Technical Bulletin TB12-02 May, 2012

Agricultural
Experiment Station

Colorado State University

College of Agricultural Sciences

Department of Soil and Crop Sciences

SUSTAINABLE DRYLAND AGROECOSYSTEMS MANAGEMENT
2006-2007 Results

2012

SUSTAINABLE DRYLAND AGROECOSYSTEMS MANAGEMENT[1]

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A Cooperative Project

of the

Colorado Agricultural Experiment Station
Department of Soil and Crop Sciences
Department of Bioagricultural Sciences and Pest Management
Colorado State University
Fort Collins, Colorado

and the

USDA - Agriculture Research Service
Natural Resources Research Center
Great Plains Systems Research Unit
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PROJECT HISTORY

The Dryland Agroecosystems Project was established in the fall of 1985 with the first winter wheat and corn crops harvested in 1986.The long-term research objectives are to provide producers with information that they can use to make management decisions under dryland cropping conditions and to learn more about soil quality and carbon sequestration parameters as impacted by intensive no-till dryland cropping systems in the semiarid environment of the west central Great Plains. Grain yields, stover yields, crop residue amounts, soil water measurements, and crop nutrient content have been reported annually in previously published technical bulletins. This bulletin covers the 2006 and 2007 research results. Common introduction and materials and methods sections are presented for the two years, while the production parameters mentioned above are presented by year, in two sections identified as Section A (2006) and Section B (2007).

Results from past years have shown that cropping intensification, compared to traditional stubble mulch tillage wheat fallow, is feasible and profitable in this environment if managed under no-till or minimum-till systems. The cropping systems evaluated from 1986 to 1998 included intensive rotations like wheat-corn(sorghum)-fallow and wheat-corn(sorghum)-millet-fallow with traditional wheat-fallow as the standard of comparison. The intense rotations of wheat-corn(sorghum)-fallow and wheat-corn(sorghum)-millet-fallow more than doubled grain water use efficiency relative to wheat-fallow. The increased soil water storage resulting from adoption of no-till systems made cropping intensification possible. The deletion of summer fallow, however, does increases the risk of water deficit for the following crop. The traditional wheat-fallow system requires less management skill and poses less risk relative to the intensive systems, but over time is less profitable. Government programs also affect management decisions greatly, particularly where producers have developed a good wheat or corn yield base.

Based on our findings with the intensive systems from 1985 to 1997 (12 cropping seasons), we altered the systems in 1998 to reduce the amount of fallow in our cropping systems. We now consider the 3-year (wheat-corn(sorghum)-fallow) system as the standard of comparison. These changes will be outlined later in this report. Unfortunately, shortly after we made these changes the region was hit with a drought. Some of the more intensive cropping systems have not been successful during the drought. Winter wheat planted after wheat or millet with no fallow period has had a high rate of crop failure and/or low yields due to lack of soil moisture for seed germination and/or inadequate stored soil moisture.

New Research Sites:

The dryland agroecosystems project established a linkage with the Department of Bioagricultural Sciences and Pest Management in 1997. We started evaluating the interactions of cropping systems with both pest and beneficial insects at three new experimental sites. The additional sites at Briggsdale, Akron, and Lamar also allow us to test our most successful intensive cropping systems at three new combinations of precipitation and evaporative demand and enable us to study insect dynamics as influenced by cropping system. We want to determine if the presence of multiple crops in the system will alter populations of beneficial insects and provide new avenues of biological pest management of Russian Wheat Aphid in wheat as well as insect pests in other crops. These results will be presented in a separate report.

Adoption of Intensive Cropping Systems:

Producers in northeastern Colorado adopted the more intensive cropping systems at an increasing rate from 1990 until 2002, the first year of the recent drought. The drought that started in fall 2001 had a devastating effect on dryland crop yields in 2002. Corn is one of the principal crops grown in the more intensive systems; thus we can use its acreage as an index of adoption rate by producers. Colorado Agricultural Statistic reported that there were only 55,000 acres of dryland corn harvested in 2002 (See table below) in Colorado. However, many thousands of additional acres were planted and not harvested.

Dryland Corn Acreage in Eight Northeastern Colorado Counties and state total from 1971 to 2005.

Year	Eight NE Counties*	Total for State
	Acres	
1971-1988	21,200	23,700
1989	27,000	28,000
1990	26,000	26,000
1991	32,500	33,000
1992	48,500	50,000
1993	79,000	90,000
1994	92,500	100,000
1995	95,500	100,000
1996	104,000	110,000
1997	138,500	150,000
1998	191,000	240,000
1999	220,000	290,000
2000	198,000	340,000
2001	233,000	305,000
2002	50,000	55,000
2003	150,700	205,000
2004	183,700	325,000
2005	140,900	235,000
2006	164,500	235,000
2007	204,300	360,000

*Data from CO Agric. Statistics (Adams, Kit Carson, Logan, Morgan, Phillips, Sedgewick, Washington, Yuma)

The drought had a dramatic effect on producers' ability to operate under intensive no-till cropping systems management. After 2002, the harvested dryland corn acreage rebounded to 205,000 in 2003; 325,000 in 2004; decreased again in 2005 and 2006 to 235,000 and 164,500, respectively; but rose sharply to 360,000 in 2007, a more favorable corn yield year.

Dryland corn is almost exclusively grown under no-till in a three or four year rotation, and thus we can estimate the total acreage under intensive dryland cropping systems from the annual dryland corn acreage statistics. So for 2006 and 2007 the state acreage of intensified dryland cropping systems was approximately 900,000 acres. The average economic impact of these systems is an increased return to land, labor, capital, and management of $14.85/acre (Kann et al., 2002), under an "average" rainfall environment.

INTRODUCTION

Colorado agriculture is highly dependent on precipitation from both snow and rainfall. In the dryland environment each unit of precipitation is critical to production. At Akron each additional inch (25 mm) of water above the initial yield threshold translates into 4.5 bu/A of dryland winter wheat (12 kg/ha/mm), consequently profit is highly related to water conservation (Greb et al., 1974). These data point to the need for maximum precipitation use efficiency in this semi-arid cropping environment and the importance of this project to producers.

The dryland cropping systems research project was established in 1985 to identify systems that maximize efficient water use under dryland conditions in Eastern Colorado. A more comprehensive justification for its initiation can be found in Peterson, et al. (1988). A summary of our general understanding of the climate-soil-cropping systems interactions can be found in a recent publication by Peterson and Westfall (2004).

The general objective of the project is to identify no-till dryland crop and soil management systems that will maximize water use efficiency of the total annual precipitation and economic return.

Specific objectives are to:

1. Determine if cropping sequences with fewer and/or shorter summer fallow periods are feasible.
2. Quantify the relationships among climate (precipitation and evaporative demand), soil type, and cropping sequences that involve fewer and/or shorter fallow periods.
3. Quantify the effects of long-term use of no-till management systems on soil structural stability, micro-organisms and faunal populations, and the organic C, N, and P content of the soil, all in conjunction with various crop sequences.
4. Identify cropping or management systems that will minimize soil erosion by crop residue maintenance.
5. Develop a data base across climatic zones that will allow economic assessment of entire management systems.

Peterson, et al. (1988) document details of the project in regard to the "start-up" period and data from the 1986-87 crop year. Previous year's results have been reported in CSU Agricultural Experiment Station Technical Bulletins that are available at the following web site: http://www.colostate.edu/Depts/aes/pubs_list.html. Other publications related to this project have been published by various graduate students, faculty, and postdoctoral students and are listed in Appendix C.

MATERIALS AND METHODS

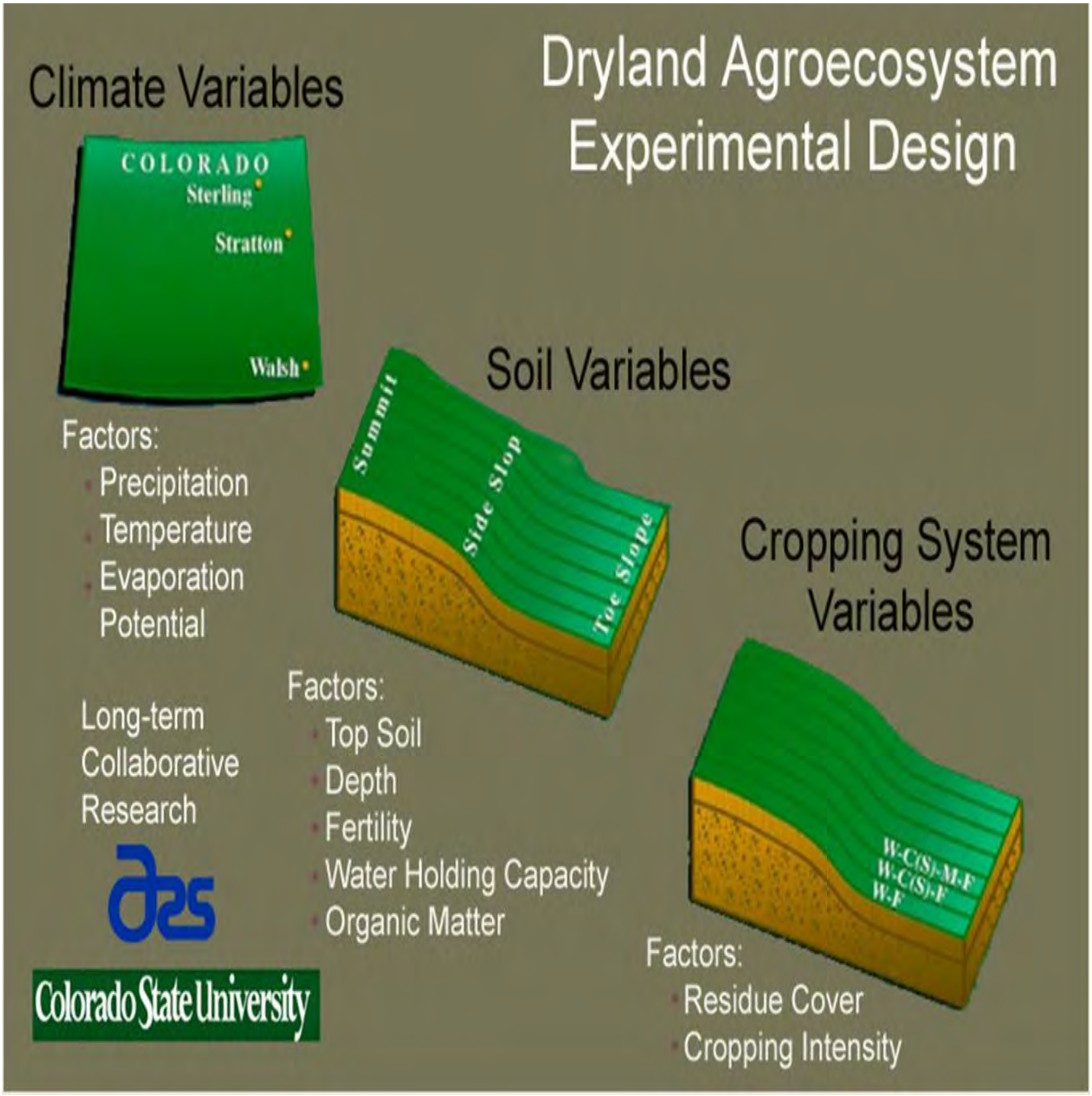
From 1986 -1997 we studied interactions of climate, soils and cropping systems at three sites, located near Sterling, Stratton, and Walsh, in Eastern Colorado, that represent a gradient in potential evapotranspiration (PET) (Fig. 1). Elevation, precipitation and evaporative demand are shown in Table 1. All sites have long-term precipitation averages of approximately 14-17 inches (400-450 mm), but increase in PET from north to south. Growing season open pan evaporation is used as an index of PET.

