1	NC	0	22.4	1528.8	1475.6	634.51	1566.7
2004	H108	ftbarn	1	R	1	0.00	1918.5	1865.3	802.08	1980.5
2004	H109	ftbarn	1	R	3	22.4	1692.2	1639.0	704.77	1740.2
2004	H110	ftbarn	1	R	2	22.4	1362.0	1308.8	562.78	1389.6
2004	H111	ftbarn	1	T	3	0.00	1083.6	1030.4	443.07	1094.0
2004	H112	ftbarn	1	T	1	0.00	1776.9	1723.7	741.19	1830.1
2004	H113	ftbarn	1	T	2	22.4	1508.4	1455.2	625.74	1545.0
2004	H114	ftbarn	1	W	1	0.00	1693.4	1640.2	705.29	1741.5
2004	H115	ftbarn	1	W	2	22.4	1303.7	1250.5	537.72	1327.7
2004	H116	ftbarn	1	W	1	22.4	1360.4	1307.2	562.10	1387.9
2004	H117	ftbarn	1	NC	0	0.00	1500.3	1447.1	622.25	1536.4
2004	H118	ftbarn	1	R	3	0.00	1709.8	1656.6	712.34	1758.9
2004	H119	ftbarn	1	R	1	22.4	1029.5	976.3	419.81	1036.6

(*Table B10,* continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2004	H120	ftbarn	1	R	2	0.00	1371.8	1318.6	567.00	1400.0
2004	H201	ftbarn	2	NC	0	0.00	1196.5	1143.3	491.62	1213.9
2004	H202	ftbarn	2	R	2	0.00	1270.3	1217.1	523.35	1292.2
2004	H203	ftbarn	2	R	1	22.4	1599.1	1545.9	664.74	1641.3
2004	H204	ftbarn	2	R	3	22.4	1415.8	1362.6	585.92	1446.7
2004	H205	ftbarn	2	W	3	0.00	1584.8	1531.6	658.59	1626.2
2004	H206	ftbarn	2	W	2	22.4	1690.2	1637.0	703.91	1738.1
2004	H207	ftbarn	2	W	2	0.00	1392.3	1339.1	575.81	1421.8
2004	H208	ftbarn	2	T	1	22.4	927.20	874.00	375.82	928.0
2004	H209	ftbarn	2	T	2	22.4	968.40	915.20	393.54	971.70
2004	H210	ftbarn	2	T	3	22.4	836.80	783.60	336.95	832.00
2004	H211	ftbarn	2	NC	0	22.4	1384.3	1331.1	572.37	1413.3
2004	H212	ftbarn	2	R	3	0.00	1924.2	1871.0	804.53	1986.5
2004	H213	ftbarn	2	R	2	22.4	1172.8	1119.6	481.43	1188.7
2004	H214	ftbarn	2	R	1	0.00	1736.2	1683.0	723.69	1786.9
2004	H215	ftbarn	2	W	1	22.4	1595.6	1542.4	663.23	1637.6
2004	H216	ftbarn	2	W	1	0.00	1841.4	1788.2	768.93	1898.6
2004	H217	ftbarn	2	W	3	22.4	862.10	808.90	347.83	858.80
2004	H218	ftbarn	2	T	1	0.00	1152.2	1099.0	472.57	1166.8
2004	H219	ftbarn	2	T	3	0.00	899.30	846.10	363.82	898.30
2004	H220	ftbarn	2	T	2	0.00	919.70	866.50	372.60	920.00

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2004	H301	ftbarn	3	W	2	22.4	1313.4	1260.2	541.89	1338.0
2004	H302	ftbarn	3	W	1	0.00	1491.7	1438.5	618.56	1527.3
2004	H303	ftbarn	3	W	3	22.4	1144.2	1091.0	469.13	1158.4
2004	H304	ftbarn	3	NC	0	22.4	1567.7	1514.5	651.24	1608.0
2004	H305	ftbarn	3	T	1	22.4	1184.0	1130.8	486.24	1200.6
2004	H306	ftbarn	3	T	2	0.00	1440.3	1387.1	596.45	1472.7
2004	H307	ftbarn	3	T	3	22.4	1440.9	1387.7	596.71	1473.4
2004	H308	ftbarn	3	R	3	0.00	1006.8	953.60	410.05	1012.5
2004	H309	ftbarn	3	R	1	22.4	785.70	732.50	314.98	777.70
2004	H310	ftbarn	3	R	1	0.00	772.70	719.50	309.39	763.90
2004	H311	ftbarn	3	W	1	22.4	1155.4	1102.2	473.95	1170.2
2004	H312	ftbarn	3	W	3	0.00	1707.5	1654.3	711.35	1756.4
2004	H313	ftbarn	3	W	2	0.00	1060.6	1007.4	433.18	1069.6
2004	H314	ftbarn	3	NC	0	0.00	1765.1	1711.9	736.12	1817.6
2004	H315	ftbarn	3	T	2	22.4	1084.2	1031.0	443.33	1094.6
2004	H316	ftbarn	3	T	1	0.00	1610.7	1557.5	669.73	1653.7
2004	H317	ftbarn	3	T	3	0.00	1241.0	1187.8	510.75	1261.1
2004	H318	ftbarn	3	R	2	0.00	1187.6	1134.4	487.79	1204.4
2004	H319	ftbarn	3	R	2	22.4	1053.4	1000.2	430.09	1061.9
2004	H320	ftbarn	3	R	3	22.4	852.60	799.40	343.74	848.80

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2004	H401	ftbarn	4	R	2	22.4	1666.7	1613.5	693.81	1713.1
2004	H402	ftbarn	4	R	3	22.4	1696.3	1643.1	706.53	1744.5
2004	H403	ftbarn	4	R	2	0.00	1805.4	1752.2	753.45	1860.4
2004	H404	ftbarn	4	T	3	0.00	1610.7	1557.5	669.73	1653.7
2004	H405	ftbarn	4	T	1	22.4	1330.1	1276.9	549.07	1355.7
2004	H406	ftbarn	4	T	2	22.4	1351.5	1298.3	558.27	1378.5
2004	H407	ftbarn	4	W	1	0.00	1348.8	1295.6	557.11	1375.6
2004	H408	ftbarn	4	W	3	0.00	965.0	911.8	392.07	968.1
2004	H409	ftbarn	4	W	3	22.4	1343.0	1289.8	554.61	1369.4
2004	H410	ftbarn	4	NC	0	22.4	1112.9	1059.7	455.67	1125.1
2004	H411	ftbarn	4	R	3	0.00	1416.8	1363.6	586.35	1447.8
2004	H412	ftbarn	4	R	1	0.00	1577.6	1524.4	655.49	1618.5
2004	H413	ftbarn	4	R	1	22.4	1374.4	1321.2	568.12	1402.8
2004	H414	ftbarn	4	T	1	0.00	1659.0	1605.8	690.49	1704.9
2004	H415	ftbarn	4	T	2	0.00	869.6	816.40	351.05	866.8
2004	H416	ftbarn	4	T	3	22.4	1548.7	1495.5	643.07	1587.8
2004	H417	ftbarn	4	W	2	0.00	1386.0	1332.8	573.10	1415.1
2004	H418	ftbarn	4	W	1	22.4	1639.8	1586.6	682.24	1684.5
2004	H419	ftbarn	4	W	2	22.4	1567.6	1514.4	651.19	1607.9
2004	H420	ftbarn	4	NC	0	0.00	1415.1	1361.9	585.62	1446.0

(*Table B10*, continued)

Year	Plot No.	Locatio n	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2004	V101	vboro	1	T	2	0.00	1163.5	1110.3	477.43	1178.8
2004	V102	vboro	1	T	1	22.4	1233.8	1180.6	507.66	1253.5
2004	V103	vboro	1	T	3	22.4	1258.0	1204.8	518.06	1279.2
2004	V104	vboro	1	W	3	0.00	1320.6	1267.4	544.98	1345.6
2004	V105	vboro	1	W	3	22.4	1366.8	1313.6	564.85	1394.7
2004	V106	vboro	1	W	2	0.00	1319.7	1266.5	544.60	1344.7
2004	V107	vboro	1	NC	0	22.4	1001.3	948.1	407.68	1006.6
2004	V108	vboro	1	R	1	0.00	1163.7	1110.5	477.52	1179.1
2004	V109	vboro	1	R	3	22.4	1273.8	1220.6	524.86	1296.0
2004	V110	vboro	1	R	2	22.4	1388.1	1334.9	574.01	1417.3
2004	V111	vboro	1	T	3	0.00	1397.8	1344.6	578.18	1427.6
2004	V112	vboro	1	T	1	0.00	964.8	911.60	391.99	967.9
2004	V113	vboro	1	T	2	22.4	1304.6	1251.4	538.10	1328.7
2004	V114	vboro	1	W	1	0.00	1094.8	1041.6	447.89	1105.9
2004	V115	vboro	1	W	2	22.4	1001.2	948.0	407.64	1006.5
2004	V116	vboro	1	W	1	22.4	1384.4	1331.2	572.42	1413.4
2004	V117	vboro	1	NC	0	0.00	1104.7	1051.5	452.15	1116.4
2004	V118	vboro	1	R	3	0.00	930.3	877.10	377.15	931.2
2004	V119	vboro	1	R	1	22.4	1423.0	1369.8	589.01	1454.4
2004	V120	vboro	1	R	2	0.00	1360.5	1307.3	562.14	1388.0
2004	V201	vboro	2	NC	0	0.00	675.7	622.50	267.68	660.9

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2004	V202	vboro	2	R	2	0.00	846.00	792.8	340.90	841.7
2004	V203	vboro	2	R	1	22.4	1456.2	1403.0	603.29	1489.6
2004	V204	vboro	2	R	3	22.4	1022.8	969.60	416.93	1029.5
2004	V205	vboro	2	W	3	0.00	1116.4	1063.2	457.18	1128.8
2004	V206	vboro	2	W	2	22.4	1537.9	1484.7	638.42	1576.4
2004	V207	vboro	2	W	2	0.00	1209.2	1156.0	497.08	1227.4
2004	V208	vboro	2	T	1	22.4	1329.3	1276.1	548.72	1354.9
2004	V209	vboro	2	T	2	22.4	1254.3	1201.1	516.47	1275.3
2004	V210	vboro	2	T	3	22.4	1573.4	1520.2	653.69	1614.1
2004	V211	vboro	2	NC	0	22.4	986.00	932.8	401.10	990.4
2004	V212	vboro	2	R	3	0.00	1269.7	1216.5	523.10	1291.6
2004	V213	vboro	2	R	2	22.4	1263.5	1210.3	520.43	1285.0
2004	V214	vboro	2	R	1	0.00	1094.7	1041.5	447.85	1105.8
2004	V215	vboro	2	W	1	22.4	1358.7	1305.5	561.37	1386.1
2004	V216	vboro	2	W	1	0.00	1471.1	1417.9	609.70	1505.4
2004	V217	vboro	2	W	3	22.4	1457.7	1404.5	603.94	1491.2
2004	V218	vboro	2	T	1	0.00	1395.8	1342.6	577.32	1425.5
2004	V219	vboro	2	T	3	0.00	1419.7	1366.5	587.60	1450.9
2004	V220	vboro	2	T	2	0.00	1272.2	1219.0	524.17	1294.3

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2004	V301	vboro	3	W	2	22.4	1334.9	1281.7	551.13	1360.8
2004	V302	vboro	3	W	1	0.00	1561.0	1507.8	648.35	1600.9
2004	V303	vboro	3	W	3	22.4	1440.3	1387.1	596.45	1472.7
2004	V304	vboro	3	NC	0	22.4	1344.7	1291.5	555.35	1371.2
2004	V305	vboro	3	T	1	22.4	1694.8	1641.6	705.89	1742.9
2004	V306	vboro	3	T	2	0.00	1481.4	1428.2	614.13	1516.4
2004	V307	vboro	3	T	3	22.4	1475.6	1422.4	611.63	1510.2
2004	V308	vboro	3	R	3	0.00	1475.7	1422.5	611.68	1510.3
2004	V309	vboro	3	R	1	22.4	1375.5	1322.3	568.59	1403.9
2004	V310	vboro	3	R	1	0.00	1189.4	1136.2	488.57	1206.3
2004	V311	vboro	3	W	1	22.4	1449.1	1395.9	600.24	1482.1
2004	V312	vboro	3	W	3	0.00	1360.4	1307.2	562.10	1387.9
2004	V313	vboro	3	W	2	0.00	1360.5	1307.3	562.14	1388.0
2004	V314	vboro	3	NC	0	0.00	1417.8	1364.6	586.78	1448.8
2004	V315	vboro	3	T	2	22.4	1528.9	1475.7	634.55	1566.8
2004	V316	vboro	3	T	1	0.00	1360.4	1307.2	562.10	1387.9
2004	V317	vboro	3	T	3	0.00	1349.6	1296.4	557.45	1376.4
2004	V318	vboro	3	R	2	0.00	1469.5	1416.3	609.01	1503.7
2004	V319	vboro	3	R	2	22.4	1612.0	1558.8	670.28	1655.0
2004	V320	vboro	3	R	3	22.4	1432.6	1379.4	593.14	1464.6

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2004	V401	vboro	4	R	2	22.4	1686.7	1633.5	702.41	1734.3
2004	V402	vboro	4	R	3	22.4	1576.2	1523.0	654.89	1617.0
2004	V403	vboro	4	R	2	0.00	1607.3	1554.1	668.26	1650.0
2004	V404	vboro	4	T	3	0.00	1463.3	1410.1	606.34	1497.2
2004	V405	vboro	4	T	1	22.4	1587.3	1534.1	659.66	1628.8
2004	V406	vboro	4	T	2	22.4	1546.7	1493.5	642.21	1585.7
2004	V407	vboro	4	W	1	0.00	1427.6	1374.4	590.99	1459.2
2004	V408	vboro	4	W	3	0.00	1383.5	1330.3	572.03	1412.4
2004	V409	vboro	4	W	3	22.4	1401.6	1348.4	579.81	1431.6
2004	V410	vboro	4	NC	0	22.4	1344.9	1291.7	555.43	1371.4
2004	V411	vboro	4	R	3	0.00	1406.4	1353.2	581.88	1436.7
2004	V412	vboro	4	R	1	0.00	1326.9	1273.7	547.69	1352.3
2004	V413	vboro	4	R	1	22.4	1369.0	1315.8	565.79	1397.0
2004	V414	vboro	4	T	1	0.00	1281.8	1228.6	528.30	1304.4
2004	V415	vboro	4	T	2	0.00	1443.1	1389.9	597.66	1475.7
2004	V416	vboro	4	T	3	22.4	1469.5	1416.3	609.01	1503.7
2004	V417	vboro	4	W	2	0.00	1228.6	1175.4	505.42	1248.0
2004	V418	vboro	4	W	1	22.4	1252.2	1199.0	515.57	1273.0
2004	V419	vboro	4	W	2	22.4	1482.1	1428.9	614.43	1517.1
2004	V420	vboro	4	NC	0	0.00	1298.6	1245.4	535.52	1322.3