Table 1.Elevation, long-term average annual precipitation, and evaporation characteristics for each site.

Site	Elevation	Annual Precipitation^1	Growing Season Open Pan Evaporation2	Deficit (Precip. - Evap.)
	--Ft. (m) --	---In. (mm) ---	---In. (mm) ---	---In. (mm) ---
Briggsdale	4850 (1478)	13.7 (350)	61 (1550)	- 48 (- 1220)
Sterling	4400 (1341)	17.4 (440)	63 (1600)	- 45 (- 1140)
Akron	4540 (1384)	16.0 (405)	63 (1600)	- 47 (- 1185)
Stratton	4380 (1335)	16.3 (415)	68 (1725)	- 52 (- 1290)
Lamar	3640 (1110)	14.7 (375)	76 (1925)	- 62 (- 1555)
Walsh	3720 (1134)	15.5 (395)	78 (1975)	- 61 (- 1555)

[1] Annual precipitation = 1961-1990 mean; [2] Growing season = March - October

Each of the original three sites (Sterling, Stratton, and Walsh) was selected to represent a catenary sequence of soils common to the geographic area. Textural profiles for each soil at each location are shown in Figures 2a, 2b, and 2c. There are dramatic differences in soils across slope position at a given site and from site to site. We will contrast the summit soils at the three sites to illustrate how different the soils are. Each profile was described by NRCS personnel in the summer of 1991. Note first how the summit soils at the three sites differ in texture and horizonation. The surface horizons of these three soils (Ap) present a range of textures from loam at Sterling, to silt loam at Stratton, to sandy loam at Walsh. Obviously the water holding capacities and infiltration rates differ. An examination of the horizons below the surface reveals even more striking differences.



Dryland Agroecosystem Experimental Design

Climate Variables

Factors:

- Precipitation
- Temperature
- Evaporation Potential

Long-term Collaborative Research

Colorado State University

Soil Variables

Factors:

- Top Soil
- Depth
- Fertility
- Water Holding Capacity
- Organic Matter

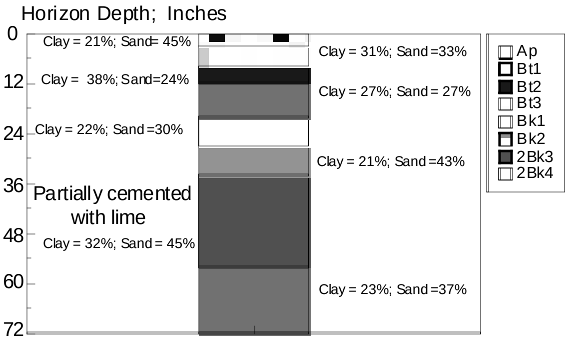
Cropping System Variables

Factors:

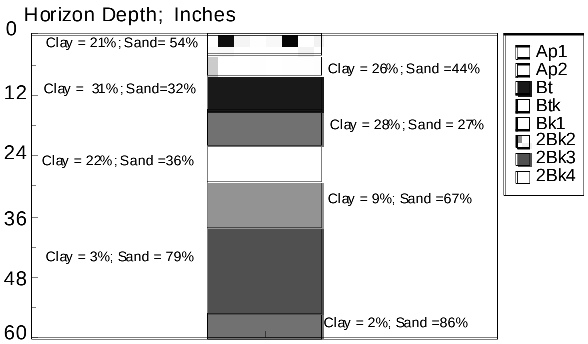
- Residue Cover
- Cropping Intensity

The summit soil profile at Sterling (Figure 2a) changes from a clay content of 21% at the surface(Ap) to 31% in the 3-8" depth (Bt1) to a clay content of 38% in the layer between the 8-12" depth (Bt2). At the 12" depth the clay content drops abruptly to 27%. The water infiltration in this soil is greatly reduced by this fine textured layer (Bt2). At about the 36" depth (2Bk3) there is an abrupt change from 21% clay to 32% clay in addition to a marked increase in lime content. The mixture of 32% clay and 45% sand with lime creates a partially cemented zone that is slowly permeable to water, but relatively impermeable to roots. Profile plant available water holding capacity is 9" in the upper 36 inches of the profile. This had limited crop production on this soil.

Sterling Summit Soil Profile



Sterling Sidelope Soil Profile



Sterling Toeslope Soil Profile

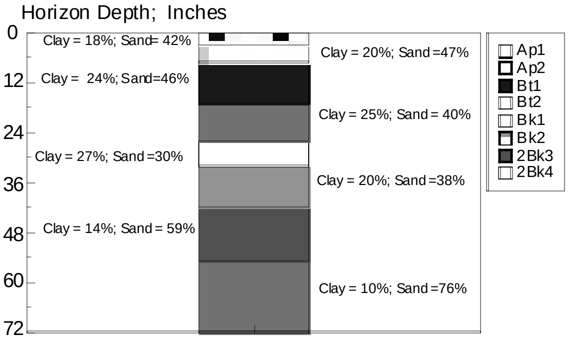
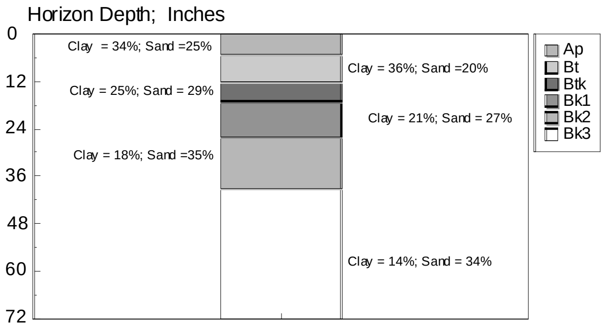
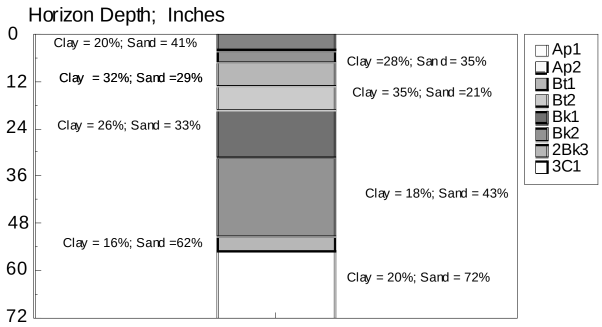


Figure 2a.Soil profile textural characteristics for soils at the Sterling site.

Stratton Summit Soil Profile



Stratton Sideslope Soil Profile



Stratton Toeslope Soil Profile

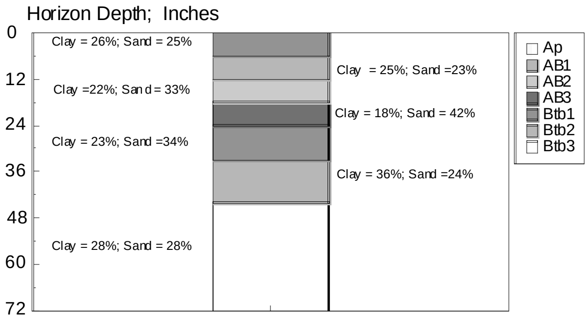
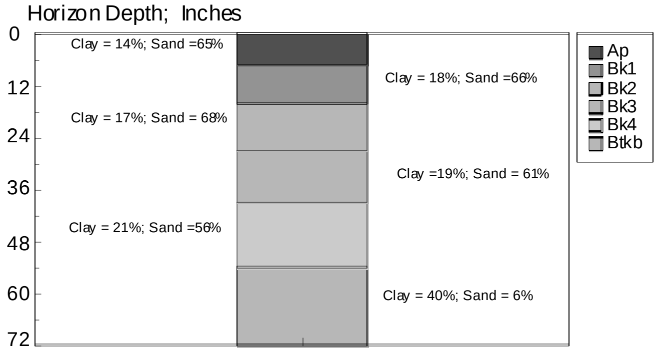
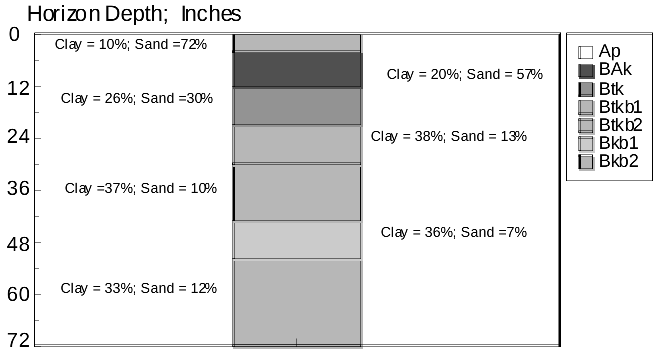


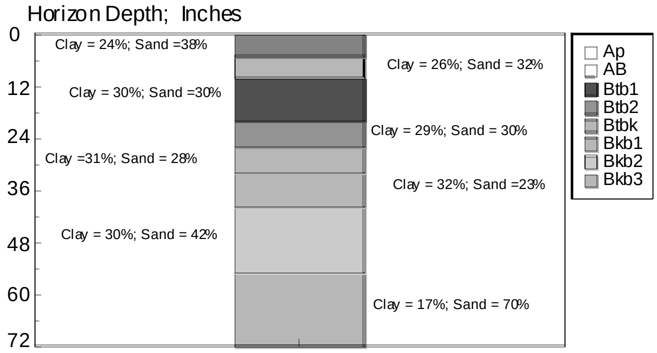
Figure 2b.Soil profile textural characteristics for soils at the Stratton site.



Walsh Summit Soil Profile



Walsh Sideslope Soil Profile



Walsh Toeslope Soil Profile

Figure 2c.Soil profile textural characteristics for soils at the Walsh site.

Cropping Systems/Management

The cropping systems that were in place in 2006 and 2007at the original three experimental sites (Sterling, Stratton and Walsh) are delineated in Table 2a. One of the cropping systems is “opportunity cropping”, which has the goal of producing a crop every year without summer fallow. The crops grown in this system from the initiation date to 2005 are shown in Table 2b. The cropping systems initiated in 1997 at the three new sites (Briggsdale, Akron, and Lamar) are shown in Table 2c. The cultivars planted, planting rates, dates and harvest information for each site are reported in Table 7 for 2006 and Table 29 for 2007.

Nitrogen fertilizer is applied annually in accordance with the NO_3-N content of the soil profile (0-6 ft), soil organic matter content (0-6 in) before planting, and expected yield on each soil position at each site. Therefore, N rate changes by year, crop grown, and soil position, if needed. The N rates at Sterling, Stratton and Walsh for 2006 are given in Table 3 and for 2007 in Table 28. Nitrogen fertilizer for wheat, corn, and sunflower was dribbled on the soil surface over the row at planting time at Sterling and Stratton. Zinc (1 lb/A) was applied to the corn with the P fertilizer. Nitrogen on wheat at Walsh was topdressed in the spring, and N was sidedressed on corn and sorghum. The N source was 32-0-0 solution of urea-ammonium nitrate. The same procedures were used for fertilization at Briggsdale. However, at Lamar commercial applicators or large plot equipment is used to apply the fertilizer at this location.

Phosphorus management is one of the experimental variables at Sterling, Stratton and Walsh. Consequently, P (10-34-0) was applied at planting near the seed. Phosphorus is applied on one-half of each corn and soybean plot over all soils, but applied to the entire wheat plot when a particular rotation is in wheat. The rate of P is determined by the lowest soil test on the catena, which is usually found on the sideslope position. This rate has been 20 lbs P_2O_5/A (9.5 kg/ha of P) at each site each year thus far. We changed the P fertilization treatment for wheat in fall 1992, so that the half plot that had never received P fertilizer in previous years receives P in the wheat phase of the rotation. This was required because low P availability was resulting in poor wheat stand establishment and low yields. Other crops in the rotation only receive P on the half plot designated as NP. Zinc (0.9 lbs/A) is banded near the seed at corn planting at Sterling, Stratton, and Briggsdale to correct a soil Zn deficiency.

Yields, Nitrogen, and Available Soil Moisture

Grain yields were determined using a small plot research combine. The center section of each treatment was harvested on each slope position. At maturity, meter row samples of each crop were collected and processed to determine stover (straw) to grain ratio. The stover (straw) and grain were processed and analyzed for total N using a combustion N analyzer.

Soil moisture measurements were taken at planting and harvest of each crop for each treatment and slope positions using the neutron-scatter technique. This timing also represents the beginning and end of non-crop fallow periods. Galvanized metal conduit was used for neutron probe access tubes and were installed, two per soil position, in each treatment at the Sterling, Stratton and Walsh sites. The access tubes were installed at the initiation of this study in 1987 and have not been moved since original installation. Available soil water and change over the growing season was calculated based upon the available soil water holding capacity for each treatment, depth and slope position.

SECTION A
2006 Results & Discussion

Climatic Data

Precipitation is the most limiting variable in dryland agriculture in Eastern Colorado. The precipitation received during the last six months of a given year greatly influences crop yield potential for the following crop year, especially spring planted crops. For the last half of 2005 Sterling only received 4.1 in of precipitation, which is about one-half the normal. At the Stratton site the 2005 precipitation was normal at 8.6 in. The Walsh site was similar to Sterling in that it received only 4.3 in, which is about one-half of the normal level (Table 4a).

Precipitation in the first six months of 2006 was well below the long-term normal amounts at all three sites. Sterling only received 20% of the normal, while Stratton and Walsh received about 70% and 50% of the normal, respectively. Based on these precipitation observations, yield potential for both fall planted and spring planted crops would be expected to be reduced at all sites.

Precipitation in the last six months of 2006 exceeded the normal amounts at Sterling and Walsh by 10 and 25%, respectively (Table 4a). Late season rainfall if stored in the soil provides a good starting point for spring crops the following year. The Stratton site was about 30% below the normal for this time period (Table 4a).

Precipitation patterns for the three newer sites are reported in Table 4b. Note that the precipitation for the last half of 2005 was near normal for the Akron and Lamar sites, but Briggsdale was at about 60% of the long-term normal amount. Precipitation in the first six months of 2006 at Briggsdale was in even greater deficit, only 15% of the norm. Akron remained near the normal for this period, but Lamar received only about 60% of the norm. The last half of 2006 precipitation was about average at Akron but was exceptional at Lamar, where it was double the normal amount for this period. Briggsdale remained dry relative to normal for this period, receiving only 80% of the normal amount.

An overall view of the 18 month period precipitation that affected 2006 yield potentials revealed that the Sterling, Stratton, and Walsh sites were only at about 60, 75, and 75% of the normal for the period (Table 4a). At the northernmost of the newer sites, Briggsdale, precipitation was 50% below the normal (Table 4b). At Akron and Lamar the amounts received exceed the normal, especially at Lamar.

Precipitation received during the vegetative production stage (Sept-Mar) and the reproductive stage for corn and wheat from 1987-2006 are shown in Tables 5a-c for Sterling, Stratton, and Walsh. Similar data for the Briggsdale, Akron, and Lamar sites is shown in Tables 6a-c. We will refer to these data more extensively in the crop yield discussion section of the bulletin.

Wheat Production

Wheat yields at the Sterling and Walsh sites (Table 8) were below average (site average yields less than 20 bu/A at Sterling and less than 10 bu/A at Walsh) as a result of low preplant soil water content (Table 20), below average fall precipitation (Table 4a) and below normal rainfall during the reproductive period (Tables 5a and 5c). Wheat yields at Stratton, although larger than at Sterling and Walsh, were about half of the long-term average yield at this site. The higher yields were related to more soil water content at planting (Table 20), which was the result of better 2005 fall rainfall than at the other two sites (Table 4a). Below average precipitation during the reproductive period at Stratton decreased the yields relative to other years. Wheat yields following fallow in the WCF and WSF systems were the highest at all sites, as would be expected, because of the greater opportunity to store soil water.

Note that wheat yields on the summit and side slope soil positions at Sterling and Stratton tended to be higher on the NP side. The NP side of the plot has received P for the life of the experiment (Table 8). We apply P fertilizer at a rate of 20 lbs P_2O_5/A (9.5 kg/ha of P) at wheat planting each year on both the N and NP sides of each plot. Originally P was only applied to the side labeled NP. We changed the P fertilization treatment for wheat in fall 1992, so that the half plot that had never received P fertilizer in previous years began receiving P fertilizer at each wheat planting event after that year. This change was necessary because low P availability was resulting in poor wheat stand establishment and low yields. Other crops in the rotation only receive P on the half plot designated as NP. This adjustment also permits us to measure the residual P fertilizer effect on the yield of other crops.

Wheat yields at the three newer sites varied from relatively good at Lamar to below average at Akron and Briggsdale (Table 9). The yields are linked to the precipitation patterns reported in Table 4b. The Akron site had near normal precipitation in the last half of 2005, and thus good soil moisture for stand establishment. This site also had adequate spring precipitation in 2006, but less than 45% of the normal June rainfall. Since June is the grain fill period, it is likely that this deficit resulted in the lower than expected grain yields.

Wheat yields at the Briggsdale site were low because of below average precipitation from pre-planting through grain fill. For example, in June this site only received 10% of the normal rainfall. Even though wheat followed a summer fallow period in all rotations, the stored water was inadequate to sustain normal yields.

Wheat yields at Lamar were near the average for this site. Normal precipitation levels in late 2005 provided good soil moisture for stand establishment and the stored soil water was apparently adequate to provide for the plants despite lower than average spring precipitation.

Rotation effects on wheat grain yield were not apparent, except that the most intense rotations at Akron and Briggsdale yielded about half of the yield in the other rotations. The reason is not obvious.

Corn/Sorghum Production

Corn yields at Sterling and Stratton were far below average in 2006, but sorghum yields at Walsh were average to above average, especially on the summit and sideslope soil positions (Table10). Corn yields in Eastern CO are highly correlated to July and August precipitation amounts (Nielsen et al. 1996), and according to the data in Table 4a it would seem that Sterling corn yields should have been higher. However, June precipitation at the Sterling site was essentially zero, and thus the corn plants were too drought damaged to recover. Corn yields at Stratton also were well below the expected yield based on July and August precipitation (Table 4a). At this site June precipitation was slightly above average, and thus it is not obvious why the yields were so low. The excellent grain sorghum yields at the Walsh site were attributable to the 35% above normal July and August precipitation (Table 4a). Plant population issues may have contributed to the lower than expected sorghum yields at the toeslope position.

Corn yield responses to P fertilization occurred on the sideslope soil positions at both Sterling and Stratton, but not at the summit position where soil P levels also are low. Soil test P levels on the toeslope positions are in the high category and no response is expected in any year. The lack of corn yield response on the summit positions probably indicates that the carryover from the wheat P fertilization was adequate for the corn. Grain sorghum at Walsh responded to P fertilization on summit and sideslope soil positions as would be expected from the low soil test P levels. It also indicates that carryover from the P fertilization of the wheat did not meet the plant demands. Grain sorghum on the toeslope seemed to respond to some degree, which is surprising when soil test P levels on those soils are considered.

Corn yield and sorghum yields were not affected by rotation, which is as expected because in all cases these crops follow a wheat crop and thus have the same soil moisture regime. The exception was the continuous corn at the Walsh site, which had low yield on all soil positions. Corn following corn leaves a very low soil water regime for the any spring crop that might follow it in the rotation.

Akron was the only one of the three newer sites where corn was grown in 2006 and it was a total failure (Table11). This was an unexpected because total July and August precipitation was three in. above the long-term average amount.