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2005	H101	ftbarn	1	T	2	0.00	1126.3	1073.1	461.4	1139.3
2005	H102	ftbarn	1	T	1	22.4	1190.5	1137.3	489.0	1207.5
2005	H103	ftbarn	1	T	3	22.4	1055.0	1001.8	430.8	1063.6
2005	H104	ftbarn	1	W	3	0.00	1048.1	994.9	427.8	1056.3
2005	H105	ftbarn	1	W	3	22.4	1496.2	1443.0	620.5	1532.1
2005	H106	ftbarn	1	W	2	0.00	1286.5	1233.3	530.3	1309.4
2005	H107	ftbarn	1	NC	0	22.4	1061.2	1008.0	433.4	1070.2
2005	H108	ftbarn	1	R	1	0.00	1314.4	1261.2	542.3	1339.1
2005	H109	ftbarn	1	R	3	22.4	1557.2	1504.0	646.7	1596.8
2005	H110	ftbarn	1	R	2	22.4	1119.4	1066.2	458.5	1132.0
2005	H111	ftbarn	1	T	3	0.00	606.5	553.3	237.9	587.5
2005	H112	ftbarn	1	T	1	0.00	1153.5	1100.3	473.1	1168.2
2005	H113	ftbarn	1	T	2	22.4	1264.7	1211.5	520.9	1286.3
2005	H114	ftbarn	1	W	1	0.00	1574.2	1521.0	654.0	1614.9
2005	H115	ftbarn	1	W	2	22.4	1612.0	1558.8	670.3	1655.0
2005	H116	ftbarn	1	W	1	22.4	1378.8	1325.6	570.0	1407.4
2005	H117	ftbarn	1	NC	0	0.00	1064.7	1011.5	434.9	1073.9
2005	H118	ftbarn	1	R	3	0.00	1341.1	1287.9	553.8	1367.4
2005	H119	ftbarn	1	R	1	22.4	1184.8	1131.6	486.6	1201.5
2005	H120	ftbarn	1	R	2	0.00	1187.2	1134.0	487.6	1204.0

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2005	H201	ftbarn	2	NC	0	0.00	1315.8	1262.6	542.9	1340.5
2005	H202	ftbarn	2	R	2	0.00	1291.3	1238.1	532.4	1314.5
2005	H203	ftbarn	2	R	1	22.4	1561.5	1508.3	648.6	1601.4
2005	H204	ftbarn	2	R	3	22.4	1401.9	1348.7	579.9	1432.0
2005	H205	ftbarn	2	W	3	0.00	1423.8	1370.6	589.4	1455.2
2005	H206	ftbarn	2	W	2	22.4	1143.8	1090.6	469.0	1157.9
2005	H207	ftbarn	2	W	2	0.00	1247.0	1193.8	513.3	1267.5
2005	H208	ftbarn	2	T	1	22.4	1209.6	1156.4	497.3	1227.8
2005	H209	ftbarn	2	T	2	22.4	965.4	912.20	392.2	968.5
2005	H210	ftbarn	2	T	3	22.4	641.70	588.50	253.1	624.80
2005	H211	ftbarn	2	NC	0	22.4	1329.9	1276.7	549.0	1355.5
2005	H212	ftbarn	2	R	3	0.00	985.5	932.30	400.9	989.9
2005	H213	ftbarn	2	R	2	22.4	1234.5	1181.3	508.0	1254.2
2005	H214	ftbarn	2	R	1	0.00	1506.9	1453.7	625.1	1543.4
2005	H215	ftbarn	2	W	1	22.4	1127.0	1073.8	461.7	1140.1
2005	H216	ftbarn	2	W	1	0.00	1276.9	1223.7	526.2	1299.2
2005	H217	ftbarn	2	W	3	22.4	1003.0	949.8	408.4	1008.4
2005	H218	ftbarn	2	T	1	0.00	1225.0	1171.8	503.9	1244.1
2005	H219	ftbarn	2	T	3	0.00	1073.5	1020.3	438.7	1083.3
2005	H220	ftbarn	2	T	2	0.00	754.8	701.6	301.7	744.9

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2005	H301	ftbarn	3	W	2	22.4	1048.5	995.30	428.0	1056.7
2005	H302	ftbarn	3	W	1	0.00	892.9	839.70	361.1	891.5
2005	H303	ftbarn	3	W	3	22.4	1287.3	1234.1	530.7	1310.3
2005	H304	ftbarn	3	NC	0	22.4	1385.4	1332.2	572.8	1414.4
2005	H305	ftbarn	3	T	1	22.4	1001.9	948.70	407.9	1007.3
2005	H306	ftbarn	3	T	2	0.00	1294.8	1241.6	533.9	1318.3
2005	H307	ftbarn	3	T	3	22.4	1123.5	1070.3	460.2	1136.4
2005	H308	ftbarn	3	R	3	0.00	1303.5	1250.3	537.6	1327.5
2005	H309	ftbarn	3	R	1	22.4	1195.1	1141.9	491.0	1212.4
2005	H310	ftbarn	3	R	1	0.00	795.3	742.10	319.1	787.9
2005	H311	ftbarn	3	W	1	22.4	1303.9	1250.7	537.8	1327.9
2005	H312	ftbarn	3	W	3	0.00	1212.9	1159.7	498.7	1231.3
2005	H313	ftbarn	3	W	2	0.00	1265.4	1212.2	521.2	1287.0
2005	H314	ftbarn	3	NC	0	0.00	1579.4	1526.2	656.3	1620.4
2005	H315	ftbarn	3	T	2	22.4	1232.1	1178.9	506.9	1251.7
2005	H316	ftbarn	3	T	1	0.00	981.5	928.30	399.2	985.6
2005	H317	ftbarn	3	T	3	0.00	1180.2	1127.0	484.6	1196.6
2005	H318	ftbarn	3	R	2	0.00	1133.0	1079.8	464.3	1146.5
2005	H319	ftbarn	3	R	2	22.4	1216.6	1163.4	500.3	1235.2
2005	H320	ftbarn	3	R	3	22.4	1042.4	989.20	425.4	1050.3

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2005	H401	ftbarn	4	R	2	22.4	1451.9	1398.7	601.4	1485.0
2005	H402	ftbarn	4	R	3	22.4	1121.0	1067.8	459.2	1133.7
2005	H403	ftbarn	4	R	2	0.00	1449.9	1396.7	600.6	1482.9
2005	H404	ftbarn	4	T	3	0.00	1385.5	1332.3	572.9	1414.6
2005	H405	ftbarn	4	T	1	22.4	999.8	946.60	407.0	1005.0
2005	H406	ftbarn	4	T	2	22.4	1444.2	1391.0	598.1	1476.9
2005	H407	ftbarn	4	W	1	0.00	1131.5	1078.3	463.7	1144.9
2005	H408	ftbarn	4	W	3	0.00	1207.2	1154.0	496.2	1225.2
2005	H409	ftbarn	4	W	3	22.4	984.2	931.00	400.3	988.5
2005	H410	ftbarn	4	NC	0	22.4	865.4	812.20	349.2	862.3
2005	H411	ftbarn	4	R	3	0.00	928.9	875.70	376.6	929.8
2005	H412	ftbarn	4	R	1	0.00	1321.1	1267.9	545.2	1346.2
2005	H413	ftbarn	4	R	1	22.4	1201.8	1148.6	493.9	1219.5
2005	H414	ftbarn	4	T	1	0.00	1261.2	1208.0	519.4	1282.6
2005	H415	ftbarn	4	T	2	0.00	1481.7	1428.5	614.3	1516.7
2005	H416	ftbarn	4	T	3	22.4	1148.0	1094.8	470.8	1162.4
2005	H417	ftbarn	4	W	2	0.00	1469.2	1416.0	608.9	1503.4
2005	H418	ftbarn	4	W	1	22.4	1020.0	966.80	415.7	1026.5
2005	H419	ftbarn	4	W	2	22.4	1024.1	970.90	417.5	1030.8
2005	H420	ftbarn	4	NC	0	0.00	1180.4	1127.2	484.7	1196.8

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2005	V101	vboro	1	T	2	0.00	1458.9	1405.7	604.5	1492.5
2005	V102	vboro	1	T	1	22.4	1511.1	1457.9	626.9	1547.9
2005	V103	vboro	1	T	3	22.4	1463.1	1409.9	606.3	1496.9
2005	V104	vboro	1	W	3	0.00	1466.1	1412.9	607.5	1500.1
2005	V105	vboro	1	W	3	22.4	1437.4	1384.2	595.2	1469.7
2005	V106	vboro	1	W	2	0.00	1605.9	1552.7	667.7	1648.6
2005	V107	vboro	1	NC	0	22.4	1518.5	1465.3	630.1	1555.8
2005	V108	vboro	1	R	1	0.00	1218.9	1165.7	501.3	1237.7
2005	V109	vboro	1	R	3	22.4	1632.4	1579.2	679.1	1676.7
2005	V110	vboro	1	R	2	22.4	1347.0	1293.8	556.3	1373.7
2005	V111	vboro	1	T	3	0.00	979.2	926.00	398.2	983.2
2005	V112	vboro	1	T	1	0.00	1595.6	1542.4	663.2	1637.6
2005	V113	vboro	1	T	2	22.4	1298.7	1245.5	535.6	1322.4
2005	V114	vboro	1	W	1	0.00	1442.4	1389.2	597.4	1475.0
2005	V115	vboro	1	W	2	22.4	1616.9	1563.7	672.4	1660.2
2005	V116	vboro	1	W	1	22.4	1093.8	1040.6	447.5	1104.8
2005	V117	vboro	1	NC	0	0.00	1347.5	1294.3	556.5	1374.2
2005	V118	vboro	1	R	3	0.00	1612.8	1559.6	670.6	1655.9
2005	V119	vboro	1	R	1	22.4	1150.8	1097.6	472.0	1165.4
2005	V120	vboro	1	R	2	0.00	1272.9	1219.7	524.5	1295.0

(*Table B10,* continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2005	V201	vboro	2	NC	0	0.00	1441.0	1387.8	596.8	1473.5
2005	V202	vboro	2	R	2	0.00	1202.5	1149.3	494.2	1220.3
2005	V203	vboro	2	R	1	22.4	1249.6	1196.4	514.5	1270.3
2005	V204	vboro	2	R	3	22.4	1167.8	1114.6	479.3	1183.4
2005	V205	vboro	2	W	3	0.00	1435.1	1381.9	594.2	1467.2
2005	V206	vboro	2	W	2	22.4	1445.0	1391.8	598.5	1477.7
2005	V207	vboro	2	W	2	0.00	1232.8	1179.6	507.2	1252.4
2005	V208	vboro	2	T	1	22.4	1110.7	1057.5	454.7	1122.8
2005	V209	vboro	2	T	2	22.4	1589.9	1536.7	660.8	1631.6
2005	V210	vboro	2	T	3	22.4	1065.0	1011.8	435.1	1074.3
2005	V211	vboro	2	NC	0	22.4	1848.7	1795.5	772.1	1906.3
2005	V212	vboro	2	R	3	0.00	1597.5	1544.3	664.0	1639.6
2005	V213	vboro	2	R	2	22.4	1948.7	1895.5	815.1	2012.5
2005	V214	vboro	2	R	1	0.00	1716.7	1663.5	715.3	1766.2
2005	V215	vboro	2	W	1	22.4	1622.0	1568.8	674.6	1665.7
2005	V216	vboro	2	W	1	0.00	1662.1	1608.9	691.8	1708.2
2005	V217	vboro	2	W	3	22.4	1345.1	1291.9	555.5	1371.7
2005	V218	vboro	2	T	1	0.00	1282.7	1229.5	528.7	1305.4
2005	V219	vboro	2	T	3	0.00	1318.3	1265.1	544.0	1343.2
2005	V220	vboro	2	T	2	0.00	1076.0	1022.8	439.8	1085.9

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2005	V301	vboro	3	W	2	22.4	1808.2	1755.0	754.7	1863.3
2005	V302	vboro	3	W	1	0.00	1481.0	1427.8	614.0	1515.9
2005	V303	vboro	3	W	3	22.4	1658.6	1605.4	690.3	1704.5
2005	V304	vboro	3	NC	0	22.4	1552.0	1498.8	644.5	1591.3
2005	V305	vboro	3	T	1	22.4	2192.0	2138.8	919.7	2270.8
2005	V306	vboro	3	T	2	0.00	1756.7	1703.5	732.5	1808.7
2005	V307	vboro	3	T	3	22.4	1489.9	1436.7	617.8	1525.4
2005	V308	vboro	3	R	3	0.00	1635.5	1582.3	680.4	1680.0
2005	V309	vboro	3	R	1	22.4	1634.9	1581.7	680.1	1679.3
2005	V310	vboro	3	R	1	0.00	1563.4	1510.2	649.4	1603.4
2005	V311	vboro	3	W	1	22.4	1496.3	1443.1	620.5	1532.2
2005	V312	vboro	3	W	3	0.00	1508.7	1455.5	625.9	1545.4
2005	V313	vboro	3	W	2	0.00	1674.6	1621.4	697.2	1721.5
2005	V314	vboro	3	NC	0	0.00	1520.8	1467.6	631.1	1558.2
2005	V315	vboro	3	T	2	22.4	1576.4	1523.2	655.0	1617.2
2005	V316	vboro	3	T	1	0.00	1447.4	1394.2	599.5	1480.3
2005	V317	vboro	3	T	3	0.00	1429.0	1375.8	591.6	1460.7
2005	V318	vboro	3	R	2	0.00	1499.1	1445.9	621.7	1535.2
2005	V319	vboro	3	R	2	22.4	1911.0	1857.8	798.9	1972.5
2005	V320	vboro	3	R	3	22.4	1644.8	1591.6	684.4	1689.9

(*Table B10*, continued)

Year	Plot No.	Location	Replication	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Field Weight, (Lint + Bag) (g)	Net Lint Wt (Field Wt. - Bag Wt) (g)	Net Lint Wt (Net Wt X Ginout) (g)	Yield (kg ha^{-1})
2005	V401	vboro	4	R	2	22.4	1670.4	1617.2	695.4	1717.0
2005	V402	vboro	4	R	3	22.4	1772.7	1719.5	739.4	1825.7
2005	V403	vboro	4	R	2	0.00	1683.6	1630.4	701.1	1731.1
2005	V404	vboro	4	T	3	0.00	1600.4	1547.2	665.3	1642.7
2005	V405	vboro	4	T	1	22.4	1457.7	1404.5	603.9	1491.2
2005	V406	vboro	4	T	2	22.4	1662.5	1609.3	692.0	1708.7
2005	V407	vboro	4	W	1	0.00	1287.7	1234.5	530.8	1310.7
2005	V408	vboro	4	W	3	0.00	1537.2	1484.0	638.1	1575.6
2005	V409	vboro	4	W	3	22.4	1453.8	1400.6	602.3	1487.1
2005	V410	vboro	4	NC	0	22.4	1805.5	1752.3	753.5	1860.5
2005	V411	vboro	4	R	3	0.00	1759.5	1706.3	733.7	1811.6
2005	V412	vboro	4	R	1	0.00	1390.3	1337.1	575.0	1419.6
2005	V413	vboro	4	R	1	22.4	1665.1	1611.9	693.1	1711.4
2005	V414	vboro	4	T	1	0.00	1234.8	1181.6	508.1	1254.5
2005	V415	vboro	4	T	2	0.00	1585.8	1532.6	659.0	1627.2
2005	V416	vboro	4	T	3	22.4	1826.3	1773.1	762.4	1882.6
2005	V417	vboro	4	W	2	0.00	1442.7	1389.5	597.5	1475.3
2005	V418	vboro	4	W	1	22.4	1365.9	1312.7	564.5	1393.7
2005	V419	vboro	4	W	2	22.4	1738.0	1684.8	724.5	1788.8
2005	V420	vboro	4	NC	0	0.00	1270.4	1217.2	523.4	1292.3

Table B11. Cotton lint quality by soil cover treatments of no cover (NC), rye (R), triticale (T) and wheat (W) planted at seeding rates of zero (0), 129 (1), 258 (2) and 387(3) plants m^{-2}, with and without spring applied nitrogen fertilization applied from February 28- March 3 as determined by Cotton Incorporated, Cary, North Carolina.