Proso Millet

The proso millet at Sterling was sprayed out due to major weed problems and yields at Stratton and Walsh were low (Table 12). The low yields are most likely due to lack of weed control because summer precipitation was adequate at both sites (Table 4a). Proso millet at Briggsdale and Lamar yielded 32 and 19 bu/A, respectively, which is respectable for those climatic conditions (Table 11)..

Forage Crops and Barley for Grain

Forage sorghum was produced at the Briggsdale and Lamar sites, and yields were 1.1 and 3.0 T/A, respectively (Table 11). Spring barley was produced at the Akron and Briggsdale sites in place of winter wheat. All barley grain yields were less than 8 bu/A at both sites, which was regarded as a crop failure (Table 11). The dry conditions did not permit good stand establishment.

Nitrogen Content of Grain and Stover (straw)

The N content of all grain and stover (straw) in all crops is measured annually at the Sterling, Stratton and Walsh sites (Tables 13-18). Wheat grain N content (Table13) ranged from a low of 2.3 to a high of 3.2%, which is equivalent to grain protein contents of 13.1 to 18.2%. Low wheat grain yields resulted in these higher than expected grain N (protein) levels. The low grain yields also resulted in relatively high wheat straw N contents (Table 14).

Corn and sorghum grain N contents (Table 15) ranged from a low of 1.6 to a high of 2.3%, which is equivalent to grain protein contents of 10.1 to 14.5%. As with the wheat crop the low corn grain yields at Sterling and Stratton contributed to the higher than normal grain N contents. Sorghum at Walsh had excellent grain N contents given the better than average sorghum grain yields.

No millet grain was harvested at the Sterling site and no samples were taken at Stratton; thus no millet grain N content is reported for those sites (Table17). Millet grain N contents at Walsh averaged about 2.3%, which is equivalent to about 14% protein. Millet stover N contents averaged about 1.5% (Table 18).

Soil Moisture

Available soil moisture contents are measured annually at planting and harvest of each crop in one foot depth increments at the Sterling, Stratton, and Walsh sites to a depth of six feet or to bedrock in the case of the shallower soils. Soil moisture data for 2006 are presented in Tables 19-26. The total amount water used by a given crop can be estimated by adding the change in soil water content between planting and harvesting to the amount of precipitation received during the growing season. Since we have no measure of how much of the precipitation infiltrates, the crop water use with this method is an estimate.

SECTION B
2007 Results & Discussion

Climatic Data

The precipitation received during the last six months of a given year greatly influences crop yield potential for the following crop year, especially spring planted crops. For the last half of 2006 the Sterling site received slightly more rainfall than normal, but it was concentrated in the summer months and rainfall from October through December was well below normal. At the Stratton site the 2006 precipitation was only 63% of the normal and the late fall amounts were essentially zero. At the Walsh site the last half of 2006 received 30% more than normal (Table 30a).

Precipitation in the first six months of 2007 was below the long-term normal amounts at all three sites. Sterling and Stratton received 75 and 85% of the normal, respectively, but the Walsh only received 25% of the normal.

Precipitation in the last six months of 2007, which is the most influential on yield potential of spring planted crops, exceeded the normal amounts at Sterling by 30%. However, at the Stratton and Walsh sites the last half of 2007 precipitation amounts were 60 and 17% of normal, respectively (Table 30a).

Precipitation patterns for the three newer sites are reported in Table 30b. Precipitation in the last half of 2006 exceeded the normal amounts the Akron and Lamar sites, but Briggsdale received only about 75% of the long-term normal amount. Precipitation in the first six months of 2007 was below normal at all three sites; 70, 90, and 60% of the normal amounts for Briggsdale, Akron, and Lamar, respectively. Precipitation in the last half of 2007 was about average at Akron, but was about 78% of normal at Briggsdale and only 55% at Lamar.

In general the 18 month period precipitation that affected 2007 yield potentials was near normal at the Sterling and Akron sites, above normal at Lamar, and well below normal at the Briggsdale, Stratton, and Walsh sites.

Precipitation received during the vegetative production stage (Sept-Mar) and the reproductive stage for corn and wheat from 1987-2007 are shown in Tables 30c-e for Sterling, Stratton, and Walsh. Similar data for the Briggsdale, Akron, and Lamar sites is shown in Tables 30f-h. We will refer to these data more extensively in the crop yield discussion section of the bulletin.

Wheat production

Wheat production at Sterling and Stratton in 2007 was greater than in 2006 (Table 31), which was attributable to improved moisture conditions at wheat planting (Table 30a) and excellent precipitation during the reproductive period (Tables 30c and 30d). Yields after fallow in the WCF rotation at these sites were near the long-term averages except for the toeslope position at Stratton, which usually yields above 70 bu/A. Wheat yields at Walsh were about 15 bu/A higher than the long-term average for this location. This was unusual given that the precipitation during the reproductive stage was below normal (Table 30e).

Rotation had a noticeable effect on wheat yields at the Sterling site (Table 31). Wheat grain yields in rotations without fallow were noticeably less than WCF. The exception was the yield of wheat following wheat in the WW2CM rotation, which yielded almost as much as wheat after fallow (Table 31). The probable reason for this occurrence was that the first year wheat (W1) yield in 2006 was low, and thus it was almost like a fallow treatment. At the Stratton site rotation had less effect on wheat yield, and in fact with adequate P fertilizer there was little yield reduction. At the Walsh site yields were about the same no matter the rotation.

Wheat yields on the side slope soil positions at Sterling and Stratton tended to be higher on the NP side (Table 31). There were no measureable yield differences at the Walsh site due to P fertilizer treatment. As a reminder, the NP side of the plot has received P for the life of the experiment (Table 8). We apply P fertilizer at a rate of 20 lbs P_2O_5/A (9.5 kg/ha of P) at wheat planting each year on both the N and NP sides of each plot. Originally P was only applied to the side labeled NP. We changed the P fertilization treatment for wheat in fall 1992, so that the half plot that had never received P fertilizer in previous years began receiving P fertilizer whenever wheat is planted in that plot. This change was necessary because low P availability was resulting in poor wheat stand establishment and low yields. Other crops in the rotation only receive P on the half plot designated as NP. This adjustment also permits us to measure the residual P fertilizer effect on the yield of other crops.

Wheat yields at the Briggsdale, Akron, and Lamar sites also were higher, relative to 2006 (Table 32). Yields at Briggsdale averaged over 35 bu/A, which for this very water limited site, was excellent. Surface soil water contents at field capacity at planting and above average May rainfall probably were responsible for the good yields (Table 30b). Yields at Akron, were not as good as can be expected at this site, and the reason for this is unknown because the rainfall during the reproductive stage was near normal. The Lamar site wheat yields were excellent, especially with the Hatcher variety, which averaged 48 bu/A. The high yield was attributable to field capacity water content in the surface soil at planting and the above average May precipitation (Table 30b).

Rotation effects were observable at the Akron site where the longer summer fallow period of the WF rotation produced the highest yield (Table 30b). At the Briggsdale and Lamar sites the rotation effects were more subtle. In fact at Briggsdale the rotations with less summer fallow time had the highest yields. Reasons for the anomalies related to rotation at Briggsdale and Lamar are not obvious.

Corn/Sorghum

Corn and sorghum yields at the Sterling, Stratton, and Walsh sites were near the long-term means for these sites (Table 33). Precipitation during the corn reproductive period at Sterling was about normal for this period, and corn yields at that site reflected this fact. The only unusually low yields were on the summit soil position, and we have no explanation for this abnormality (Table 33). Rotation had no effect on corn yields at Sterling, which is not surprising because the soil water storage period for all rotations is the same length and corn yield is most dependent on late summer precipitation.

Although corn yields at Stratton was better in 2007 than in 2006, they were not up to expected levels for this site. Lower than normal rainfall amounts during the reproductive period probably accounts for this fact (Table 30d). Rotation effects were not obvious for the same reason given for Sterling.

Sorghum yields at Walsh (Table 33) were lower than normally expected for this site, but given the very low June, July, and August rainfall levels (Table 30a), the yields were respectable. Neither soil position nor rotation appeared to affect sorghum yields. However continuous cropping treatments did yield less than sorghum in set rotations like WSF.

The only one of the three newer sites that had corn or grain sorghum in 2007 was Akron and the corn crop was a total failure in 2007 (Table 35).

Proso Millet

Proso millet yields at the Sterling site were in the expected range, but yields at Stratton were much lower than expected (Table 34). At Walsh the millet crop was considered a complete failure. Both the Stratton and Walsh sites were water stressed in the summer of 2007, but given the yield levels of corn and sorghum, the low millet yields were not anticipated.

Proso millet was also grown at the three newer sites. The crop failed at Akron, yielded about 6 bu/A at Briggsdale, and about 20 bu/A at Lamar (Table 35). The reason for the crop failure at Akron and low yield at Briggsdale was not due to lack of precipitation at those sites because the Lamar site received even less summer rainfall and yet yielded relatively well. With the data available we have no explanation for the low yields at these sites.

Summer Crops

In addition to wheat, corn and millet the crop rotations at the Akron, Briggsdale, and Lamar sites included triticale for forage, foxtail millet for forage, forage sorghum, and spring barley. The yields for each of these crops are reported in table 35. Note that in all cases the crops grown for forage yielded relatively well. Spring barley, grown as a substitute for wheat, produced 35 to 40 bu/A at the Akron site, but yielded less than 5 bu/A at Briggsdale.

Nitrogen Content of Grain and Stover (straw)

The N content of all grain and stover (straw) in all crops is measured annually at the Sterling, Stratton and Walsh sites (Tables 36a-38b). Wheat grain N content (Table 36a) ranged from a low of 1.7 to a high of 3.0%, which is equivalent to grain protein contents of 9.7 and 17.1%. The lower grain N contents were associated with the higher wheat grain yields. For example the lowest N contents occurred at the Walsh site (Table 36a), which had the highest wheat grain yields (Table31). Wheat straw N contents reported in Table 36b were inversely related to grain N content as would be expected. Lower grain yields resulted in higher grain N contents and lower straw N contents.

Corn and sorghum grain N contents (Table 15) ranged from a low of 1.5 to a high of 2.2% (Table 37a), which is equivalent to grain protein contents of 9.45 to 13.9%. Stover N contents ranged from 0.95 to 2.27% (Table 37b).

Millet grain N contents are only reported for the Sterling site, where they averaged about 2.3%, which is equivalent to 14.5% protein (Table 38a). Millet stover N contents averaged about 1.75% (Table 38b).