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer ($kg\ ha^{-1}$)	Ginout (%)	Micronaire	UHM
101	ftbarn	1	2004	T	2	0.00	0.36	5.2	1.11
102	ftbarn	1	2004	T	1	22.4	0.36	5.2	1.06
103	ftbarn	1	2004	T	3	22.4	0.39	5.0	1.12
104	ftbarn	1	2004	W	3	0.00	0.38	5.4	1.16
105	ftbarn	1	2004	W	3	22.4	0.38	5.2	1.11
106	ftbarn	1	2004	W	2	0.00	0.39	4.9	1.18
107	ftbarn	1	2004	NC	0	22.4	0.39	5.1	1.09
109	ftbarn	1	2004	R	1	0.00	0.37	5.1	1.13
110	ftbarn	1	2004	R	3	22.4	0.37	5.3	1.09
111	ftbarn	1	2004	R	2	22.4	0.38	5.1	1.12
112	ftbarn	1	2004	T	3	0.00	0.38	5.1	1.12
113	ftbarn	1	2004	T	1	0.00	0.38	4.7	1.14
114	ftbarn	1	2004	T	2	22.4	0.37	5.3	1.16
115	ftbarn	1	2004	W	1	0.00	0.39	5.2	1.14
116	ftbarn	1	2004	W	2	22.4	0.39	5.2	1.11
117	ftbarn	1	2004	W	1	22.4	0.38	5.3	1.08
118	ftbarn	1	2004	NC	0	0.00	0.38	5.2	1.14
118	ftbarn	1	2004	R	3	0.00	0.38	5.1	1.16
119	ftbarn	1	2004	R	1	22.4	0.37	5.2	1.12
120	ftbarn	1	2004	R	2	0.00	0.37	5.0	1.09

(*Table B11*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Ginout (%)	Micronaire	UHM
201	ftbarn	2	2004	NC	0	0.00	0.38	5.1	1.12
202	ftbarn	2	2004	R	2	0.00	0.38	4.9	1.12
203	ftbarn	2	2004	R	1	22.4	0.38	5.1	1.16
204	ftbarn	2	2004	R	3	22.4	0.38	5.3	1.11
205	ftbarn	2	2004	W	3	0.00	0.38	50	1.15
206	ftbarn	2	2004	W	2	22.4	0.37	50	1.14
207	ftbarn	2	2004	W	2	0.00	0.39	4.9	1.16
208	ftbarn	2	2004	T	1	22.4	0.39	5.2	1.11
209	ftbarn	2	2004	T	2	22.4	0.38	5.1	1.13
210	ftbarn	2	2004	T	3	22.4	0.39	4.8	1.13
211	ftbarn	2	2004	NC	0	22.4	0.38	4.8	1.16
212	ftbarn	2	2004	R	3	0.00	0.39	5.2	1.11
213	ftbarn	2	2004	R	2	22.4	0.38	4.9	1.12
214	ftbarn	2	2004	R	1	0.00	0.38	4.4	1.13
215	ftbarn	2	2004	W	1	22.4	0.40	5.1	1.13
216	ftbarn	2	2004	W	1	0.00	0.38	4.8	1.10
217	ftbarn	2	2004	W	3	22.4	0.39	4.5	1.15
218	ftbarn	2	2004	T	1	0.00	0.38	4.8	1.15
219	ftbarn	2	2004	T	3	0.00	0.40	4.7	1.14
220	ftbarn	2	2004	T	2	0.00	0.37	4.9	1.17

(*Table B11*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Ginout (%)	Micronaire	UHM
301	ftbarn	3	2004	W	2	22.4	0.365	4.8	1.05
302	ftbarn	3	2004	W	1	0.00	0.37	5.0	1.12
303	ftbarn	3	2004	W	3	22.4	0.37	4.7	1.13
304	ftbarn	3	2004	NC	0	22.4	0.375	4.5	1.11
305	ftbarn	3	2004	T	1	22.4	0.37	4.4	1.08
306	ftbarn	3	2004	T	2	0.00	0.38	4.7	1.13
307	ftbarn	3	2004	T	3	22.4	0.36	5.0	1.10
308	ftbarn	3	2004	R	3	0.00	0.385	4.7	1.09
309	ftbarn	3	2004	R	1	22.4	0.385	5.0	1.13
310	ftbarn	3	2004	R	1	0.00	0.365	5.0	1.14
311	ftbarn	3	2004	W	1	22.4	0.365	4.6	1.15
312	ftbarn	3	2004	W	3	0.00	0.37	4.7	1.11
313	ftbarn	3	2004	W	2	0.00	0.38	4.6	1.13
314	ftbarn	3	2004	NC	0	0.00	0.375	4.8	1.13
315	ftbarn	3	2004	T	2	22.4	0.375	4.5	1.13
316	ftbarn	3	2004	T	1	0.00	0.375	4.9	1.14
317	ftbarn	3	2004	T	3	0.00	0.37	4.8	1.14
318	ftbarn	3	2004	R	2	0.00	0.38	5.2	1.09
319	ftbarn	3	2004	R	2	22.4	0.375	4.8	1.13
320	ftbarn	3	2004	R	3	22.4	0.375	4.5	1.12

(*Table B11*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Ginout (%)	Micronaire	UHM
401	ftbarn	4	2004	R	2	22.4	0.28	4.4	1.06
402	ftbarn	4	2004	R	3	22.4	0.38	4.7	1.11
403	ftbarn	4	2004	R	2	0.00	0.37	4.8	1.14
404	ftbarn	4	2004	T	3	0.00	0.37	4.8	1.10
405	ftbarn	4	2004	T	1	22.4	0.38	4.7	1.1
406	ftbarn	4	2004	T	2	22.4	0.38	4.7	1.12
407	ftbarn	4	2004	W	1	0.00	0.38	5.1	1.09
408	ftbarn	4	2004	W	3	0.00	0.39	5.1	1.11
409	ftbarn	4	2004	W	3	22.4	0.38	4.4	1.11
410	ftbarn	4	2004	NC	0	22.4	0.36	4.9	1.14
411	ftbarn	4	2004	R	3	0.00	0.39	4.9	1.11
412	ftbarn	4	2004	R	1	0.00	0.37	4.9	1.11
413	ftbarn	4	2004	R	1	22.4	0.37	*	*
414	ftbarn	4	2004	T	1	0.00	0.37	4.9	1.12
415	ftbarn	4	2004	T	2	0.00	0.38	4.8	1.11
416	ftbarn	4	2004	T	3	22.4	0.38	4.6	1.12
417	ftbarn	4	2004	W	2	0.00	0.40	4.8	1.13
418	ftbarn	4	2004	W	1	22.4	0.38	4.7	1.11
419	ftbarn	4	2004	W	2	22.4	0.37	4.7	1.12
420	ftbarn	4	2004	NC	0	0.00	0.36	4.9	1.12

(*Table B11*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Ginout (%)	Micronaire	UHM
101	vboro	1	2004	T	2	0.00	0.39	4.4	1.18
102	vboro	1	2004	T	1	22.4	0.39	4.4	1.16
103	vboro	1	2004	T	3	22.4	0.38	4.2	1.14
104	vboro	1	2004	W	3	0.00	0.39	4.2	1.15
105	vboro	1	2004	W	3	22.4	0.39	4.8	1.14
106	vboro	1	2004	W	2	0.00	0.40	4.5	1.19
107	vboro	1	2004	NC	0	22.4	0.39	4.6	1.18
108	vboro	1	2004	R	1	0.00	0.40	4.7	1.11
109	vboro	1	2004	R	3	22.4	0.40	4.3	1.20
110	vboro	1	2004	R	2	22.4	0.40	4.4	1.15
111	vboro	1	2004	T	3	0.00	0.39	4.6	1.19
112	vboro	1	2004	T	1	0.00	0.40	4.2	1.15
113	vboro	1	2004	T	2	22.4	0.38	4.6	1.15
114	vboro	1	2004	W	1	0.00	0.40	4.3	1.15
115	vboro	1	2004	W	2	22.4	0.39	4.5	1.14
116	vboro	1	2004	W	1	22.4	0.40	4.3	1.12
117	vboro	1	2004	NC	0	0.00	0.39	4.1	1.17
118	vboro	1	2004	R	3	0.00	0.41	4.4	1.12
119	vboro	1	2004	R	1	22.4	0.41	4.5	1.10
120	vboro	1	2004	R	2	0.00	0.42	4.6	1.12

(*Table B11*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Ginout (%)	Micronaire	UHM
201	vboro	2	2004	NC	0	0.00	0.39	4.8	1.16
202	vboro	2	2004	R	2	0.00	0.39	4.3	1.20
203	vboro	2	2004	R	1	22.4	0.39	3.9	1.18
204	vboro	2	2004	R	3	22.4	0.39	4.8	1.15
205	vboro	2	2004	W	3	0.00	0.40	4.6	1.14
206	vboro	2	2004	W	2	22.4	0.41	4.4	1.08
207	vboro	2	2004	W	2	0.00	0.40	4.5	1.12
208	vboro	2	2004	T	1	22.4	0.39	4.4	1.19
209	vboro	2	2004	T	2	22.4	0.40	4.4	1.11
210	vboro	2	2004	T	3	22.4	0.40	4.4	1.10
211	vboro	2	2004	NC	0	22.4	0.38	4.7	1.14
212	vboro	2	2004	R	3	0.00	0.39	4.7	1.14
213	vboro	2	2004	R	2	22.4	0.39	4.6	1.11
214	vboro	2	2004	R	1	0.00	0.38	5.0	1.11
215	vboro	2	2004	W	1	22.4	0.38	4.5	1.15
216	vboro	2	2004	W	1	0.00	0.40	4.5	1.14
217	vboro	2	2004	W	3	22.4	0.39	4.6	1.12
218	vboro	2	2004	T	1	0.00	0.40	4.6	1.14
219	vboro	2	2004	T	3	0.00	0.40	4.1	1.14
220	vboro	2	2004	T	2	0.00	0.39	4.6	1.13

(*Table B11*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Ginout (%)	Micronaire	UHM
301	vboro	3	2004	W	2	22.4	0.45	5.6	1.16
302	vboro	3	2004	W	1	0.00	0.41	5.1	1.08
303	vboro	3	2004	W	3	22.4	0.39	4.1	1.18
304	vboro	3	2004	NC	0	22.4	0.39	5.1	1.14
305	vboro	3	2004	T	1	22.4	0.40	4.4	1.11
306	vboro	3	2004	T	2	0.00	0.39	4.8	1.13
307	vboro	3	2004	T	3	22.4	0.40	4.7	1.15
308	vboro	3	2004	R	3	0.00	0.41	4.9	1.11
309	vboro	3	2004	R	1	22.4	0.40	4.6	1.12
310	vboro	3	2004	R	1	0.00	0.40	4.7	1.11
311	vboro	3	2004	W	1	22.4	0.40	4.5	1.17
312	vboro	3	2004	W	3	0.00	0.41	4.7	1.08
313	vboro	3	2004	W	2	0.00	0.41	4.5	1.12
314	vboro	3	2004	NC	0	0.00	0.41	4.5	1.18
315	vboro	3	2004	T	2	22.4	0.39	4.6	1.11
316	vboro	3	2004	T	1	0.00	0.40	4.7	1.13
317	vboro	3	2004	T	3	0.00	0.39	4.5	1.12
318	vboro	3	2004	R	2	0.00	0.42	5.2	1.11
319	vboro	3	2004	R	2	22.4	0.42	4.5	1.15
320	vboro	3	2004	R	3	22.4	0.40	4.5	1.13

(*Table B11*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Ginout (%)	Micronaire	UHM
401	vboro	4	2004	R	2	22.4	0.40	4.5	1.13
402	vboro	4	2004	R	3	22.4	0.40	4.4	1.12
403	vboro	4	2004	R	2	0.00	0.41	4.9	1.13
404	vboro	4	2004	T	3	0.00	0.43	4.6	1.13
405	vboro	4	2004	T	1	22.4	0.41	4.7	1.13
405	vboro	4	2004	T	2	22.4	0.41	4.7	1.13
406	vboro	4	2004	W	1	0.00	0.40	4.5	1.13
407	vboro	4	2004	W	3	0.00	0.39	4.9	1.07
408	vboro	4	2004	W	3	22.4	0.40	4.8	1.14
409	vboro	4	2004	NC	0	22.4	0.40	5.2	1.11
410	vboro	4	2004	R	3	0.00	0.39	5.2	1.13
411	vboro	4	2004	R	1	0.00	0.41	4.4	1.12
412	vboro	4	2004	R	1	22.4	0.41	5.1	1.11
413	vboro	4	2004	T	1	0.00	0.40	5.0	1.15
414	vboro	4	2004	T	2	0.00	0.41	4.9	1.13
415	vboro	4	2004	T	3	22.4	0.38	5.4	1.11
416	vboro	4	2004	W	2	0.00	0.39	4.7	1.14
417	vboro	4	2004	W	1	22.4	0.39	4.9	1.13
418	vboro	4	2004	W	2	22.4	0.40	4.9	1.15
419	vboro	4	2004	NC	0	0.00	0.40	5.1	1.11
420	vboro	4	2004	NC	0	22.4	0.41	5.6	1.11

Table B12. Cotton aphid leaf population data as estimated from the most recently expanded, fully mature leaves of no cover (NC), rye (R), triticale (T) and wheat (W) cover treatments planted at zero (0), 129 (1), 258 (2) and 387 (3) plants m^{-2} with and without spring applied nitrogen applied from February 28-March 3.

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
H101	ftbarn	1	1	T	2	0.00	40	30	10	10	20
H102	ftbarn	1	1	T	1	22.4	50	100	50	100	20
H103	ftbarn	1	1	T	3	22.4	20	20	100	50	30
H104	ftbarn	1	1	W	3	0.00	30	20	30	50	50
H105	ftbarn	1	1	W	3	22.4	20	10	10	20	10
H106	ftbarn	1	1	W	2	0.00	200	75	50	100	30
H107	ftbarn	1	1	NC	0	22.4	50	30	30	40	20
H108	ftbarn	1	1	R	1	0.00	10	20	20	20	20
H109	ftbarn	1	1	R	3	22.4	50	10	10	20	30
H110	ftbarn	1	1	R	2	22.4	100	50	30	100	20
H111	ftbarn	1	1	T	3	0.00	100	150	100	20	40
H112	ftbarn	1	1	T	1	0.00	300	50	100	70	50
H113	ftbarn	1	1	T	2	22.4	200	100	50	300	70
H114	ftbarn	1	1	W	1	0.00	10	30	20	20	50
H115	ftbarn	1	1	W	2	22.4	300	500	100	80	150
H116	ftbarn	1	1	W	1	22.4	200	30	100	300	50
H117	ftbarn	1	1	NC	0	0.00	20	20	30	50	10
H118	ftbarn	1	1	R	3	0.00	50	30	20	20	30
H119	ftbarn	1	1	R	1	22.4	300	100	20	100	100
H120	ftbarn	1	1	R	2	0.00	30	150	70	20	50

(*Table B12*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
H201	ftbarn	1	1	NC	0	0.00	100	70	50	100	30
H202	ftbarn	2	1	R	2	0.00	50	30	20	20	50
H203	ftbarn	2	1	R	1	22.4	50	20	100	10	70
H204	ftbarn	2	1	R	3	22.4	100	60	30	10	50
H205	ftbarn	2	1	W	3	0.00	30	10	200	70	20
H316	ftbarn	3	1	T	1	0.00	70	10	100	50	70
H317	ftbarn	3	1	T	3	0.00	300	100	200	200	100
H318	ftbarn	3	1	R	2	0.00	100	100	60	200	70
H319	ftbarn	3	1	R	2	22.4	70	300	200	200	100
H320	ftbarn	3	1	R	3	22.4	300	300	100	200	200
H401	ftbarn	4	1	R	2	22.4	200	300	200	300	100
H402	ftbarn	4	1	R	3	22.4	200	50	100	30	200
H403	ftbarn	4	1	R	2	0.00	100	70	200	20	50
H404	ftbarn	4	1	T	3	0.00	30	50	50	200	50
H405	ftbarn	4	1	T	1	22.4	50	200	100	70	30
H406	ftbarn	4	1	T	2	22.4	100	200	200	50	70
H407	ftbarn	4	1	W	1	0.00	50	70	30	80	100
H408	ftbarn	4	1	W	3	0.00	200	20	100	100	200
H409	ftbarn	4	1	W	3	22.4	200	200	200	200	200
H410	ftbarn	4	1	NC	0	22.4	200	200	200	200	200
H411	ftbarn	4	1	R	3	0.00	50	100	30	200	50
H412	ftbarn	4	1	R	1	0.00	100	50	30	80	50
H413	ftbarn	4	1	R	1	0.00	20	50	50	50	100

(*Table B12*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
H414	ftbarn	4	1	T	1	0.00	100	60	20	100	80
H415	ftbarn	4	1	T	2	0.00	90	300	200	100	200
H416	ftbarn	4	1	T	3	22.4	70	30	50	100	70
H417	ftbarn	4	1	W	2	0.00	200	50	70	100	200
H418	ftbarn	4	1	W	1	22.4	70	100	50	50	50
H419	ftbarn	4	1	W	2	22.4	100	300	70	80	100
H420	ftbarn	4	1	NC	0	22.4	100	300	100	200	80
V101	vboro	1	1	T	2	0.00	100	70	60	70	90
V102	vboro	1	1	T	1	22.4	150	90	50	50	20
V103	vboro	1	1	T	3	22.4	200	70	70	60	10
V104	vboro	1	1	W	3	0.00	140	90	100	100	120
V105	vboro	1	1	W	3	22.4	90	25	45	300	100
V106	vboro	1	1	W	2	0.00	70	30	120	60	20
V107	vboro	1	1	NC	0	22.4	130	100	100	30	70
V108	vboro	1	1	R	1	0.00	75	90	40	10	20
V109	vboro	1	1	R	3	22.4	140	100	200	70	100
V110	vboro	1	1	R	2	22.4	70	50	70	150	100
V111	vboro	1	1	T	3	0.00	70	20	40	70	10
V112	vboro	1	1	T	1	0.00	100	50	200	80	200
V113	vboro	1	1	T	2	22.4	10	0	40	20	10
V114	vboro	1	1	W	1	0.00	300	0	40	40	10
V115	vboro	1	1	W	2	22.4	200	40	30	50	70
V116	vboro	1	1	W	1	22.4	40	60	20	20	40

(*Table B12*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
V117	vboro	1	1	NC	0	0.00	170	300	100	150	200
V118	vboro	1	1	R	3	0.00	90	120	40	120	30
V119	vboro	1	1	R	1	22.4	20	150	100	70	30
V120	vboro	1	1	R	2	0.00	10	30	50	100	100
V201	vboro	1	1	NC	0	0.00	60	80	50	20	200
V202	vboro	2	1	R	2	0.00	40	150	10	30	20
V203	vboro	2	1	R	1	22.4	300	60	100	10	30
V204	vboro	2	1	R	3	22.4	70	40	70	50	40
V205	vboro	2	1	W	3	0.00	300	200	70	100	100
V206	vboro	2	1	W	2	22.4	60	70	100	50	200
V207	vboro	2	1	W	2	0.00	60	150	100	30	100
V208	vboro	2	1	T	1	22.4	300	100	60	100	75
V209	vboro	2	1	T	2	22.4	200	70	10	20	100
V210	vboro	2	1	T	3	22.4	100	75	50	10	70
V211	vboro	2	1	NC	0	22.4	30	200	150	80	100
V212	vboro	2	1	R	3	0.00	40	10	140	200	100
V213	vboro	2	1	R	2	22.4	200	80	150	40	90
V214	vboro	2	1	R	1	0.00	60	80	170	80	80
V215	vboro	2	1	W	1	22.4	40	80	10	100	50
V216	vboro	2	1	W	1	0.00	80	80	30	100	300
V217	vboro	2	1	W	3	22.4	150	80	50	10	100
V218	vboro	2	1	T	1	0.00	300	40	100	100	70
V219	vboro	2	1	T	3	0.00	10	0	20	10	10

(*Table B12*, continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
V220	vboro	2	1	T	2	0.00	80	80	30	60	100
V301	vboro	3	1	W	2	22.4	20	30	80	10	40
V302	vboro	3	1	W	1	0.00	20	70	40	50	10
V303	vboro	3	1	W	3	22.4	100	30	100	10	80
V304	vboro	3	1	NC	0	22.4	30	60	10	20	30
V305	vboro	3	1	T	1	22.4	80	50	50	10	70
V306	vboro	3	1	T	2	0.00	10	140	30	10	100
V307	vboro	3	1	T	3	22.4	200	200	80	80	100
V308	vboro	3	1	R	3	0.00	20	20	20	10	30
V309	vboro	3	1	R	1	22.4	130	100	50	80	130
V310	vboro	3	1	R	1	0.00	100	60	80	10	80
V311	vboro	3	1	W	1	22.4	50	30	10	50	20
V312	vboro	3	1	W	3	0.00	100	100	60	60	60
V313	vboro	3	1	W	2	0.00	10	10	10	50	30
V314	vboro	3	1	NC	0	0.00	60	20	20	10	0
V315	vboro	3	1	T	2	22.4	150	0	50	100	30
V316	vboro	3	1	T	1	0.00	10	60	0	10	50
V317	vboro	3	1	T	3	0.00	10	20	20	150	90
V318	vboro	3	1	R	2	0.00	40	90	130	80	50
V319	vboro	3	1	R	2	22.4	30	70	50	150	100
V320	vboro	3	1	R	3	22.4	90	70	60	150	70
V401	vboro	4	1	R	2	22.4	10	50	20	20	20
V402	vboro	4	1	R	3	22.4	20	20	10	0	10
V403	vboro	4	1	R	2	0.00	30	30	50	20	10

(*Table B12,* continued)

Plot	Location	Replication	Year	Cover	Seed Rate	Fertilizer (kg ha^{-1})	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
V404	vboro	4	1	T	3	0.00	10	0	50	30	70
V405	vboro	4	1	T	1	22.4	40	30	80	100	40
V406	vboro	4	1	T	2	22.4	100	60	40	120	60
V407	vboro	4	1	W	1	0.00	100	140	100	100	150
V408	vboro	4	1	W	3	0.00	100	100	100	100	200
V409	vboro	4	1	W	3	22.4	50	300	140	160	70
V410	vboro	4	1	NC	0	22.4	30	70	150	300	70
V411	vboro	4	1	R	3	0.00	150	100	60	100	150
V412	vboro	4	1	R	1	0.00	100	150	40	70	100
V413	vboro	4	1	R	1	0.00	40	200	100	70	40
V414	vboro	4	1	T	1	0.00	10	30	70	20	30
V415	vboro	4	1	T	2	0.00	50	50	80	40	140
V416	vboro	4	1	T	3	22.4	70	30	120	40	100
V417	vboro	4	1	W	2	0.00	30	70	90	140	100
V418	vboro	4	1	W	1	22.4	60	20	50	10	70
V419	vboro	4	1	W	2	22.4	120	70	150	100	300
V420	vboro	4	1	NC	0	0.00	50	20	70	70	100

Table B13 . Soil bulk density of randomly selected, untrafficed sites from 0-7.5 and 7.5-15 cm soil depths within each plot taken from September 12-16, 2005.

Location	Cover	Plot No	Sample ID	Depth (cm)	Cylinder volume (cm^3)	Weight of Cylinder (g)	Weight of Tin (g)	Dry Weight (Cylinder + tin) (g)	Soil Dry Weight (g)	Db (g/cc)	Porosity (%)
ftbarn	T	101	HO5-101S	0.0-7.5	347.5	166.50	8.34	759.99	585.15	1.68	0.365
ftbarn	T	101	HO5-101D	7.5-15	347.5	166.40	8.27	784.96	610.29	1.76	0.337
ftbarn	W	106	H05-106S	0.0-7.5	347.5	166.30	8.08	765.23	590.85	1.70	0.358
ftbarn	W	106	H05-106D	7.5-15	347.5	166.50	8.11	811.42	636.81	1.83	0.308
ftbarn	NC	117	H05-117S	0.0-7.5	347.5	166.40	8.10	753.76	579.26	1.67	0.371
ftbarn	NC	117	H05-117D	7.5-15	347.5	166.40	8.25	793.82	619.17	1.78	0.328
ftbarn	R	120	HO5120S	0.0-7.5	347.5	166.32	8.32	759.62	584.98	1.68	0.365
ftbarn	R	120	H05-120D	7.5-15	347.5	166.31	8.15	775.01	600.55	1.73	0.348
ftbarn	NC	201	H05-201S	0.0-7.5	347.5	166.34	8.17	749.43	574.92	1.65	0.376
ftbarn	NC	201	H05-201D	7.5-15	347.5	166.38	8.17	820.16	645.61	1.86	0.299
ftbarn	R	202	H05-202S	0.0-7.5	347.5	163.2	8.27	771.99	600.52	1.73	0.348
ftbarn	R	202	H05-202D	7.5-15	347.5	166.47	8.22	786.01	611.32	1.76	0.336
ftbarn	W	207	H05-207S	0.0-7.5	347.5	166.42	8.08	748.64	574.14	1.65	0.377
ftbarn	W	207	H05-2O7D	7.5-15	347.5	162.02	8.12	801.83	631.69	1.82	0.314
ftbarn	T	220	H05-220S	0.0-7.5	347.5	166.39	8.09	763.65	589.17	1.70	0.360
ftbarn	T	220	H05-220D	7.5-15	347.5	161.99	8.20	768.07	597.88	1.72	0.351

(*Table B13*, continued)

Location	Cover	Plot No	Sample ID	Depth (cm)	Cylinder volume (cm^3)	Weight of Cylinder (g)	Weight of Tin (g)	Dry Weight (Cylinder + tin) (g)	Soil Dry Weight (g)	Db (g/cc)	Porosity (%)
ftbarn	T	306	H05-306S	0.0-7.5	347.5	166.46	8.22	753.89	579.21	1.67	0.371
ftbarn	T	306	H05-306D	7.5-15	347.5	162.05	8.14	783.81	613.62	1.77	0.334
ftbarn	W	313	H05-313S	0.0-7.5	347.5	162.05	8.12	748.45	578.28	1.66	0.372
ftbarn	W	313	H05-313D	7.5-15	347.5	162.07	8.13	790.17	619.97	1.78	0.327
ftbarn	NC	314	H05-314S	0.0-7.5	347.5	166.26	8.21	745.49	571.02	1.64	0.380
ftbarn	NC	314	H05-314D	7.5-15	347.5	166.33	8.23	778.62	604.06	1.74	0.344
ftbarn	R	318	H05-318S	0.0-7.5	347.5	166.4	8.11	768.19	593.68	1.71	0.355
ftbarn	R	318	H05-318D	7.5-15	347.5	166.8	8.10	807.73	632.83	1.82	0.313
ftbarn	R	403	H05-403S	0.0-7.5	347.5	161.92	8.16	748.87	578.79	1.67	0.371
ftbarn	R	403	H05-403D	7.5-15	347.5	161.95	8.10	786.04	615.99	1.77	0.331
ftbarn	T	415	H05-415S	0.0-7.5	347.5	161.98	8.08	737.2	567.14	1.63	0.384
ftbarn	T	415	H05-415D	7.5-15	347.5	166.07	8.12	790.42	616.23	1.77	0.331
ftbarn	W	417	H05-417S	0.0-7.5	347.5	162.06	8.12	736.52	566.34	1.63	0.385
ftbarn	W	417	H05-417D	7.5-15	347.5	162.01	8.34	748.18	577.83	1.66	0.373

(*Table B13*, continued)

Location	Cover	Plot No	Sample ID	Depth (cm)	Cylinder volume (cm^3)	Weight of Cylinder (g)	Weight of Tin (g)	Dry Weight (Cylinder + tin) (g)	Soil Dry Weight (g)	Db (g/cc)	Porosity (%)
ftbarn	NC	420	H05-420S	0.0-7.5	347.5	162	8.26	755.35	585.09	1.68	0.365
ftbarn	NC	420	H05-420D	7.5-15	347.5	161.85	8.08	832.51	662.58	1.91	0.280
vboro	T	101	VO5-101S	0.0-7.5	347.5	162.01	8.12	730.78	560.65	1.61	0.391
vboro	T	101	VO5-101D	7.5-15	347.5	162.08	8.10	756.85	586.67	1.69	0.363
vboro	W	106	V05-106S	0.0-7.5	347.5	166.5	8.23	727.87	553.14	1.59	0.399
vboro	W	106	V05-106D	7.5-15	347.5	166.34	8.31	766.23	591.58	1.70	0.358
vboro	NC	117	V05-117S	0.0-7.5	347.5	166.5	8.16	752.38	577.72	1.66	0.373
vboro	NC	117	V05-117D	7.5-15	347.5	161.99	8.17	793.74	623.58	1.79	0.323
vboro	R	120	VO5120S	0.0-7.5	347.5	166.44	8.17	709.31	534.70	1.54	0.419
vboro	R	120	V05-120D	7.5-15	347.5	166.01	8.26	749.15	574.88	1.65	0.376
vboro	NC	201	V05-201S	0.0-7.5	347.5	162.05	8.21	692.31	522.05	1.50	0.433
vboro	NC	201	V05-201D	7.5-15	347.5	166.46	8.08	757.15	582.61	1.68	0.367
vboro	R	202	V05-202S	0.0-7.5	347.5	162.01	8.11	752.07	581.95	1.67	0.368
vboro	R	202	V05-202D	7.5-15	347.5	162.05	8.10	781.6	611.45	1.76	0.336

(*Table B13*, continued)

Location	Cover	Plot No	Sample ID	Depth (cm)	Cylinder volume (cm^3)	Weight of Cylinder (g)	Weight of Tin (g)	Dry Weight (Cylinder + tin) (g)	Soil Dry Weight (g)	Db (g/cc)	Porosity (%)
vboro	W	207	V05-207S	0.0-7.5	347.5	161.98	8.19	789.78	619.61	1.78	0.327
vboro	W	207	V05-2O7D	7.5-15	347.5	161.97	8.21	789.74	619.56	1.78	0.327
vboro	T	220	V05-220S	0.0-7.5	347.5	162.02	8.13	704.12	533.97	1.54	0.420
vboro	T	220	V05-220D	7.5-15	347.5	166.1	8.12	763.53	589.31	1.70	0.360
vboro	T	306	V05-306S	0.0-7.5	347.5	166.19	8.13	759.26	584.94	1.68	0.365
vboro	T	306	V05-306D	7.5-15	347.5	162	8.21	785.34	615.13	1.77	0.332
vboro	W	313	V05-313S	0.0-7.5	347.5	162.03	8.22	745.47	575.22	1.66	0.375
vboro	W	313	V05-313D	7.5-15	347.5	162.11	8.11	756.81	586.59	1.69	0.363
vboro	NC	314	V05-314S	0.0-7.5	347.5	162.01	8.09	738	567.90	1.63	0.383
vboro	NC	314	V05-314D	7.5-15	347.5	161.89	8.17	768.73	598.67	1.72	0.350
vboro	R	318	V05-318S	0.0-7.5	347.5	161.93	8.10	679.02	508.99	1.46	0.447
vboro	R	318	V05-318D	7.5-15	347.5	162.05	8.08	786.5	616.37	1.77	0.331
vboro	R	403	V05-403S	0.0-7.5	347.5	162.05	8.11	680.35	510.19	1.47	0.446
vboro	R	403	V05-403D	7.5-15	347.5	161.96	8.13	773.7	603.61	1.74	0.345

(*Table B13*, continued)

Location	Cover	Plot No	Sample ID	Depth (cm)	Cylinder volume (cm^3)	Weight of Cylinder (g)	Weight of Tin (g)	Dry Weight (Cylinder + tin) (g)	Soil Dry Weight (g)	Db (g/cc)	Porosity (%)
vboro	T	415	V05-415S	0.0-7.5	347.5	166.01	8.17	755.33	581.15	1.67	0.369
vboro	T	415	V05-415D	7.5-15	347.5	166.42	8.22	795.57	620.93	1.79	0.326
vboro	W	417	V05-417S	0-7.5	347.5	162.06	8.09	732.93	562.78	1.62	0.389
vboro	W	417	V05-417D	7.5-15	347.5	162.14	8.12	821.08	650.82	1.87	0.293
vboro	NC	420	V05-420S	0-7.5	347.5	166.52	8.20	734.23	559.51	1.61	0.392
vboro	NC	420	V05-420D	7.5-15	347.5	166.32	8.22	783.85	609.31	1.75	0.338

Table B14. Climatic Data from State Climate Office of North Carolina (NC CRONOS Database) for the Cunningham Research Station, Kinston, North Carolina.