Residual Soil Nitrate

Residual soil nitrate levels before planting wheat and corn and sorghum at Sterling, Stratton, and Walsh are reported in Table 39. The residual soil N levels for the wheat crop ranged from 30 to 200 kg N/ha in the soil profile across all sites and slope positions. Residual levels prior to corn and sorghum planting ranged from 25 to 140 kg N/ha in the soil profile across all sites and slope positions. Residual levels prior to proso millet planting ranged from 15 to 205 kg N/ha in the soil profile across all sites and slope positions. Residual N levels did not appear to be related to soil position or crop grown previously.

Soil Moisture

Available soil moisture contents are measured annually at planting and harvest of each crop in one foot depth increments at the Sterling, Stratton, and Walsh sites to a depth of six feet or to bedrock in the case of the shallower soils. Soil moisture data for 2007 are presented in Tables 40-47. The total amount water used by a given crop can be calculated by adding the change in soil water content between planting and harvesting to the amount of precipitation received during the growing season.

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Table 2a. Cropping systems for each of the original sites in 2005-2006 and 2006-2007 cropping year.

Site	Rotations
Sterling	1) Wheat-Corn-Fallow (WCF)
	2) Wheat-Corn-Millet (WCM)
	3) Wheat1-Wheat2-Corn-Millet (WWCM)
	4) Opportunity Cropping*
	5) Perennial Grass
Stratton	1) Wheat-Corn-Fallow (WCF)
	2) Wheat-Corn-Millet (WCM)
	3) Wheat1-Wheat2-Corn-Millet (WWCM)
	4) Opportunity Cropping*
	5) Perennial Grass
Walsh	1) Wheat-Corn-Fallow (WSF)
	2) Wheat-Corn-Millet (WCB)
	3) Wheat1-Wheat2-Corn-Mung Bean (WWCB)
	4) Opportunity Cropping*
	5) Perennial Grass
	6) Continuous Row Crop (Alternate corn & sorghum)

*Opportunity cropping is designed to be continuous cropping without fallow, but not monoculture. See Table 2b for specific crops present each year.

Table 2b. Opportunity cropping history from 1985 to 2007 at the original dryland sites.

	Site		
Year	**Sterling**	**Stratton**	**Walsh**
1985	Wheat	Fallow	Sorghum
1986	Wheat	Wheat	Sorghum
1987	Corn	Sorghum	Proso Millet
1988	Corn	Sorghum	Sudex
1989	Attempted hay millet	Attempted hay millet	Sorghum
1990	Wheat	Wheat	Attempted sunflower
1991	Corn	Corn	Wheat
1992	Hay millet	Hay Millet	Corn
1993	Corn	Corn	Fallow
1994	Sunflower	Sunflower	Wheat
1995	Wheat	Wheat	Wheat
1996	Corn	Corn	Fallow
1997	Hay millet	Hay Millet	Corn
1998	Wheat	Wheat	Sorghum
1999	Corn	Corn	Corn
2000	Austrian Winter Pea	Austrian Winter Pea	Soybean
2001	Wheat	Wheat	Sorghum
2002	Corn	Corn	Sorghum
2003	Corn	Proso Millet	Sorghum
2004	Proso Millet	Proso Millet	Corn
2005	Corn	Corn	Corn
2006	Proso Millet	Proso Millet	Sorghum
2007	Wheat	Wheat	Corn

Table 2c. Cropping systems in 2005-2006 for the Briggsdale, Akron, and Lamar Sites.

Site	Rotations
Briggsdale	1) Wheat-Fallow (WF)
	2) Wheat-Hay Millet-Fallow (WMF)
	3) Wheat-Corn-Fallow (WCF)
	4) Barley-Triticale-Millet (BTM)
	5) Opportunity (Fallowed in 2006)
Akron	1) Wheat-Fallow (WF)
	2) Wheat-Millet (Proso)-Flex (W-M-Flex)
	3) Triticale/Pea-Foxtail Millet - Flex (T/P-M-Flex)
	4) Wheat-Barley-Corn-Flex (WBCF)
Lamar	1) Wheat-Fallow (WF)
	2(Wheat-Sorghum (Forage)-Fallow (WSF)
	3) Wheat-Millet-Fallow (WMF)

Table 3. Nitrogen fertilizer application by soil and crop for 2006.

					ROTATION		
SITE	**SOIL**	**CROP**	**W'WCM**	**WW'CM**	**WCM**	**WCF**	**OPP**
Sterling	Summit	Wheat	60 lb.	60 lb.	60 lb.	60 lb.	-
	Sideslope	"	60 lb.	60 lb.	60 lb.	60 lb.	-
	Toeslope	"	60 lb.	60 lb.	60 lb.	60 lb.	-
	Summit	Corn	75 lb.	75 lb.	75 lb.	75 lb.	-
	Sideslope	"	75 lb.	75 lb.	75 lb.	75 lb.	-
	Toeslope	"	75 lb.	75 lb.	75 lb.	75 lb.	-
	Summit	Millet	40 lb.	40 lb.	40 lb.	-	40 lb.
	Sideslope	"	40 lb.	40 lb.	40 lb.	-	40 lb.
	Toeslope	"	40 lb.	40 lb.	40 lb.	-	40 lb.
			W'WCM	WW'CM	WCM	WCF	OPP
Stratton	Summit	Wheat	60 lb.	60 lb.	60 lb.	60 lb.	-
	Sideslope	"	60 lb.	60 lb.	60 lb.	60 lb.	-
	Toeslope	"	60 lb.	60 lb.	60 lb.	60 lb.	-
	Summit	Corn	75 lb.	75 lb.	75 lb.	75 lb.	-
	Sideslope	"	75 lb.	75 lb.	75 lb.	75 lb.	-
	Toeslope	"	75 lb.	75 lb.	75 lb.	75 lb.	-
	Summit	Millet	40 lb.	40 lb.	40 lb.	-	40 lb.
	Sideslope	"	40 lb.	40 lb.	40 lb.	-	40 lb.
	Toeslope	"	40 lb.	40 lb.	40 lb.	-	40 lb.
			WWSM	WSM	WSF	WCM	CONT. CROP
Walsh	Summit	Wheat	6 lb.	6 lb.	6 lb.	6 lb.	-
	Sideslope	"	6 lb.	6 lb.	6 lb.	6 lb.	-
	Toeslope	"	6 lb.	6 lb.	6 lb.	6 lb.	-
	Summit	Sorghum	6 lb.	6 lb.	6 lb.	-	6 lb.
	Sideslope	"	6 lb.	6 lb.	6 lb.	-	6 lb.
	Toeslope	"	6 lb.	6 lb.	6 lb.	-	6 lb.
	Summit	Corn	-	-	-	6 lb.	-
	Sideslope	"	-	-	-	6 lb.	-
	Toeslope	"	-	-	-	6 lb.	-
	Summit	Millet	-	-	-	-	-
	Sideslope	"	-	-	-	-	-
	Toeslope	"	-	-	-	-	-

Table 4a. Monthly precipitation for the original sites for the 2005 - 2006 growing season.

MONTH	LOCATION					
	STERLING		STRATTON		WALSH	
	Inches	Inches	Inches	Inches	Inches	Inches
2005	2005	Normals[1]	2005	Normals[1]	2005	Normals[1]
JULY	0.50	3.23	1.20	2.80	1.20	2.62
AUGUST	1.50	1.90	3.50	2.60	1.30	1.96
SEPTEMBER	0.20	1.04	0.00	1.45	0.20	1.74
OCTOBER	1.30	0.76	3.60	0.85	1.50	0.89
NOVEMBER	0.60	0.50	0.30	0.62	0.10	0.53
DECEMBER	0.00	0.40	0.00	0.28	0.00	0.31
SUBTOTAL	4.10	7.83	8.60	8.60	4.30	8.05
	Inches	Inches	Inches	Inches	Inches	Inches
2006	2006	Normals[1]	2006	Normals[1]	2006	Normals[1]
JANUARY	0.32	0.33	0.22	0.28	0.25	0.27
FEBRUARY	0.03	0.33	0.01	0.30	0.00	0.28
MARCH	0.26	1.07	0.14	0.76	0.50	0.81
APRIL	0.32	1.60	0.56	1.23	0.67	1.15
MAY	0.93	3.27	1.42	2.70	1.22	2.69
JUNE	0.04	3.00	2.85	2.45	1.06	2.29
SUBTOTAL	1.90	9.60	5.20	7.72	3.70	7.49
	Inches	Inches	Inches	Inches	Inches	Inches
2006	2006	Normals[1]	2006	Normals[1]	2006	Normals[1]
JULY	1.95	3.23	1.93	2.80	2.30	2.62
AUGUST	3.33	1.90	1.56	2.60	3.94	1.96
SEPTEMBER	2.03	1.04	0.83	1.45	1.42	1.74
OCTOBER	1.01	0.76	1.14	0.85	1.79	0.89
NOVEMBER	0.01	0.50	0.01	0.62	0.00	0.53
DECEMBER	0.09	0.40	0.07	0.28	0.98	0.31
SUBTOTAL	8.42	7.83	5.54	8.60	10.43	8.05
YEAR TOTAL	10.32	17.43	10.74	16.32	14.13	15.54
18 MONTH TOTAL	14.42	25.26	19.34	24.92	18.43	23.59

[1] Normals = 1961 - 1990 database

Table 4b. Monthly precipitation for the three new sites for the 2005 - 2006 growing season.