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
11/1/2003	81.5	47.6	0.00	27.5	8.70	0.00
11/2/2003	79.0	50.0	0.00	26.1	10.0	0.00
11/3/2003	80.3	53.0	0.00	26.8	11.7	0.00
11/4/2003	82.8	67.2	0.00	28.2	19.6	0.00
11/5/2003	84.2	65.8	0.01	29.0	18.8	0.03
11/6/2003	81.5	69.8	0.40	27.5	21.0	1.02
11/7/2003	71.1	60.1	0.01	21.7	15.6	0.03
11/8/2003	60.6	49.6	0.00	15.9	9.80	0.00
11/9/2003	54.2	42.1	0.00	12.3	5.60	0.00
11/10/2003	61.9	39.8	0.00	16.6	4.30	0.00
11/11/2003	70.9	43.7	0.00	21.6	6.50	0.00
11/12/2003	79.1	58.1	0.00	26.2	14.5	0.00
11/13/2003	68.7	42.3	0.00	20.4	5.70	0.00
11/14/2003	53.7	35.7	0.00	12.1	2.10	0.00
11/15/2003	61.1	41.2	0.00	16.2	5.10	0.00
11/16/2003	71.0	49.0	0.00	21.7	9.40	0.00
11/17/2003	75.3	57.8	0.00	24.1	14.3	0.00
11/18/2003	74.1	54.6	0.00	23.4	12.6	0.00
11/19/2003	74.4	55.9	0.86	23.6	13.3	2.18
11/20/2003	63.3	43.4	0.00	17.4	6.30	0.00
11/21/2003	74.7	40.8	0.00	23.7	4.90	0.00
11/22/2003	77.0	44.4	0.00	25.0	6.90	0.00
11/23/2003	73.2	42.2	0.00	22.9	5.70	0.00
11/24/2003	75.1	45.6	0.00	23.9	7.60	0.00
11/25/2003	54.8	41.5	0.00	12.7	5.30	0.00
11/26/2003	60.2	42.2	0.00	15.7	5.70	0.00
11/27/2003	62.0	39.7	0.00	16.7	4.30	0.00
11/28/2003	76.1	46.1	0.06	24.5	7.80	0.15
11/29/2003	48.2	35.6	0.00	9.0	2.00	0.00
11/30/2003	60.6	30.7	0.00	15.9	-0.70	0.00
12/1/2003	65.8	40.6	0.00	18.8	4.80	0.00
12/2/2003	50.8	29.3	0.00	10.4	-1.50	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
12/3/2003	40.9	28.5	0.00	4.90	-1.9	0.00
12/4/2003	47.6	34.7	0.64	8.70	1.5	1.63
12/5/2003	48.0	39.7	0.02	8.90	4.3	0.05
12/6/2003	43.8	33.3	0.01	6.60	0.7	0.03
12/7/2003	46.3	30.0	0.00	7.90	-1.1	0.00
12/8/2003	50.8	26.5	0.00	10.4	-3.1	0.00
12/9/2003	58.9	27.9	0.00	14.9	-2.3	0.00
12/10/2003	71.2	40.3	1.33	21.8	4.6	3.38
12/11/2003	56.1	41.5	0.00	13.4	5.3	0.00
12/12/2003	51.2	31.7	0.00	10.7	-0.2	0.00
12/13/2003	46.1	31.8	0.00	7.80	-0.1	0.00
12/14/2003	43.6	36.4	1.58	6.40	2.4	4.01
12/15/2003	53.0	33.7	0.00	11.7	0.9	0.00
12/16/2003	60.9	31.1	0.00	16.1	-0.5	0.00
12/17/2003	63.9	35.3	0.04	17.7	1.8	0.10
12/18/2003	48.3	31.2	0.00	9.10	-0.4	0.00
12/19/2003	42.2	30.6	0.00	5.70	-0.8	0.00
12/20/2003	41.9	30.4	0.00	5.50	-0.9	0.00
12/21/2003	45.7	24.4	0.00	7.60	-4.2	0.00
12/22/2003	58.7	33.2	0.00	14.8	0.7	0.00
12/23/2003	67.6	34.7	0.08	19.8	1.5	0.20
12/24/2003	64.8	46.4	0.32	18.2	8.0	0.81
12/25/2003	46.3	31.4	0.00	7.90	-0.3	0.00
12/26/2003	50.3	28.9	0.00	10.2	-1.7	0.00
12/27/2003	58.0	28.8	0.00	14.4	-1.8	0.00
12/28/2003	58.8	27.9	0.00	14.9	-2.3	0.00
12/29/2003	61.6	34.0	0.00	16.4	1.1	0.00
12/30/2003	63.0	34.4	0.00	17.2	1.3	0.00
12/31/2003	59.5	30.4	0.00	15.3	-0.9	0.00
1/1/2004	62.2	33.8	0.00	16.8	1.0	0.00
1/2/2004	66.4	39.1	0.00	19.1	3.9	0.00
1/3/2004	71.9	48.3	0.00	22.2	9.1	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
1/4/2004	75.0	59.9	0.00	23.9	15.5	0.00
1/5/2004	76.6	63.7	0.12	24.8	17.6	0.30
1/6/2004	63.2	34.1	0.00	17.3	1.2	0.00
1/7/2004	37.6	24.2	0.00	3.10	-4.3	0.00
1/8/2004	39.9	24.3	0.00	4.40	-4.3	0.00
1/9/2004	36.0	31.0	0.04	2.20	-0.6	0.10
1/10/2004	31.5	19.0	0.00	-0.30	-7.2	0.00
1/11/2004	32.8	14.4	0.02	0.40	-9.8	0.05
1/12/2004	56.9	28.7	0.02	13.8	-1.8	0.05
1/13/2004	60.4	31.1	0.00	15.8	-0.5	0.00
1/14/2004	49.5	30.5	0.00	9.70	-0.8	0.00
1/15/2004	51.3	35.1	0.00	10.7	1.7	0.00
1/16/2004	42.4	26.7	0.00	5.80	-2.9	0.00
1/17/2004	50.3	23.7	0.00	10.2	-4.6	0.00
1/18/2004	65.4	39.8	0.15	18.6	4.3	0.38
1/19/2004	50.2	30.0	0.00	10.1	-1.1	0.00
1/20/2004	37.2	23.0	0.00	2.90	-5.0	0.00
1/21/2004	40.7	21.8	0.00	4.80	-5.7	0.00
1/22/2004	54.2	25.6	0.00	12.3	-3.6	0.00
1/23/2004	41.9	30.6	0.00	5.50	-0.8	0.00
1/24/2004	60.1	30.0	0.00	15.6	-1.1	0.00
1/25/2004	30.5	23.6	0.00	-0.80	-4.7	0.00
1/26/2004	30.0	24.1	0.00	-1.10	-4.4	0.00
1/27/2004	33.7	28.8	0.27	0.90	-1.8	0.69
1/28/2004	37.9	26.7	0.14	3.30	-2.9	0.36
1/29/2004	51.6	27.5	0.15	10.9	-2.5	0.38
1/30/2004	52.9	32.7	0.00	11.6	0.4	0.00
1/31/2004	37.4	24.0	0.00	3.00	-4.4	0.00
2/1/2004	39.9	22.8	0.00	4.40	-5.1	0.00
2/2/2004	53.3	25.5	0.00	11.8	-3.6	0.00
2/3/2004	54.0	38.3	0.19	12.2	3.5	0.48
2/4/2004	52.3	31.9	0.00	11.3	-0.1	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
2/5/2004	53.0	30.0	0.00	11.7	-1.10	0.00
2/6/2004	72.8	40.5	0.12	22.7	4.70	0.30
2/7/2004	67.9	37.9	0.00	19.9	3.30	0.00
2/8/2004	44.6	29.2	0.00	7.00	-1.60	0.00
2/9/2004	51.0	26.2	0.00	10.6	-3.20	0.00
2/10/2004	53.3	41.2	0.00	11.8	5.10	0.00
2/11/2004	54.4	43.2	0.00	12.4	6.20	0.00
2/12/2004	45.0	34.6	0.71	7.20	1.40	1.80
2/13/2004	56.6	34.1	0.00	13.7	1.20	0.00
2/14/2004	48.3	43.1	0.42	9.10	6.20	1.07
2/15/2004	50.0	32.0	0.40	10.0	0.00	1.02
2/16/2004	37.6	28.1	0.00	3.10	-2.20	0.00
2/17/2004	36.9	28.6	0.23	2.70	-1.90	0.58
2/18/2004	49.0	31.8	0.00	9.40	-0.10	0.00
2/19/2004	62.8	30.4	0.00	17.1	-0.90	0.00
2/20/2004	67.0	36.6	0.00	19.4	2.60	0.00
2/21/2004	68.4	47.4	0.00	20.2	8.60	0.00
2/22/2004	57.3	31.5	0.00	14.1	-0.30	0.00
2/23/2004	53.0	32.7	0.00	11.7	0.40	0.00
2/24/2004	50.3	41.0	0.48	10.2	5.00	1.22
2/25/2004	48.7	36.0	0.00	9.30	2.20	0.00
2/26/2004	37.6	32.0	0.53	3.10	0.00	1.35
2/27/2004	42.9	32.4	0.65	6.10	0.20	1.65
2/28/2004	55.4	31.8	0.00	13.0	-0.10	0.00
2/29/2004	64.8	27.8	0.00	18.2	-2.30	0.00
3/1/2004	71.0	36.0	0.00	21.7	2.20	0.00
3/2/2004	77.2	58.4	0.00	25.1	14.7	0.00
3/3/2004	76.5	51.5	0.00	24.7	10.8	0.00
3/4/2004	78.7	56.8	0.00	25.9	13.8	0.00
3/5/2004	79.4	61.6	0.00	26.3	16.4	0.00
3/6/2004	77.4	61.3	0.01	25.2	16.3	0.03
3/7/2004	71.2	45.2	0.00	21.8	7.30	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
3/8/2004	55.2	36.4	0.00	12.9	2.40	0.00
3/9/2004	54.0	30.8	0.00	12.2	-0.70	0.00
3/10/2004	50.0	38.4	0.00	10.0	3.60	0.00
3/11/2004	60.0	33.2	0.00	15.6	0.70	0.00
3/12/2004	67.7	40.1	0.00	19.8	4.50	0.00
3/13/2004	57.3	37.0	0.00	14.1	2.80	0.00
3/14/2004	63.5	32.7	0.00	17.5	0.40	0.00
3/15/2004	63.8	53.1	0.01	17.7	11.7	0.03
3/16/2004	65.0	48.9	0.97	18.3	9.40	2.46
3/17/2004	49.4	36.7	0.00	9.70	2.60	0.00
3/18/2004	58.0	34.7	0.03	14.4	1.50	0.08
3/19/2004	61.6	41.6	0.00	16.4	5.30	0.00
3/20/2004	66.5	34.0	0.00	19.2	1.10	0.00
3/21/2004	65.7	40.3	0.00	18.7	4.60	0.00
3/22/2004	47.8	29.6	0.00	8.80	-1.30	0.00
3/23/2004	53.3	27.1	0.00	11.8	-2.70	0.00
3/24/2004	64.0	28.8	0.00	17.8	-1.80	0.00
3/25/2004	71.5	39.2	0.00	21.9	4.00	0.00
3/26/2004	74.0	45.5	0.00	23.3	7.50	0.00
3/27/2004	77.4	49.9	0.02	25.2	9.90	0.05
3/28/2004	65.7	47.8	0.00	18.7	8.80	0.00
3/29/2004	59.3	43.8	0.00	15.2	6.60	0.00
3/30/2004	63.4	41.9	0.00	17.4	5.50	0.00
3/31/2004	68.1	47.4	0.29	20.1	8.60	0.74
4/1/2004	60.5	44.7	0.03	15.8	7.10	0.08
4/2/2004	57.2	43.8	0.00	14.0	6.60	0.00
4/3/2004	62.1	37.8	0.00	16.7	3.20	0.00
4/4/2004	60.1	44.2	0.00	15.6	6.80	0.00
4/5/2004	57.7	36.9	0.00	14.3	2.70	0.00
4/6/2004	65.2	29.4	0.00	18.4	-1.40	00.00
4/7/2004	78.1	47.4	0.00	25.6	8.60	0.00
4/8/2004	78.4	53.3	0.00	25.8	11.8	0.00

(*Table B14,* continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
4/9/2004	75.1	51.5	0.00	23.9	10.8	0.00
4/10/2004	75.6	48.2	0.37	24.2	9.00	0.94
4/11/2004	78.1	54.1	1.23	25.6	12.3	3.12
4/12/2004	69.2	49.6	0.61	20.7	9.80	1.55
4/13/2004	76.6	60.2	0.11	24.8	15.7	0.28
4/14/2004	60.1	46.4	0.04	15.6	8.00	0.10
4/15/2004	66.5	42.8	0.01	19.2	6.00	0.03
4/16/2004	73.7	39.1	0.01	23.2	3.90	0.03
4/17/2004	79.4	46.8	0.00	26.3	8.20	0.00
4/18/2004	82.0	57.7	0.00	27.8	14.3	0.00
4/19/2004	81.7	58.9	0.00	27.6	14.9	0.00
4/20/2004	85.3	59.9	0.00	29.6	15.5	0.00
4/21/2004	81.5	59.6	0.00	27.5	15.3	0.00
4/22/2004	81.3	60.5	0.00	27.4	15.8	0.00
4/23/2004	83.6	59.2	0.00	28.7	15.1	0.00
4/24/2004	78.8	59.2	0.00	26.0	15.1	0.00
4/25/2004	78.5	56.9	0.00	25.8	13.8	0.00
4/26/2004	82.1	57.1	0.46	27.8	13.9	1.17
4/27/2004	69.7	53.2	0.29	20.9	11.8	0.74
4/28/2004	67.7	45.6	0.08	19.8	7.60	0.20
4/29/2004	75.2	44.8	0.03	24.0	7.10	0.08
4/30/2004	77.2	51.9	0.02	25.1	11.1	0.05
5/1/2004	70.1	62.8	0.04	21.2	17.1	0.10
5/2/2004	80.8	64.3	0.03	27.1	17.9	0.08
5/3/2004	67.3	48.4	0.05	19.6	9.10	0.13
5/4/2004	missing	missing	missing	22.0	missing	missing
5/5/2004	missing	missing	missing	26.0	missing	missing
5/6/2004	83.1	62.4	0.00	28.4	16.9	0.00
5/7/2004	88.3	60.9	0.00	31.3	16.1	0.00
5/8/2004	82.0	61.5	0.00	27.8	16.4	0.00
5/9/2004	86.3	61.1	0.00	30.2	16.2	0.00
5/10/2004	84.2	60.5	0.00	29.0	15.8	0.00