MONTH	**LOCATION**					
	BRIGGSDALE		**AKRON**		**LAMAR**	
	Inches	**Inches**	**Inches**	**Inches**	**Inches**	**Inches**
2005	2005	Normals[1]	2005	Normals[1]	2005	Normals[1]
JULY	0.30	2.51	1.68	2.67	0.50	2.23
AUGUST	0.86	1.81	3.14	2.11	3.85	1.85
SEPTEMBER	0.32	1.28	0.13	1.24	0.35	1.32
OCTOBER	2.01	0.66	2.86	0.90	1.85	0.71
NOVEMBER	0.32	0.45	0.57	0.55	0.12	0.56
DECEMBER	0.00	0.27	0.09	0.40	0.04	0.40
SUBTOTAL	3.81	6.98	8.50	7.87	6.71	7.07
	Inches	**Inches**	**Inches**	**Inches**	**Inches**	**Inches**
2006	2006	Normals[1]	2006	Normals[1]	2006	Normals[1]
JANUARY	0.00	0.30	0.11	0.33	0.11	0.42
FEBRUARY	0.00	0.19	0.00	0.35	0.00	0.41
MARCH	0.44	0.78	0.35	0.84	0.35	0.90
APRIL	0.12	1.28	1.17	1.64	1.17	1.15
MAY	0.36	1.94	1.74	2.96	1.74	2.50
JUNE	0.16	2.07	1.01	2.47	1.01	2.18
SUBTOTAL	1.08	6.56	7.78	8.59	4.38	7.56
	Inches	**Inches**	**Inches**	**Inches**	**Inches**	**Inches**
2006	2006	Normals[1]	2006	Normals[1]	2006	Normals[1]
JULY	2.16	2.51	3.37	2.64	3.35	2.23
AUGUST	0.86	1.81	4.39	2.12	6.45	1.85
SEPTEMBER	1.97	1.28	1.19	1.24	2.18	1.32
OCTOBER	0.00	0.66	0.65	0.93	4.23	0.71
NOVEMBER	0.00	0.45	0.00	0.53	0.00	0.56
DECEMBER	0.59	0.27	0.09	0.40	0.47	0.40
SUBTOTAL	5.58	6.98	9.69	7.86	16.68	7.07
YEAR TOTAL	6.66	13.54	17.47	16.45	21.06	14.63
18 MONTH TOTAL	10.47	20.52	25.97	24.32	27.77	21.70

[1] Normals = 1961 - 1990 database

Table 5a. Precipitation by growing season segments for STERLING SITE from 1987-2006.

Year	Wheat Vegetative Sept.-March Inches	Wheat Reproductive April-June Inches	Corn Pre-plant July-April Inches	Corn Growing Season May - Oct. Inches
1987-88	5.2	9.9	11.1	15.8
1988-89	3.1	6.5	10.5	14.3
1989-90	5.1	4.7	11.8	13.0
1990-91	3.8	7.2	12.3	11.7
1991-92	4.5	4.8	9.1	14.8
1992-93	4.5	6.2	15.5	10.6
1993-94	6.4	3.0	10.2	6.1
1994-95	7.3	14.4	9.6	17.2
1995-96	4.2	9.2	7.5	18.0
1996-97	4.7	7.0	10.6	21.4
1997-98	5.5	4.9	16.7	13.8
1998-99	5.8	7.7	13.5	12.8
1999-00	5.7	3.0	12.6	8.6
2000-01	6.8	8.2	11.5	13.8
2001-02	4.2	1.9	8.2	8.1
2002-03	5.2	7.6	12.9	8.4
2003-04	1.3	5.3	6.4	10.1
2004-05	3.5	6.6	10.5	8.5
2005-06	2.7	1.3	5.0	9.3
Long Term Average	4.7	6.3	10.8	12.4

Table 5b. Precipitation by growing season segment for STRATTON SITE from 1987-2006.

Year	Wheat Vegetative Sept.-March Inches	Wheat Reproductive April-June Inches	Corn Preplant July-April Inches	Corn Growing Season May - Oct. Inches
1987-88	4.3	7.2	8.8	12.6
1988-89	3.0	9.4	5.3	15.5
1989-90	5.3	6.1	11.0	13.4
1990-91	4.4	4.1	10.7	14.7
1991-92	3.3	6.1	14.2	13.6
1992-93	3.3	3.8	11.8	14.7
1993-94	4.3	7.8	16.7	13.5
1994-95	7.0	10.0	14.8	13.7
1995-96	3.5	6.0	8.1	14.5
1996-97	2.9	6.2	12.2	23.2
1997-98	8.0	5.9	22.6	13.9
1998-99	4.4	8.5	15.6	12.3
1999-00	6.2	3.9	14.2	8.8
2000-01	4.7	4.3	9.8	10.6
2001-02	3.8	2.2	9.5	6.9
2002-03	4.1	8.7	8.6	10.9
2003-04	5.1	3.8	9.8	6.3
2004-05	3.5	6.7	7.1	13.9
2005-06	4.3	4.8	9.5	9.7
Long Term Average	4.5	6.1	11.6	12.8

Table 5c. Precipitation by growing season segment for the WALSH site from 1987-2006.

Year	Wheat Vegetative Sept.-March Inches	Wheat Reproductive April-June Inches	Corn Preplant July-April Inches	Corn Growing Season May - Oct. Inches
1987-88	4.3	7.6	7.4	11.1
1988-89	4.1	11.5	8.1	20.2
1989-90	5.7	7.4	14.1	12.5
1990-91	5.0	7.7	11.7	12.2
1991-92	2.7	5.8	7.1	13.2
1992-93	6.1	9.2	13.8	14.5
1993-94	3.2	5.3	8.7	16.3
1994-95	4.6	7.2	16.6	7.2
1995-96	1.7	3.5	1.9	17.1
1996-97	5.8	5.3	17.2	11.3
1997-98	6.9	2.3	12.3	13.3
1998-99	8.2	7.4	19.4	14.5
1999-00	7.9	3.2	15.8	10.0
2000-01	9.0	7.9	13.4	9.6
2001-02	1.7	2.2	2.9	11.8
2002-03	6.7	11.4	15.8	12.5
2003-04	3.2	10.1	8.2	13.5
2004-05	3.0	4.7	8.5	8.3
2005-06	2.6	3.0	5.7	11.7
Long Term Average	4.9	6.5	11.0	12.7

Table 6a. Precipitation by growing season segment for Briggsdale from 1997-2006.

Year	Wheat Vegetative Sept.-March Inches	Wheat Reproductive April-June Inches	Corn Preplant July-April Inches	Corn Growing Season May - Oct. Inches
1997-98	3.9	3.9	11.6	11.9
1998-99	4.6	8.4	15.3	12.4
1999-00	4.7	3.7	11.4	4.9
2000-01	2.9	8.0	5.6	10.4
2001-02	3.2	2.2	5.9	6.7
2002-03	3.8	4.9	8.1	7.1
2003-04	1.2	4.3	6.5	6.7
2004-05	3.1	5.6	5.6	8.7
2005-06	3.1	0.6	4.4	5.5
Long Term Average	3.4	4.6	8.3	8.3

Table 6b. Precipitation by growing season segment for the Akron Site from 1997-2006.

Year	Wheat Vegetative Sept.-March Inches	Wheat Reproductive April-June Inches	Corn Preplant July-April Inches	Corn Growing Season May - Oct. Inches
1997-98	5.6	2.1	11.1	6.5
1998-99	2.8	7.9	11.4	17.1
1999-00	6.0	2.7	16.3	9.9
2000-01	6.4	6.3	12.1	12.7
2001-02	3.5	2.7	8.8	8.3
2002-03	5.9	10.9	11.9	11.3
2003-04	1.9	6.1	6.3	13.3
2004-05	4.5	7.2	10.7	15.9
2005-06	4.1	3.9	10.1	12.4
Long Term Average	4.5	5.5	11.0	11.9

Table 6c. Precipitation by growing season segment for the Lamar Site from 1997-2006.

Year	Wheat Vegetative Sept.-March Inches	Wheat Reproductive April-June Inches	Corn Preplant July-April Inches	Corn Growing Season May - Oct. Inches
1997-98	10.5	2.6	19.4	15.9
1998-99	7.5	9.2	22.5	11.0
1999-00	4.5	2.4	9.9	4.4
2000-01	3.6	7.0	5.7	10.2
2001-02	1.6	1.6	5.1	4.8
2002-03	4.5	6.0	6.8	8.5
2003-04	2.1	8.2	7.7	12.9
2004-05	7.7	6.7	14.8	11.8
2005-06	2.8	3.9	8.3	10.8
Long Term Average	5.0	5.3	11.1	10.0

Table 7. Crop Variety, seeding rate, and planting date for each site in 2005-2006 season.

Site	Crop	Variety	Seeding Rate	Planting Date	Harvest Date
Akron	Wheat	Prairie Red	76 lb./acre	10/02/06	06/29/06
	Corn	Pioneer 38P03	16K seeds/acre	05/18/06	10/31/06
	Barley	Otis/Stoneham	58 lb./acre	04/03/06	07/24/06
	Foxtail Millet	Golden German	15 lb./acre	06/05/06	08/22/06
	Proso Millet	Huntsman	15 lb./acre	06/19/06	08/22/06
Briggsdale	Wheat	Hatcher	60 lb./acre	09/26/05	07/13/06
	Triticale	Wintri	75 lb./acre	09/26/05	06/19/06
	Barley	Otis/Stoneham	50 lb./acre	03/26/06	07/13/06
	Proso Millet	Huntsman	18 lb./acre	07/13/06	09/26/06
	F. Sorghum	Grazex/Golden German	12 lb./6lb./acre	07/15/06	09/26/06
Lamar	Wheat	Stanton/Jagalene	45 lb./acre	09/15/05	06/21/06
	F. Sorghum	Sucrosorgo 405	7 lb./acre	06/20/06	11/17/06
	Proso Millet	Huntsman	15 lb./acre	06/07/06	09/12/06
Sterling	Wheat	Hatcher	60 lb./acre	09/15/05	07/10/06
	Corn	DKC 38-33RR	18K seeds/acre	05/09/06	10/24/06
	Proso Millet	Huntsman	18 lb./acre	06/27/06	Failure
Stratton	Wheat	Hatcher	60 lb./acre	09/20/05	07/06/06
	Corn	DKC 38-33RR	18K seeds/acre	05/08/06	10/04/06
	Proso Millet	Huntsman	18 lb./acre	07/03/06	Failure
Walsh	Wheat	Above	50 lb./acre	10/14/05	06/27/06
	Corn	Mycogen 2E762	17K seeds/acre	05/22/06	10/23/06
	Grain Sorghum	Mycogen 627	40K seeds/acre	05/22/06	11/09/06
	Proso Millet	Huntsman	17 lb./acre	06/21/06	09/19/06

Table 8. Grain and stover yields for WHEAT at Sterling, Stratton and Walsh in 2006.

	SLOPE POSITION											
	SUMMIT				SIDESLOPE				TOESLOPE			
SITE & ROTATION	*GRAIN*		*STOVER*		*GRAIN*		*STOVER*		*GRAIN*		*STOVER*	
	NP*	**NP**	**NP***	**NP**	**NP***	**NP**	**NP***	**NP**	**NP***	**NP**	**NP***	**NP**
STERLING:	------ Bu./A. -----		---- lbs./A. ------		------ Bu./A. ----		--- lbs./A. ------		----- Bu./A. ----		---- lbs./A. -----	
WCF	5.3	7.8	950	1470	14.9	11.4	2743	2069	21.8	22.5	6275	4535
WCM	1.3	6.8	390	1475	12.8	5.0	2385	2700	4.2	1.8	690	790
(W)WCM	3.7	3.8	2725	4850	7.5	8.2	1550	1510	3.3	2.1	5540	680
W(W)CM	4.2	13.4	1340	3280	9.7	11.1	2260	2385	6.0	5.7	1540	1850
	NP*	**NP**	**NP***	**NP**	**NP***	**NP**	**NP***	**NP**	**NP***	**NP**	**NP***	**NP**
STRATTON:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		---- lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCF	18.9	24.1	2490	3155	13.7	32.0	1765	6175	39.3	33.0	8560	7265
WCM	11.2	10.7	1630	1610	2.5	32.6	140	4430	28.0	16.4	5010	3015
(W)WCM	15.2	7.2	2410	1355	8.2	5.4	2470	1615	34.6	27.5	8250	6435
W(W)CM	10.3	5.7	1855	1025	28.8	24.0	7580	6175	18.3	21.9	9525	6970
	NP*	**NP**	**NP***	**NP**	**NP***	**NP**	**NP***	**NP**	**NP***	**NP**	**NP***	**NP**
WALSH:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		---- lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WSF	8.3	5.8	2335	1100	7.7	7.3	1685	1700	5.2	7.7	1520	1915
WCB	1.7	0.2	1630	130	0.9	0.1	575	25	1.3	0.1	1960	50
(W)WSB	0.5	0.2	400	110	0.3	0.2	120	80	0.4	0.3	240	750
W(W)SB	1.6	0.9	600	485	0.7	0.7	250	420	0.5	0.3	390	170

1. Wheat grain yield expressed at 12% moisture.
* Only receives phosphorus in wheat phase of each rotation.

Table 9. Wheat grain yields by rotation at Briggsdale, Akron, & Lamar in 2006.

Site &	Rotation	Grain Yield[1] by Variety	
		---------------bu/acre--------------	
Akron		Prairie Red	
	WF	22.3	
	WMF[2]	26.8	
	TMF[3]	20.3	
	WBCF[4]	6.1	
Briggsdale		Hatcher	
	WF	17.7	
	WMF	14.9	
	WBMF[5]	8.8	
Lamar		Jagalene	Stanton
	WF	28.1	27.2
	WSF[6]	21.1	25.2
	WCF[7]	34.2	31.7

[1] Grain adjusted to 12.5 moisture
[2] Wheat/Proso millet//Fallow
[3] Triticale/Proso millet/Fallow
[4] Wheat/Soybean for forage/Corn/Fallow
[5] Wheat/Soybean for forage/Proso millet/Fallow
[6] Wheat/Sorghum/Fallow
[7] Wheat/Corn/Fallow

Table 10. Grain and stover yields for CORN AND SORGHUM at Sterling, Stratton and Walsh in 2006.

	SLOPE POSITION											
SITE & ROTATION	**SUMMIT**				**SIDESLOPE**				**TOESLOPE**			
	GRAIN		***STOVER***		***GRAIN***		***STOVER***		***GRAIN***		***STOVER***	
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
STERLING:	**------ Bu./A. ------**		**------ lbs./A. ------**		**------ Bu./A. ------**		**----- lbs./A. ------**		**------ Bu./A. ------**		**------ lbs./A. ------**	
WCF	10.3	7.8	2570	770	21.3	25.1	1250	1790	10.0	4.9	4270	1475
WCM	8.3	9.4	3880	4090	17.4	35.2	1580	2070	10.8	4.6	2645	520
WWCM	4.0	26.8	265	1780	24.8	43.7	2360	2835	10.9	4.3	3865	345
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
STRATTON:	**------ Bu./A. ------**		**------ lbs./A. ------**		**------ Bu./A. ------**		**----- lbs./A. ------**		**------ Bu./A. ------**		**------ lbs./A. ------**	
WCF	20.4	19.3	290	320	12.8	23.0	815	1585	57.6	40.2	1540	1535
WCM		21.8		345	6.6	21.8	110	300	43.4	48.5	1465	1480
WWCM	7.4	10.9	1655	430	25.7	38.7	1730	2850	71.0	66.8	2230	1990
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
WALSH:	**------ Bu./A. ------**		**------ lbs./A. ------**		**------ Bu./A. ------**		**----- lbs./A. ------**		**------ Bu./A. ------**		**------ lbs./A. ------**	
WSF	66.0	70.0	6050	6080	65	63.0	4830	3670	58.0	58.0	5560	5835
WCM	49.0	53.0	4765	9605	25	30.0	7460	15760	7.0	14.0		21050
WWSM	52.0	82.0	3240	9680	70	68.0	6430	3685	41.0	58.0	5210	5325
OPP	52.0	96.0	2775	6495	60	83.0	3825	6350	42.0	45.0	5080	3405
CC – Corn	28.0	12.4	4730	2090	17.7	6.5	3905	2265	5.5	3.3		1245
CC – S	61.0	100.0	6340	11000	59.0	91.0	4670	4400	61.0	45.0	4290	2615

1. Corn grain yield expressed at 15.5% moisture.
2. Sorghum grain yield expressed at 14% moisture.

* Only receives phosphorus in wheat phase of each rotation.

Table 11. Summer crop yields at Akron, Briggsdale, and Lamar in 2006.

Location	Crop	Yield/acre
Akron	Corn	failure
Akron	Proso Millet	failure
Briggsdale	Proso Millet	32.0 bu
Lamar	Proso Millet	18.8 bu
Akron	Foxtail Millet	231 lb.
Briggsdale	Forage Sorghum	1.1 ton
Lamar	Forage Sorghum	3.0 ton
Akron	Spring Barley-Otis	1.6 bu
Akron	Spring Barley-Stoneham	4.4 bu
Briggsdale	Spring Barley-Otis	4.9 bu
Briggsdale	Spring Barley-Stoneham	7.3 bu

Table 12. Grain and stover yields for MILLET at Sterling, Stratton, and Walsh in 2006.

	SLOPE POSITION											
	SUMMIT				SIDESLOPE				TOESLOPE			
SITE &	*GRAIN*		*STOVER*		*GRAIN*		*STOVER*		*GRAIN*		*STOVER*	
ROTATION	N*	NP	N*	NP	N*	NP	N*	NP	N*	NP	N*	NP
STERLING:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCM		Sprayed	Out			Sprayed	Out			Sprayed	Out	
WWCM												
OPP												
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
STRATTON:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCM	5.3	10.2	235	455	10.6	12.7	470	565	54.0	49.0	2400	2180
WWCM	9.6	14.2	430	630	19.1	11.7	850	520	45.0	46.8	2000	2080
OPP	15.3	13.4	680	595	11.2	7.4	500	330	18.6	17.2	830	765
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
WALSH:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCM	11.0	13.0	705	565	11.0	14.0	285	590	15.0	22.0	695	970
WWCM	9.0	7.0	425	360	10.0	9.0	505	385	16.0	16.0	845	760

1. Millet grain yield expressed at 10.0% moisture.

* Only receives phosphorus in wheat phase of each rotation.

Table 13. Total Nitrogen content of WHEAT GRAIN at Sterling Stratton, and Walsh in the 2006 crop.

	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
SITE & ROTATION	*N Side** N	*NP Side* NP	*N Side** N	*NP Side* NP	*N Side** N	*NP Side* NP
STERLING:	------------- %	-------------	------------- %	-------------	------------- %	-------------
WCF	2.92	2.86	2.69	2.87	2.60	2.81
WWM	2.98	2.99	2.84	2.95	2.76	3.10
WWCM	3.06	3.07	3.01	3.07	3.01	3.10
W(W)CM	3.21	2.92	3.13	2.99	3.15	3.19
	N	**NP**	**N**	**NP**	**N**	**NP**
STRATTON:	------------- %	-------------	------------- %	-------------	------------- %	-------------
WCF	2.84	2.81	2.79	2.31	2.82	2.58
WWM	2.91	2.82	2.79	2.90	2.71	2.66
WWCM	2.93	3.01	2.87	2.89	2.94	2.85
W(W)CM	3.04	2.98	2.83	2.92	2.96	3.13
	N	**NP**	**N**	**NP**	**N**	**NP**
WALSH:	------------- %	-------------	------------- %	-----------	------------- %	-------------
WCF	2.61	2.45	2.70	2.50	2.67	2.71
WWM						
WWCM						
W(W)CM						

* Only receives phosphorus in wheat phase of each rotation.

Table 14. Total Nitrogen content of WHEAT STRAW at Sterling, Stratton, and Walsh in the 2006 crop.

	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
SITE & ROTATION	*N Side**	*NP Side*	*N Side**	*NP Side*	*N Side**	*NP Side*
	N	NP	N	NP	N	NP
STERLING:	-------------- %	-------------	-------------- %	-------------	-------------- %	-------------
WCF	1.13	0.93	0.78	0.71	1.10	0.82
WWM	1.60	1.34	0.82	1.42	1.52	1.79
WWCM	1.60	1.68	1.57	1.41	2.11	
W(W)CM						
	N	NP	N	NP	N	NP
STRATTON:	-------------- %	-------------	-------------- %	-------------	-------------- %	-------------
WCF						
WWM	0.84	0.89	0.93	1.07	0.75	0.74
WWCM	1.04	1.02	1.09	1.08	0.76	0.93
W(W)CM	1.14	1.02	1.41	1.29	1.14	0.98
OPP	0.93	0.87	1.22	1.09	0.94	0.97
	N	NP	N	NP	N	NP
WALSH:	-------------- %	-------------	-------------- %	-----------	-------------- %	-------------
WCF	0.48	0.51	0.51	0.53	0.68	0.74
WWM	1.21	1.16	1.03	0.79	1.29	0.93
WWCM	1.07	1.03	0.98	0.91	1.15	1.01
W(W)CM	0.73	0.73	0.84	0.77	1.34	1.25

* Only receives phosphorus in wheat phase of each rotation.

Table 15. Total Nitrogen content of CORN and SORGHUM GRAIN at Sterling, Stratton, and Walsh in the 2006 crop.