(*Table B13*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
5/11/2004	84.9	60.9	0.00	29.4	16.1	0.00
5/12/2004	84.7	64.1	0.00	29.3	17.8	0.00
5/13/2004	84.4	63.8	0.00	29.1	17.7	0.00
5/14/2004	85.9	62.7	0.00	29.9	17.1	0.00
5/15/2004	85.0	63.8	0.00	29.4	17.7	0.00
5/16/2004	85.1	62.3	0.00	29.5	16.8	0.00
5/17/2004	86.2	61.3	0.00	30.1	16.3	0.00
5/18/2004	84.9	60.8	0.00	29.4	16.0	0.00
5/19/2004	86.8	66.3	0.11	30.4	19.1	0.28
5/20/2004	missing	missing	missing	missing	missing	missing
5/21/2004	92.8	76.0	0.00	33.8	24.4	0.00
5/22/2004	94.1	70.2	0.00	34.5	21.2	0.00
5/23/2004	93.2	68.3	1.10	34.0	20.2	2.79
5/24/2004	89.5	68.3	0.00	31.9	20.2	0.00
5/25/2004	91.1	70.6	0.00	32.8	21.4	0.00
5/26/2004	93.2	74.0	0.00	34.0	23.3	0.00
5/27/2004	91.2	71.5	0.00	32.9	21.9	0.00
5/28/2004	93.4	72.7	0.00	34.1	22.6	0.00
5/29/2004	84.8	66.9	0.00	29.3	19.4	0.00
5/30/2004	77.8	65.7	0.46	25.4	18.7	1.17
5/31/2004	86.9	71.8	0.00	30.5	22.1	0.00
6/1/2004	87.3	64.4	0.00	30.7	18.0	0.00
6/2/2004	90.6	61.5	0.00	32.6	16.4	0.00
6/3/2004	91.0	69.1	0.00	32.8	20.6	0.00
6/4/2004	84.2	67.6	0.84	29.0	19.8	2.13
6/5/2004	79.8	65.8	0.00	26.6	18.8	0.00
6/6/2004	83.6	61.8	0.46	28.7	16.6	1.17
6/7/2004	85.0	69.4	0.00	29.4	20.8	0.00
6/8/2004	86.2	70.3	0.00	30.1	21.3	0.00
6/9/2004	89.4	68.2	0.01	31.9	20.1	0.03
6/10/2004	90.1	70.1	1.44	32.3	21.2	3.66
6/11/2004	91.4	70.4	0.40	33.0	21.3	1.02

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
5/11/2004	84.9	60.9	0.00	29.4	16.1	0.00
5/12/2004	84.7	64.1	0.00	29.3	17.8	0.00
5/13/2004	84.4	63.8	0.00	29.1	17.7	0.00
5/14/2004	85.9	62.7	0.00	29.9	17.1	0.00
5/15/2004	85.0	63.8	0.00	29.4	17.7	0.00
5/16/2004	85.1	62.3	0.00	29.5	16.8	0.00
5/17/2004	86.2	61.3	0.00	30.1	16.3	0.00
5/18/2004	84.9	60.8	0.00	29.4	16.0	0.00
5/19/2004	86.8	66.3	0.11	30.4	19.1	0.28
5/20/2004	missing	missing	missing	missing	missing	missing
5/21/2004	92.8	76.0	0.00	33.8	24.4	0.00
5/22/2004	94.1	70.2	0.00	34.5	21.2	0.00
5/23/2004	93.2	68.3	1.10	34.0	20.2	2.79
5/24/2004	89.5	68.3	0.00	31.9	20.2	0.00
5/25/2004	91.1	70.6	0.00	32.8	21.4	0.00
5/26/2004	93.2	74.0	0.00	34.0	23.3	0.00
5/27/2004	91.2	71.5	0.00	32.9	21.9	0.00
5/28/2004	93.4	72.7	0.00	34.1	22.6	0.00
5/29/2004	84.8	66.9	0.00	29.3	19.4	0.00
5/30/2004	77.8	65.7	0.46	25.4	18.7	1.17
5/31/2004	86.9	71.8	0.00	30.5	22.1	0.00
6/1/2004	87.3	64.4	0.00	30.7	18.0	0.00
6/2/2004	90.6	61.5	0.00	32.6	16.4	0.00
6/3/2004	91.0	69.1	0.00	32.8	20.6	0.00
6/4/2004	84.2	67.6	0.84	29.0	19.8	2.13
6/5/2004	79.8	65.8	0.00	26.6	18.8	0.00
6/6/2004	83.6	61.8	0.46	28.7	16.6	1.17
6/7/2004	85.0	69.4	0.00	29.4	20.8	0.00
6/8/2004	86.2	70.3	0.00	30.1	21.3	0.00
6/9/2004	89.4	68.2	0.01	31.9	20.1	0.03
6/10/2004	90.1	70.1	1.44	32.3	21.2	3.66
6/11/2004	91.4	70.4	0.40	33.0	21.3	1.02

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
6/12/2004	74.9	63.6	0.00	23.8	17.6	0.00
6/13/2004	80.7	60.8	0.00	27.1	16.0	0.00
6/14/2004	84.3	68.8	0.00	29.1	20.4	0.00
6/15/2004	87.9	69.5	0.00	31.1	20.8	0.00
6/16/2004	86.2	73.4	0.24	30.1	23.0	0.61
6/17/2004	86.8	72.3	0.00	30.4	22.4	0.00
6/18/2004	91.8	73.7	0.01	33.2	23.2	0.03
6/19/2004	91.0	73.1	0.00	32.8	22.8	0.00
6/20/2004	81.0	65.6	0.00	27.2	18.7	0.00
6/21/2004	84.4	59.9	0.00	29.1	15.5	0.00
6/22/2004	89.4	66.9	0.22	31.9	19.4	0.56
6/23/2004	89.7	69.7	1.57	32.1	20.9	3.99
6/24/2004	85.8	70.7	0.34	29.9	21.5	0.86
6/25/2004	91.1	71.7	0.00	32.8	22.1	0.00
6/26/2004	82.3	68.7	0.17	27.9	20.4	0.43
6/27/2004	84.4	67.6	0.12	29.1	19.8	0.30
6/28/2004	82.3	71.0	0.87	27.9	21.7	2.21
6/29/2004	86.8	70.5	0.66	30.4	21.4	1.68
6/30/2004	84.1	68.7	0.18	28.9	20.4	0.46
7/1/2004	86.8	67.6	0.14	30.4	19.8	0.36
7/2/2004	86.5	70.9	0.64	30.3	21.6	1.63
7/3/2004	87.7	70.1	0.00	30.9	21.2	0.00
7/4/2004	89.0	72.5	0.31	31.7	22.5	0.79
7/5/2004	92.5	75.0	0.00	33.6	23.9	0.00
7/6/2004	93.7	73.5	0.00	34.3	23.1	0.00
7/7/2004	95.6	74.1	0.00	35.3	23.4	0.00
7/8/2004	94.5	69.9	0.21	34.7	21.1	0.53
7/9/2004	92.6	72.0	0.00	33.7	22.2	0.00
7/10/2004	94.2	71.5	0.23	34.6	21.9	0.58
7/11/2004	88.7	71.5	0.04	31.5	21.9	0.10
7/12/2004	89.8	71.9	0.00	32.1	22.2	0.00
7/13/2004	92.8	75.6	0.01	33.8	24.2	0.03

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
7/14/2004	94.2	74.1	0.00	34.6	23.4	0.00
7/15/2004	88.3	70.3	0.00	31.3	21.3	0.00
7/16/2004	87.4	65.1	0.00	30.8	18.4	0.00
7/17/2004	89.5	66.1	0.00	31.9	18.9	0.00
7/18/2004	83.2	72.0	0.01	28.4	22.2	0.03
7/19/2004	89.6	69.4	0.00	32.0	20.8	0.00
7/20/2004	89.3	66.8	0.00	31.8	19.3	0.00
7/21/2004	89.9	67.6	0.00	32.2	19.8	0.00
7/22/2004	90.6	69.7	0.00	32.6	20.9	0.00
7/23/2004	84.1	72.1	1.11	28.9	22.3	2.82
7/24/2004	85.6	71.5	0.00	29.8	21.9	0.00
7/25/2004	85.5	70.9	0.39	29.7	21.6	0.99
7/26/2004	89.5	73.3	0.01	31.9	22.9	0.03
7/27/2004	88.4	73.7	0.00	31.3	23.2	0.00
7/28/2004	84.3	74.1	0.00	29.1	23.4	0.00
7/29/2004	87.5	72.8	0.68	30.8	22.7	1.73
7/30/2004	87.6	70.9	0.00	30.9	21.6	0.00
7/31/2004	88.1	72.9	0.13	31.2	22.7	0.33
8/1/2004	87.7	74.0	0.12	30.9	23.3	0.30
8/2/2004	86.1	74.1	0.58	30.1	23.4	1.47
8/3/2004	85.5	73.1	0.02	29.7	22.8	0.05
8/4/2004	91.5	70.7	0.00	33.1	21.5	0.00
8/5/2004	92.8	71.4	0.11	33.8	21.9	0.28
8/6/2004	77.1	57.8	0.17	25.1	14.3	0.43
8/7/2004	78.4	54.2	0.00	25.8	12.3	0.00
8/8/2004	83.9	57.4	0.00	28.8	14.1	0.00
8/9/2004	85.5	60.1	0.00	29.7	15.6	0.00
8/10/2004	86.1	63.0	0.00	30.1	17.2	0.00
8/11/2004	86.5	66.1	0.00	30.3	18.9	0.00
8/12/2004	84.2	67.1	0.79	29.0	19.5	2.01
8/13/2004	79.3	69.0	0.72	26.3	20.6	1.83
8/14/2004	74.0	65.1	4.19	23.3	18.4	10.64

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
8/15/2004	73.4	65.0	0.26	23.0	18.3	0.66
8/16/2004	82.2	66.5	0.00	27.9	19.2	0.00
8/17/2004	85.2	64.5	0.00	29.6	18.1	0.00
8/18/2004	87.0	65.5	0.07	30.6	18.6	0.18
8/19/2004	90.1	72.2	0.00	32.3	22.3	0.00
8/20/2004	89.3	72.2	0.00	31.8	22.3	0.00
8/21/2004	89.5	71.7	0.13	31.9	22.1	0.33
8/22/2004	79.3	68.8	0.13	26.3	20.4	0.33
8/23/2004	82.4	63.9	0.00	28.0	17.7	0.00
8/24/2004	83.6	61.9	0.00	28.7	16.6	0.00
8/25/2004	85.4	63.3	0.00	29.7	17.4	0.00
8/26/2004	83.7	68.6	0.00	28.7	20.3	0.00
8/27/2004	87.0	71.0	0.00	30.6	21.7	0.00
8/28/2004	88.7	68.3	0.00	31.5	20.2	0.00
8/29/2004	86.3	70.5	0.59	30.2	21.4	1.50
8/30/2004	82.7	72.6	0.00	28.2	22.6	0.00
8/31/2004	89.2	72.1	0.00	31.8	22.3	0.00
9/1/2004	77.2	68.4	0.51	25.1	20.2	1.30
9/2/2004	81.8	64.8	0.00	27.7	18.2	0.00
9/3/2004	84.3	64.4	0.00	29.1	18.0	0.00
9/4/2004	85.7	68.9	0.00	29.8	20.5	0.00
9/5/2004	85.6	68.6	0.00	29.8	20.3	0.00
9/6/2004	85.1	71.1	0.03	29.5	21.7	0.08
9/7/2004	80.9	70.8	0.07	27.2	21.6	0.18
9/8/2004	85.7	75.2	0.21	29.8	24.0	0.53
9/9/2004	83.7	72.5	0.32	28.7	22.5	0.81
9/10/2004	82.5	68.4	0.00	28.1	20.2	0.00
9/11/2004	75.9	68.8	0.00	24.4	20.4	0.00
9/12/2004	82.1	62.1	0.00	27.8	16.7	0.00
9/13/2004	80.5	59.1	0.00	26.9	15.1	0.00
9/14/2004	77.5	66.7	0.04	25.3	19.3	0.10
9/15/2004	81.2	68.2	0.25	27.3	20.1	0.64

(*Table B14,* continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
9/16/2004	80.4	67.1	0.00	26.9	19.5	0.00
9/17/2004	86.7	72.8	0.33	30.4	22.7	0.84
9/18/2004	73.8	63.1	0.20	23.2	17.3	0.51
9/19/2004	71.0	56.4	0.00	21.7	13.6	0.00
9/20/2004	71.4	54.2	0.00	21.9	12.3	0.00
9/21/2004	77.7	52.9	0.00	25.4	11.6	0.00
9/22/2004	85.2	55.0	0.00	29.6	12.8	0.00
9/23/2004	83.9	60.3	0.00	28.8	15.7	0.00
9/24/2004	80.7	61.4	0.00	27.1	16.3	0.00
9/25/2004	80.3	60.7	0.00	26.8	15.9	0.00
9/26/2004	80.1	59.1	0.00	26.7	15.1	0.00
9/27/2004	82.7	69.7	0.07	28.2	20.9	0.18
9/28/2004	79.9	71.4	0.99	26.6	21.9	2.51
9/29/2004	82.8	63.0	0.00	28.2	17.2	0.00
9/30/2004	83.7	67.0	0.00	28.7	19.4	0.00
10/1/2004	79.7	67.7	0.00	26.5	19.8	0.00
10/2/2004	81.9	67.4	0.04	27.7	19.7	0.10
10/3/2004	80.9	62.0	0.38	27.2	16.7	0.97
10/4/2004	79.4	60.7	0.01	26.3	15.9	0.03
10/5/2004	73.5	57.0	0.00	23.1	13.9	0.00
10/6/2004	69.5	50.3	0.00	20.8	10.2	0.00
10/7/2004	72.3	45.5	0.00	22.4	7.50	0.00
10/8/2004	78.4	48.7	0.00	25.8	9.30	0.00
10/9/2004	76.4	54.9	0.00	24.7	12.7	0.00
10/10/2004	80.1	54.3	0.00	26.7	12.4	0.00
10/11/2004	69.4	47.2	0.00	20.8	8.40	0.00
10/12/2004	74.7	42.2	0.00	23.7	5.70	0.00
10/13/2004	80.4	56.9	0.29	26.9	13.8	0.74
10/14/2004	73.4	61.4	0.06	23.0	16.3	0.15
10/15/2004	68.9	49.4	0.03	20.5	9.70	0.08
10/16/2004	71.9	45.0	0.01	22.2	7.20	0.03
10/17/2004	71.0	41.6	0.01	21.7	5.30	0.03

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
10/18/2004	78.5	47.5	0.01	25.8	8.60	0.03
10/19/2004	82.9	65.2	0.01	28.3	18.4	0.03
10/20/2004	70.2	60.9	0.01	21.2	16.1	0.03
10/21/2004	66.1	58.9	0.00	18.9	14.9	0.00
10/22/2004	65.3	54.4	0.01	18.5	12.4	0.03
10/23/2004	64.0	46.1	0.00	17.8	7.80	0.00
10/24/2004	60.1	45.4	0.00	15.6	7.40	0.00
10/25/2004	59.5	52.8	0.00	15.3	11.6	0.00
10/26/2004	68.1	45.1	0.00	20.1	7.30	0.00
10/27/2004	67.8	43.8	0.00	19.9	6.60	0.00
10/28/2004	68.8	54.5	0.00	20.4	12.5	0.00
10/29/2004	missing	missing	missing	missing	missing	missing
10/30/2004	79.0	51.5	0.00	26.1	10.8	0.00
10/31/2004	85.3	66.3	0.00	29.6	19.1	0.00
11/1/2004	86.1	61.6	0.00	30.1	16.4	0.00
11/2/2004	84.0	62.3	0.00	28.9	16.8	0.00
11/3/2004	74.5	61.5	0.00	23.6	16.4	0.10
11/4/2004	74.8	56.7	0.07	23.8	13.7	0.18
11/5/2004	63.5	41.2	0.01	17.5	5.10	0.03
11/6/2004	67.1	36.6	0.00	19.5	2.60	0.00
11/7/2004	74.4	41.7	0.00	23.6	5.40	0.00
11/8/2004	66.8	43.7	0.00	19.3	6.50	0.00
11/9/2004	54.8	35.7	0.00	12.7	2.10	0.00
11/10/2004	58.4	30.3	0.00	14.7	-0.90	0.00
11/11/2004	68.2	35.7	0.00	20.1	2.10	0.00
11/12/2004	68.8	55.0	0.21	20.4	12.8	0.53
11/13/2004	62.9	39.4	0.07	17.2	4.10	0.18
11/14/2004	51.0	33.3	0.03	10.6	0.70	0.08
11/15/2004	59.9	30.1	0.61	15.5	-1.10	1.55
11/16/2004	58.9	33.1	0.07	14.9	0.60	0.18
11/17/2004	65.9	34.8	0.03	18.8	1.60	0.08
11/18/2004	65.0	38.3	0.01	18.3	3.50	0.03

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
11/19/2004	73.5	45.9	0.01	23.1	7.70	0.03
11/20/2004	74.1	53.4	0.00	23.4	11.9	0.00
11/21/2004	68.6	54.8	0.00	20.3	12.7	0.00
11/22/2004	65.1	51.0	0.01	18.4	10.6	0.03
11/23/2004	60.3	55.2	0.00	15.7	12.9	0.00
11/24/2004	73.4	58.8	0.02	23.0	14.9	0.05
11/25/2004	71.2	39.8	0.01	21.8	4.30	0.03
11/26/2004	48.5	32.3	0.13	9.20	0.20	0.33
11/27/2004	57.3	30.6	0.33	14.1	-0.80	0.84
11/28/2004	63.7	46.0	0.49	17.6	7.80	1.24
11/29/2004	55.5	36.9	0.00	13.1	2.70	0.00
11/30/2004	61.3	32.4	0.00	16.3	0.20	0.00
12/1/2004	69.7	37.2	0.00	20.9	2.90	0.00
12/2/2004	60.9	30.7	0.00	16.1	-0.70	0.00
12/3/2004	56.9	33.5	0.00	13.8	0.80	0.00
12/4/2004	59.4	31.0	0.00	15.2	-0.60	0.00
12/5/2004	63.8	33.7	0.00	17.7	0.90	0.00
12/6/2004	62.7	44.1	0.00	17.1	6.70	0.00
12/7/2004	74.5	57.5	0.00	23.6	14.2	0.00
12/8/2004	72.8	46.3	0.00	22.7	7.90	0.00
12/9/2004	67.4	45.5	0.09	19.7	7.50	0.23
12/10/2004	73.4	58.7	0.17	23.0	14.8	0.43
12/11/2004	60.0	40.9	0.00	15.6	4.90	0.00
12/12/2004	54.2	37.3	0.00	12.3	2.90	0.00
12/13/2004	60.1	39.4	0.00	15.6	4.10	0.00
12/14/2004	42.9	30.9	0.00	6.10	-0.60	0.00
12/15/2004	37.9	22.9	0.00	3.30	-5.10	0.00
12/16/2004	48.2	18.6	0.00	9.00	-7.40	0.00
12/17/2004	52.8	30.5	0.00	11.6	-0.80	0.00
12/18/2004	57.2	32.1	0.00	14.0	0.10	0.00
12/19/2004	50.4	28.2	0.06	10.2	-2.10	0.15
12/20/2004	28.3	16.2	0.00	-2.10	-8.80	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
11/19/2004	73.5	45.9	0.01	23.1	7.70	0.03
11/20/2004	74.1	53.4	0.00	23.4	11.9	0.00
11/21/2004	68.6	54.8	0.00	20.3	12.7	0.00
11/22/2004	65.1	51.0	0.01	18.4	10.6	0.03
11/23/2004	60.3	55.2	0.00	15.7	12.9	0.00
11/24/2004	73.4	58.8	0.02	23.0	14.9	0.05
11/25/2004	71.2	39.8	0.01	21.8	4.30	0.03
11/26/2004	48.5	32.3	0.13	9.20	0.20	0.33
11/27/2004	57.3	30.6	0.33	14.1	-0.80	0.84
11/28/2004	63.7	46.0	0.49	17.6	7.80	1.24
11/29/2004	55.5	36.9	0.00	13.1	2.70	0.00
11/30/2004	61.3	32.4	0.00	16.3	0.20	0.00
12/1/2004	69.7	37.2	0.00	20.9	2.90	0.00
12/2/2004	60.9	30.7	0.00	16.1	-0.70	0.00
12/3/2004	56.9	33.5	0.00	13.8	0.80	0.00
12/4/2004	59.4	31.0	0.00	15.2	-0.60	0.00
12/5/2004	63.8	33.7	0.00	17.7	0.90	0.00
12/6/2004	62.7	44.1	0.00	17.1	6.70	0.00
12/7/2004	74.5	57.5	0.00	23.6	14.2	0.00
12/8/2004	72.8	46.3	0.00	22.7	7.90	0.00
12/9/2004	67.4	45.5	0.09	19.7	7.50	0.23
12/10/2004	73.4	58.7	0.17	23.0	14.8	0.43
12/11/2004	60.0	40.9	0.00	15.6	4.90	0.00
12/12/2004	54.2	37.3	0.00	12.3	2.90	0.00
12/13/2004	60.1	39.4	0.00	15.6	4.10	0.00
12/14/2004	42.9	30.9	0.00	6.10	-0.60	0.00
12/15/2004	37.9	22.9	0.00	3.30	-5.10	0.00
12/16/2004	48.2	18.6	0.00	9.00	-7.40	0.00
12/17/2004	52.8	30.5	0.00	11.6	-0.80	0.00
12/18/2004	57.2	32.1	0.00	14.0	0.10	0.00
12/19/2004	50.4	28.2	0.06	10.2	-2.10	0.15
12/20/2004	28.3	16.2	0.00	-2.10	-8.80	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
12/21/2004	54.3	19.4	0.00	12.4	-7.00	0.00
12/22/2004	64.8	29.5	0.00	18.2	-1.40	0.00
12/23/2004	68.6	47.4	0.49	20.3	8.60	1.24
12/24/2004	47.3	32.9	0.00	8.50	0.50	0.00
12/25/2004	36.3	29.7	0.00	2.40	-1.30	0.00
12/26/2004	32.3	25.3	0.05	0.20	-3.70	0.13
12/27/2004	39.0	22.3	0.30	3.90	-5.40	0.76
12/28/2004	41.7	18.9	0.10	5.40	-7.30	0.25
12/29/2004	56.7	27.1	0.00	13.7	-2.70	0.00
12/30/2004	62.5	40.1	0.00	16.9	4.50	0.00
12/31/2004	67.5	34.4	0.00	19.7	1.30	0.00
1/1/2005	70.9	43.6	0.00	21.6	6.40	0.00
1/2/2005	69.4	42.8	0.00	20.8	6.00	0.00
1/3/2005	70.5	43.1	0.00	21.4	6.20	0.00
1/4/2005	74.4	54.6	0.00	23.6	12.6	0.00
1/5/2005	71.9	54.7	0.00	22.2	12.6	0.00
1/6/2005	74.7	58.2	0.00	23.7	14.6	0.00
1/7/2005	68.3	50.8	0.00	20.2	10.4	0.00
1/8/2005	74.7	51.1	0.00	23.7	10.6	0.00
1/9/2005	57.0	43.3	0.00	13.9	6.30	0.00
1/10/2005	65.2	41.1	0.00	18.4	5.10	0.00
1/11/2005	65.5	40.4	0.00	18.6	4.70	0.00
1/12/2005	71.6	48.1	0.00	22.0	8.90	0.00
1/13/2005	77.1	59.5	0.00	25.1	15.3	0.00
1/14/2005	71.3	41.3	1.03	21.8	5.20	2.62
1/15/2005	43.3	34.2	0.00	6.30	1.20	0.00
1/16/2005	37.4	33.8	0.08	3.00	1.00	0.20
1/17/2005	35.9	23.7	0.00	2.20	-4.60	0.00
1/18/2005	28.2	16.8	0.00	-2.10	-8.40	0.00
1/19/2005	33.4	13.6	0.00	0.80	-10.2	0.00
1/20/2005	48.0	28.1	0.02	8.90	-2.20	0.05
1/21/2005	35.4	26.5	0.13	1.90	-3.10	0.33

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
1/22/2005	43.6	25.7	0.01	6.40	-3.50	0.03
1/23/2005	35.6	21.7	0.00	2.00	-5.70	0.00
1/24/2005	38.2	16.0	0.00	3.40	-8.90	0.00
1/25/2005	51.5	27.3	0.00	10.8	-2.60	0.00
1/26/2005	59.7	36.3	0.01	15.4	2.40	0.03
1/27/2005	50.4	24.3	0.00	10.2	-4.30	0.00
1/28/2005	32.6	19.1	0.00	0.30	-7.20	0.00
1/29/2005	40.7	20.5	0.01	4.80	-6.40	0.03
1/30/2005	41.9	34.7	0.10	5.50	1.50	0.25
1/31/2005	46.1	31.6	0.00	7.80	-0.20	0.00
2/1/2005	46.9	30.4	0.00	8.30	-0.90	0.00
2/2/2005	50.5	29.9	0.00	10.3	-1.20	0.00
2/3/2005	40.6	33.6	0.02	4.80	0.90	0.05
2/4/2005	48.9	35.0	0.00	9.40	1.70	0.00
2/5/2005	58.1	36.3	0.00	14.5	2.40	0.00
2/6/2005	62.3	34.7	0.00	16.8	1.50	0.00
2/7/2005	62.0	35.9	0.00	16.7	2.20	0.00
2/8/2005	69.5	35.3	0.00	20.8	1.80	0.00
2/9/2005	65.6	51.5	0.00	18.7	10.8	0.00
2/10/2005	57.9	36.0	0.00	14.4	2.20	0.00
2/11/2005	45.6	31.1	0.00	7.60	-0.50	0.00
2/12/2005	59.1	28.8	0.00	15.1	-1.80	0.00
2/13/2005	67.8	32.8	0.00	19.9	0.40	0.00
2/14/2005	62.8	43.7	0.01	17.1	6.50	0.03
2/15/2005	66.3	44.7	0.02	19.1	7.10	0.05
2/16/2005	67.0	48.5	0.01	19.4	9.20	0.03
2/17/2005	55.4	36.8	0.01	13.0	2.70	0.03
2/18/2005	45.7	28.5	0.00	7.60	-1.90	0.00
2/19/2005	53.1	23.9	0.00	11.7	-4.50	0.00
2/20/2005	57.6	34.4	0.01	14.2	1.30	0.03
2/21/2005	61.6	47.2	0.01	16.4	8.40	0.03
2/22/2005	62.3	45.7	0.00	16.8	7.60	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
2/23/2005	59.9	40.9	0.00	15.5	4.90	0.00
2/24/2005	45.9	37.2	0.00	7.70	2.90	0.00
2/25/2005	39.1	28.9	0.01	3.90	-1.70	0.03
2/26/2005	51.5	26.0	0.42	10.8	-3.30	1.07
2/27/2005	48.8	32.2	0.00	9.30	0.10	0.00
2/28/2005	47.2	38.1	0.00	8.40	3.40	0.00
3/1/2005	47.0	34.9	0.00	8.30	1.60	0.00
3/2/2005	45.7	30.7	0.00	7.60	-0.70	0.00
3/3/2005	47.5	28.3	0.00	8.60	-2.10	0.00
3/4/2005	56.1	23.6	00.0	13.4	-4.70	0.00
3/5/2005	60.9	35.5	0.00	16.1	1.90	0.00
3/6/2005	59.6	29.9	0.00	15.3	-1.20	0.00
3/7/2005	71.8	42.3	0.00	22.1	5.70	0.00
3/8/2005	63.5	35.4	0.00	17.5	1.90	0.00
3/9/2005	46.5	26.3	0.00	8.10	-3.20	0.00
3/10/2005	51.2	31.8	0.00	10.7	-0.10	0.00
3/11/2005	62.0	40.4	0.00	16.7	4.70	0.00
3/12/2005	66.8	34.7	0.00	19.3	1.50	0.00
3/13/2005	72.0	36.8	0.00	22.2	2.70	0.00
3/14/2005	45.9	32.8	0.00	7.70	0.40	0.00
3/15/2005	54.9	31.2	0.00	12.7	-0.40	0.00
3/16/2005	42.9	36.1	0.00	6.10	2.30	0.00
3/17/2005	38.1	35.4	0.00	3.40	1.90	0.00
3/18/2005	57.5	35.3	0.00	14.2	1.80	0.00
3/19/2005	58.5	42.8	0.00	14.7	6.00	0.00
3/20/2005	66.9	43.2	0.00	19.4	6.20	0.00
3/21/2005	62.4	44.0	0.00	16.9	6.70	0.00
3/22/2005	65.5	42.7	0.00	18.6	5.90	0.00
3/23/2005	74.4	54.0	0.00	23.6	12.2	0.00
3/24/2005	65.2	47.4	0.00	18.4	8.60	0.00
3/25/2005	66.3	45.7	0.00	19.1	7.60	0.00
3/26/2005	62.6	48.5	0.00	17.0	9.20	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
3/27/2005	61.4	49.5	0.00	16.3	9.70	0.00
3/28/2005	71.4	49.7	0.00	21.9	9.80	0.00
3/29/2005	73.8	49.0	0.00	23.2	9.40	0.00
3/30/2005	75.0	46.3	0.00	23.9	7.90	0.00
3/31/2005	75.8	50.4	0.00	24.3	10.2	0.00
4/1/2005	78.3	53.1	0.00	25.7	11.7	0.00
4/2/2005	68.6	49.4	0.00	20.3	9.70	0.00
4/3/2005	missing	missing	missing	missing	missing	missing
4/4/2005	74.6	46.6	0.00	23.7	8.10	0.00
4/5/2005	79.3	44.6	0.00	26.3	7.00	0.00
4/6/2005	82.2	50.7	0.00	27.9	10.4	0.00
4/7/2005	76.0	59.8	0.00	24.4	15.4	0.00
4/8/2005	75.3	61.1	0.00	24.1	16.2	0.00
4/9/2005	67.1	48.3	0.00	19.5	9.10	0.00
4/10/2005	71.4	43.9	0.00	21.9	6.60	0.00
4/11/2005	78.5	42.1	0.00	25.8	5.60	0.00
4/12/2005	58.1	48.2	0.00	14.5	9.00	0.00
4/13/2005	50.4	42.0	1.38	10.2	5.60	3.51
4/14/2005	61.9	42.1	0.06	16.6	5.60	0.15
4/15/2005	57.0	41.3	0.00	13.9	5.20	0.00
4/16/2005	61.1	38.7	0.00	16.2	3.70	0.00
4/17/2005	68.3	35.5	0.00	20.2	1.90	0.00
4/18/2005	79.8	45.2	0.00	26.6	7.30	0.00
4/19/2005	85.4	50.2	0.00	29.7	10.1	0.00
4/20/2005	86.3	58.1	0.00	30.2	14.5	0.00
4/21/2005	missing	missing	missing	missing	missing	missing
4/22/2005	84.8	52.4	0.00	29.3	11.3	0.00
4/23/2005	74.7	51.6	0.02	23.7	10.9	0.05
4/24/2005	54.6	42.8	0.00	12.6	6.00	0.00
4/25/2005	66.7	40.6	0.00	19.3	4.80	0.00
4/26/2005	68.4	52.8	0.01	20.2	11.6	0.03
4/27/2005	72.9	56.2	0.00	22.7	13.4	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
4/28/2005	70.1	47.7	0.00	21.2	8.70	0.00
4/29/2005	78.3	53.8	0.00	25.7	12.1	0.00
4/30/2005	81.0	62.7	0.00	27.2	17.1	0.00
5/1/2005	69.2	50.6	0.05	20.7	10.3	0.13
5/2/2005	74.1	46.3	0.00	23.4	7.90	0.00
5/3/2005	68.9	48.8	0.00	20.5	9.30	0.00
5/4/2005	72.9	44.6	0.00	22.7	7.00	0.00
5/5/2005	missing	missing	missing	missing	missing	missing
5/6/2005	67.6	46.8	3.30	19.8	8.20	8.38
5/7/2005	72.9	44.5	0.00	22.7	6.90	0.00
5/8/2005	75.2	53.0	0.01	24.0	11.7	0.03
5/9/2005	79.7	52.3	0.00	26.5	11.3	0.00
5/10/2005	80.8	50.2	0.00	27.1	10.1	0.00
5/11/2005	84.4	53.8	0.00	29.1	12.1	0.00
5/12/2005	89.3	59.8	0.20	31.8	15.4	0.51
5/13/2005	66.9	58.7	0.00	19.4	14.8	0.00
5/14/2005	82.0	58.0	0.00	27.8	14.4	0.00
5/15/2005	85.0	63.9	0.52	29.4	17.7	1.32
5/16/2005	76.7	64.1	0.04	24.8	17.8	0.10
5/17/2005	76.4	57.3	0.00	24.7	14.1	0.00
5/18/2005	81.0	52.9	0.00	27.2	11.6	0.00
5/19/2005	78.2	57.4	0.10	25.7	14.1	0.25
5/20/2005	75.2	54.2	0.29	24.0	12.3	0.74
5/21/2005	71.2	54.2	0.00	21.8	12.3	0.00
5/22/2005	78.1	53.7	0.00	25.6	12.1	0.00
5/23/2005	84.1	62.7	0.00	28.9	17.1	0.00
5/24/2005	76.3	54.9	0.01	24.6	12.7	0.03
5/25/2005	65.1	53.2	0.00	18.4	11.8	0.00
5/26/2005	80.3	54.8	0.00	26.8	12.7	0.00
5/27/2005	85.9	60.3	0.00	29.9	15.7	0.00
5/28/2005	87.4	63.4	0.00	30.8	17.4	0.00
5/29/2005	83.3	58.0	0.00	28.5	14.4	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
5/30/2005	72.2	63.8	0.00	22.3	17.7	0.00
5/31/2005	80.3	62.6	0.00	26.8	17.0	0.00
6/1/2005	68.8	60.7	0.22	20.4	15.9	0.56
6/2/2005	69.0	61.0	0.27	20.6	16.1	0.69
6/3/2005	76.2	63.7	0.24	24.6	17.6	0.61
6/4/2005	84.3	69.7	0.00	29.1	20.9	0.00
6/5/2005	88.8	69.0	0.00	31.6	20.6	0.00
6/6/2005	88.8	71.5	0.00	31.6	21.9	0.00
6/7/2005	89.5	68.1	0.32	31.9	20.1	0.81
6/8/2005	88.7	66.0	0.02	31.5	18.9	0.05
6/9/2005	missing	missing	missing	missing	missing	missing
6/10/2005	86.2	69.1	0.04	30.1	20.6	0.10
6/11/2005	85.6	63.6	0.00	29.8	17.6	0.00
6/12/2005	86.9	69.3	0.00	30.5	20.7	0.00
6/13/2005	90.5	73.7	0.00	32.5	23.2	0.00
6/14/2005	91.0	74.9	0.00	32.8	23.8	0.00
6/15/2005	96.1	75.3	0.00	35.6	24.1	0.00
6/16/2005	90.8	69.7	0.00	32.7	20.9	0.00
6/17/2005	83.1	64.2	0.00	28.4	17.9	0.00
6/18/2005	85.0	58.2	0.00	29.4	14.6	0.00
6/19/2005	83.8	61.1	0.00	28.8	16.2	0.00
6/20/2005	76.3	58.4	0.00	24.6	14.7	0.00
6/21/2005	84.3	54.1	0.00	29.1	12.3	0.00
6/22/2005	89.8	65.7	0.00	32.1	18.7	0.00
6/23/2005	89.5	65.0	0.00	31.9	18.3	0.00
6/24/2005	88.6	62.8	0.00	31.4	17.1	0.00
6/25/2005	83.5	66.3	0.01	28.6	19.1	0.03
6/26/2005	86.7	73.6	0.00	30.4	23.1	0.00
6/27/2005	92.6	74.0	0.00	33.7	23.3	0.00
6/28/2005	87.3	73.8	0.28	30.7	23.2	0.71
6/29/2005	84.2	72.1	1.25	29.0	22.3	3.18
6/30/2005	90.8	72.6	1.50	32.7	22.6	3.81

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
7/1/2005	92.5	74.6	0.25	33.6	23.7	0.64
7/2/2005	90.3	71.4	0.75	32.4	21.9	1.91
7/3/2005	86.0	70.3	0.01	30.0	21.3	0.03
7/4/2005	88.6	69.6	0.00	31.4	20.9	0.00
7/5/2005	91.2	74.6	0.00	32.9	23.7	0.00
7/6/2005	92.0	74.9	0.00	33.3	23.8	0.00
7/7/2005	92.6	73.9	0.00	33.7	23.3	0.00
7/8/2005	86.1	71.8	0.00	30.1	22.1	0.00
7/9/2005	89.6	68.7	0.00	32.0	20.4	0.00
7/10/2005	90.8	69.7	0.00	32.7	20.9	0.00
7/11/2005	89.9	72.3	0.00	32.2	22.4	0.00
7/12/2005	89.5	75.3	0.06	31.9	24.1	0.15
7/13/2005	90.0	71.0	1.21	32.2	21.7	3.07
7/14/2005	86.1	70.6	0.02	30.1	21.4	0.05
7/15/2005	90.5	72.9	0.92	32.5	22.7	2.34
7/16/2005	91.1	76.6	0.00	32.8	24.8	0.00
7/17/2005	92.1	77.0	0.06	33.4	25.0	0.15
7/18/2005	91.2	75.0	0.18	32.9	23.9	0.46
7/19/2005	92.5	74.9	0.03	33.6	23.8	0.08
7/20/2005	92.8	74.8	0.00	33.8	23.8	0.00
7/21/2005	93.2	76.3	0.00	34.0	24.6	0.00
7/22/2005	92.8	72.1	2.96	33.8	22.3	7.52
7/23/2005	90.4	72.0	0.02	32.4	22.2	0.05
7/24/2005	86.3	71.5	0.00	30.2	21.9	0.00
7/25/2005	91.2	70.0	0.00	32.9	21.1	0.00
7/26/2005	95.0	76.2	0.00	35.0	24.6	0.00
7/27/2005	100.5	76.3	0.00	38.1	24.6	0.00
7/28/2005	92.2	73.8	0.00	33.4	23.2	0.00
7/29/2005	85.0	68.9	2.00	29.4	20.5	5.08
7/30/2005	81.9	70.0	0.01	27.7	21.1	0.03
7/31/2005	80.5	70.8	0.00	26.9	21.6	0.00
8/1/2005	84.8	70.5	0.00	29.3	21.4	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
8/2/2005	86.9	68.6	0.00	30.5	20.3	0.00
8/3/2005	92.8	67.6	0.12	33.8	19.8	0.30
8/4/2005	91.7	68.3	0.00	33.2	20.2	0.00
8/5/2005	89.9	70.3	0.00	32.2	21.3	0.00
8/6/2005	89.9	69.4	0.00	32.2	20.8	0.00
8/7/2005	86.5	68.7	0.00	30.3	20.4	0.00
8/8/2005	84.4	71.0	0.00	29.1	21.7	0.00
8/9/2005	87.1	71.3	0.32	30.6	21.8	0.81
8/10/2005	88.9	71.1	0.00	31.6	21.7	0.00
8/11/2005	93.7	72.9	0.00	34.3	22.7	0.00
8/12/2005	93.8	73.1	0.00	34.3	22.8	0.00
8/13/2005	92.9	73.0	0.00	33.8	22.8	0.00
8/14/2005	92.9	71.5	0.00	33.8	21.9	0.00
8/15/2005	95.3	74.3	0.00	35.2	23.5	0.00
8/16/2005	95.6	72.9	0.35	35.3	22.7	0.89
8/17/2005	84.8	71.9	0.04	29.3	22.2	0.10
8/18/2005	88.4	69.9	0.00	31.3	21.1	0.00
8/19/2005	90.5	71.9	0.00	32.5	22.2	0.00
8/20/2005	95.6	76.3	0.00	35.3	24.6	0.00
8/21/2005	97.7	75.9	0.00	36.5	24.4	0.00
8/22/2005	94.5	70.0	0.00	34.7	21.1	0.00
8/23/2005	84.3	73.2	0.54	29.1	22.9	1.37
8/24/2005	84.9	70.5	0.01	29.4	21.4	0.03
8/25/2005	83.9	64.8	0.00	28.8	18.2	0.00
8/26/2005	84.6	61.9	0.00	29.2	16.6	0.00
8/27/2005	86.5	68.5	0.00	30.3	20.3	0.00
8/28/2005	90.8	69.6	0.00	32.7	20.9	0.00
8/29/2005	87.9	72.4	0.00	31.1	22.4	0.00
8/30/2005	94.7	73.6	0.00	34.8	23.1	0.00
8/31/2005	93.1	75.7	0.00	33.9	24.3	0.00
9/1/2005	89.9	66.4	0.00	32.2	19.1	0.00
9/2/2005	90.4	66.9	0.00	32.4	19.4	0.00

(*Table B14*, continued)

Date/Time (EST)	2 m Maximum Temp. (^{0}F)	2 m Minimum Temp. (^{0}F)	1 m Daily Precip. (in)	2 m Maximum Temp. (^{0}C)	2 m Minimum Temp. (^{0}C)	1 m Daily Precip. (cm)
9/3/2005	89.8	68.1	0.00	32.1	20.1	0.00
9/4/2005	84.5	61.8	0.00	29.2	16.6	0.00
9/5/2005	85.6	60.0	0.00	29.8	15.6	0.00
9/6/2005	84.2	64.9	0.00	29.0	18.3	0.00
9/7/2005	81.6	64.1	0.00	27.6	17.8	0.00
9/8/2005	85.4	64.7	0.00	29.7	18.2	0.00
9/9/2005	86.5	59.9	0.00	30.3	15.5	0.00
9/10/2005	83.2	63.9	0.00	28.4	17.7	0.00
9/11/2005	81.7	66.4	0.00	27.6	19.1	0.00
9/12/2005	83.5	65.5	0.00	28.6	18.6	0.00
9/13/2005	87.1	74.9	0.00	30.6	23.8	0.00
9/14/2005	78.7	74.8	2.68	25.9	23.8	6.81
9/15/2005	85.0	74.8	0.09	29.4	23.8	0.23
9/16/2005	88.7	74.3	0.00	31.5	23.5	0.00
9/17/2005	91.7	70.5	0.07	33.2	21.4	0.18
9/18/2005	91.1	72.6	0.41	32.8	22.6	1.04
9/19/2005	87.2	72.4	0.00	30.7	22.4	0.00
9/20/2005	88.1	71.5	0.00	31.2	21.9	0.00
9/21/2005	82.9	67.4	0.09	28.3	19.7	0.23
9/22/2005	86.5	69.0	0.00	30.3	20.6	0.00
9/23/2005	89.4	67.7	0.00	31.9	19.8	0.00
9/24/2005	86.8	71.1	0.00	30.4	21.7	0.00
9/25/2005	83.7	67.7	0.00	28.7	19.8	0.00
9/26/2005	86.0	64.8	0.01	30.0	18.2	0.03
9/27/2005	82.1	66.7	0.11	27.8	19.3	0.28
9/28/2005	80.4	58.8	0.00	26.9	14.9	0.00
9/29/2005	87.4	62.1	0.00	30.8	16.7	0.00
9/30/2005	73.2	61.4	0.00	22.9	16.3	0.00
10/1/2005	82.1	62.7	0.00	27.8	17.1	0.00
10/2/2005	79.7	57.1	0.00	26.5	13.9	0.00
10/3/2005	82.5	59.9	0.00	28.1	15.5	0.00
10/4/2005	82.2	67.4	0.00	27.9	19.7	0.00

Appendix C

Table C1. Small grain cover crop biomass dry weight summary as determined from oven dry weights of 0.25 m^2 samples taken from each plot on April 18, 2004 and April 22, 2005 prior to cover cop termination.

	Fort Barnwell				**Vanceboro**			
	2004		**2005**		**2004**		**2005**	
	Fertilization		**Fertilization**		**Fertilization**		**Fertilization**	
Cover	**None**	**22.4 N kg ha^{-1}**	**None**	**22.4 N kg ha^{-1}**	**None**	**22.4 N kg ha^{-1}**	**None**	**22.4 N kg ha^{-1}**
R1	732	1512	492	1417	985	2355	845	2030
R2	932	1782	747	1612	1765	2140	1475	1700
R3	752	1572	782	1297	1855	2270	1805	1870
T1	882	1592	697	1267	2350	3685	2125	3095
T2	952	1945	907	1802	1995	3670	1930	3280
T3	942	1962	1002	1682	2170	3095	2185	3425
W1	907	1377	717	1112	1565	1895	1480	1890
W2	937	1542	657	1252	2125	2300	1860	2205
W3	1202	1322	807	1272	1995	2915	1630	2605

Apparent Nitrogen Use Efficiency

Evaluation of apparent nitrogen use efficiency (NUE) **(**Biomass oven dry weight with spring N applied – Biomass dry weight with no spring N applied/Amount of fertilization applied) provides a comparison of these small grain's ability to produce biomass from nitrogen fertilization. The assumptions are that 1) all plots have equal soil N reserves; 2) plots with excess of 100% NUE have greater N mineralization rates or greater soil N reserves and 3) plots with less than 0% NUE have less soil N reserves or greater N immobilization. Neither cover type nor seeding rates were significant effects of apparently NUE (Table C1 and C2). At the Fort Barnwell location, the mean apparent NUE of 36%, 40% and 18% in 2004 and 34%, 32% of 22% in 2005 for rye, triticale and wheat, respectively, are not statistically different. At the Vanceboro location, the mean apparent NUE of 32%, 59% and 21% in 2004 and 22%, 53% and 26% in 2005 are not statistically different.

Table C2. Fort Barnwell apparent nitrogen use efficiency model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
Cover (C)	2	27	1.95	0.1620
C*Seeding Rate	6	27	0.27	0.9443

**Indicates significance at P<0.05.*

Table C3. Vanceboro apparent nitrogen use efficiency model effects.

Type 3 Tests of Fixed Effects				
Effect	**Numerator DF**	**Denominator DF**	**F Value**	**Pr > F**
C	2	27	3.25	0.0543
C*S	6	27	1.20	0.3380

**Indicates significance at P<0.05.*

Apparent Nitrogen Use Efficiency Summary

At the Fort Barnwell location, the NUE range for rye, triticale and wheat was 23-41%, 25-46% and 5-27%, respectively. In likewise comparison, at Vanceboro NUE range for rye, triticale and wheat was 3-61%, 41-75% and 8-55%. The more consistent but lower values at Fort Barnwell are likely due the positive response of nitrogen in the low CEC, low soil N environment. The highly variable response at Vanceboro reflects soil spatial variability and climatic variations. Averaging the NUE values of each year, NUE at Fort Barnwell ranged from 29-31% and at Vanceboro, 26-37%. These values closely match the accepted standard values of small grains of 33% (López-Bellido et al., 2007; Arnal et al. 2009).