	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
SITE &	*N Side**	*NP Side*	*N Side**	*NP Side*	*N Side**	*NP Side*
ROTATION	N	NP	N	NP	N	NP
STERLING:	------------- %	-------------	------------- %	-------------	------------- %	-------------
WCF	1.74	1.73	1.69	1.69	1.80	1.76
WCM	1.72	1.68	1.69	1.76	1.79	1.75
WWCM	1.72	1.73	1.72	1.70	1.78	1.78
	N	NP	N	NP	N	NP
STRATTON:	------------- %	-------------	------------- %	-------------	------------- %	-------------
WCF	1.71	1.79	1.71		1.62	
WCM	1.56	1.71	1.71	1.70	1.62	1.62
WWCM	1.72		1.66	1.69	1.61	1.64
	N	NP	N	NP	N	NP
WALSH:	------------- %	-------------	------------- %	-----------	------------- %	-------------
WSF	1.88	1.95	1.85	1.81	2.08	2.04
WSM	1.71	1.81	1.80	1.81	1.91	1.95
WWSM	1.75	1.78	1.75	1.85	2.34	2.14
CC SORG	1.91	1.99	1.90	1.94	2.13	2.02
OPP	1.90	1.97	1.95	1.98	2.20	2.29
CC CORN	1.79	1.79		1.95		0

* Only receives phosphorus in wheat phase of each rotation.

Table 16. Total Nitrogen content of CORN and SORGHUM STOVER in the 2006 crop.

	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
SITE &	*N Side**	*NP Side*	*N Side**	*NP Side*	*N Side**	*NP Side*
ROTATION	N	NP	N	NP	N	NP
STERLING:	------------- %	-------------	------------- %	-------------	------------- %	-------------
WCF	1.56	1.47	1.18	1.12	1.56	1.60
WCM	1.74	1.71	1.49	1.34	1.57	2.27
WWCM	1.49	1.34	1.31	1.01	1.59	1.43
	N	NP	N	NP	N	NP
STRATTON:	------------- %	-------------	------------- %	-------------	------------- %	-------------
WCF	1.10	1.34	0.95	1.51	2.14	0.85
WCM	1.25	1.13	1.40	1.23	1.16	1.13
WWCM	1.46	1.51	1.37	1.29	1.07	0.73
	N	NP	N	NP	N	NP
WALSH:						
	------------- %	-------------	------------- %	-----------	------------- %	-------------
WSF						
WSM	1.29	1.41	1.36	1.69	1.58	1.39
WWSM						
CC SORG						
CC CORN	1.31	1.29	1.39	1.39	1.56	1.71

* Only receives phosphorus in wheat phase of each rotation.

Table 17. Total Nitrogen content of MILLET GRAIN at Sterling, Stratton, and Walsh in the 2006 crop.

SITE & ROTATION	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
	N Side*	NP Side	N Side*	NP Side	N Side*	NP Side
	N	NP	N	NP	N	NP
STERLING:	-------------- % -------------		-------------- % -------------		-------------- % -------------	
WWM						
WWCM						
	N	NP	N	NP	N	NP
STRATTON:	-------------- % -------------		-------------- % -------------		-------------- % -------------	
WWM						
WWCM						
	N	NP	N	NP	N	NP
WALSH:	-------------- % -------------		-------------- % -----------		-------------- % -------------	
WWM	2.16	2.29	2.24	2.30	2.43	2.42
WWCM	2.27	1.17	2.17	2.30	2.34	2.30

* Only receives phosphorus in wheat phase of each rotation.

Table 18. Total Nitrogen content of MILLET STOVER at Sterling, Stratton, and Walsh in the 2006 crop.

	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
SITE & ROTATION	***N Side****	***NP Side***	***N Side****	***NP Side***	***N Side****	***NP Side***
	N	**NP**	**N**	**NP**	**N**	**NP**
STERLING:	-------------- % -------------		-------------- % -------------		-------------- % -------------	
WWM						
WWCM						
W(W)CM						
	N	**NP**	**N**	**NP**	**N**	**NP**
STRATTON:	-------------- % -------------		-------------- % -------------		-------------- % -------------	
WWM						
WWCM						
W(W)CM						
	N	**NP**	**N**	**NP**	**N**	**NP**
WALSH:						
	-------------- % -------------		-------------- % -----------		-------------- % -------------	
WWM	1.53	1.41	1.46	1.88		1.51
WWCM	0.84	1.41	1.48	1.45	2.54	1.58
W(W)CM						

* Only receives phosphorus in wheat phase of each rotation.

Table 19. Available soil water by soil depth of the WHEAT phase in the WCM rotation at Sterling and Stratton, and Walsh in 2006.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	------------mm/30cm------------			------------mm/30cm------------			-----------mm/30cm------------		
STERLING:									
15	12	0	12	18	0	18	13	0	13
45	10	0	10	28	0	28	12	0	12
75	7	0	7	25	0.5	24.5	9	0	9
105	12	0	12	33	6	27	48	0	48
135	-	-	-	-	-	-	52	0	52
155	-	-	-	-	-	-	56	0	56
TOTAL	**41**	**0**	**41**	**104**	**6.5**	**97.5**	**190**	**0**	**190**
STRATTON:									
15	0	0	0	22	22	0	35	23	12
45	7	0	7	12	19	(7)	27	36	(9)
75	7	0	7	23	16	7	40	33	7
105	12	0	12	22	14	8	34	30	4
135	17	0	17	27	12	15	18	26	(8)
155	0	0	0	20	9	11	0	20	(20)
TOTAL	**43**	**0**	**43**	**126**	**92**	**34**	**154**	**168**	**(14)**
WALSH:									
15	0			0			0		
45	0			0			0		
75	0			0			0		
105	3			0			4.7		
135	7			0			7.8		
155	0			13.8			25.8		
TOTAL	**10**			**13.8**			**38.3**		

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 20. Available soil water by soil depth of the WHEAT phase in the WCF rotation at Sterling and Stratton, and the WSF rotation at Walsh in 2003.

Site & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	------------mm/30cm------------			------------mm/30cm------------			-----------mm/30cm------------		
STERLING:									
15	4	0	4	4	0	4	7	0.5	6.5
45	11	0	11	20	0	20	18	4	14
75	11	0	11	10	0	10	4	0	4
105	14	0	14	26	0	26	20	14	6
135	-	-	-	-	-	-	20	11	9
155	-	-	-	-	-	-	18	6	12
TOTAL	40	0	14	60	0	60	87	35.5	51.5
STRATTON:									
15	0	0	0	17	8	9	36	16	20
45	18	12	6	3	8	(5)	30	32	(2)
75	17	5	12	15	0	15	38	18	20
105	15	2	13	26	0	26	37	10	27
135	17	0	17	31	12	19	19	16	3
155	14	0	14	31	4	27	13	13	0
TOTAL	81	19	62	123	32	91		105	68
WALSH:									
15									
45									
75									
105									
135									
155									
TOTAL									

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 21. Available soil water by soil depth of the WHEAT 1 phase in the WWCM rotation at Sterling and Stratton, and the WWSM rotation at Walsh in 2006.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	------------mm/30cm------------			------------mm/30cm------------			-----------mm/30cm------------		
STERLING:									
15	4	0	4	4	0	4	7	0.5	6.5
45	11	0	11	20	0	20	18	4	14
75	11	0	11	10	0	10	4	0	4
105	14	0	14	26	0	26	20	14	6
135	-	-	-	-	-	-	20	11	9
155	-	-	-	-	-	-	18	6	12
TOTAL	**40**	**0**	**40**	**60**	**0**	**60**	**87**	**35.5**	**51.5**
STRATTON:									
15	0	0	0	17	8	9	36	16	20
45	18	12	6	3	8	-5	30	32	(2)
75	17	5	12	15	0	15	38	18	20
105	15	2	13	26	0	26	37	10	27
135	17	0	17	31	12	19	19	16	3
155	14	0	14	31	4	27	13	13	0
TOTAL	**81**	**19**	**62**	**123**	**32**	**95.5**	**173**	**105**	**68**
WALSH:									
15	0			0			0		
45	4			0			0		
75	0			0			0		
105	2			25			13		
135	0			7			13		
155	0			18			26		
TOTAL	**6**			**50**			**52**		

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 22. Available soil water by soil depth of the WHEAT 2 phase in the WWCM rotation at Sterling and Stratton, and the WWSM rotation at Walsh in 2006.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	------------mm/30cm------------			------------mm/30cm------------			------------mm/30cm------------		
STERLING:									
15	13	0	13	16	0	16	20	4	16
45	12	0	12	15	0	15	8	1	7
75	20	0	20	21	0	21	16	6	10
105	40	0	40	25	0.5	24.5	44	11	33
135	-	-	-	-	-	-	47	14	33
155	-	-	-	-	-	-	44	5	39
TOTAL	**85**	**0**	**85**	**77**	**0.5**	**76.5**	**179**	**41**	**138**
STRATTON:									
15	7	0	7	25	12	13	41	23	18
45	18	0	18	7	7	0	33	28	5
75	8	0	8	11	0	11	34	17	17
105	9	0	9	21	0	21	28	15	13
135	10	0	10	22	1	21	12	21	(9)
155	7	0	7	23	0	23	10	15	(5)
TOTAL	**59**	**0**	**59**	**109**	**20**	**89**	**158**	**119**	**39**
WALSH:									
15	0			0			0		
45	2			0			1		
75	0			0			5		
105	0			0			3		
135	1			13			0		
155	7			30			14		
TOTAL	**10**			**43**			**23**		

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 23. Available soil water by soil depth of the CORN phase in the WCM rotation at Sterling, Stratton, at Walsh in 2006.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	------------mm/30cm------------			------------mm/30cm------------			------------mm/30cm------------		
STERLING:									
15	18	0	18	21	8	13	26	12	14
45	11	4	7	15	3	12	21	3	18
75	1	5	(4)	13	12	1	4	3	1
105	16	14	2	4	8	(4)	5	9	(4)
135	-	-	-	-	-	-	0	0.1	(.1)
155	-	-	-	-	-	-	0	1	(1)
TOTAL	**46**	**23**	**23**	**53**	**31**	**22**	**56**	**28.1**	**27.9**
STRATTON:									
15	5	0	5	18	5	13	28	1	27
45	18	0	18	17	0	17	41	11	30
75	14	0	14	13	0	13	42	0	42
105	13	0	13	13	0	13	36	0	36
135	15	0	15	18	0	18	34	0	34
155	12	0	12	8	0	8	14	20	(6)
TOTAL	**77**	**0**	**77**	**87**	**0**	**87**	**195**	**32**	**163**
WALSH:									
15									
45									
75									
105		No Readings			No Readings			No Readings	
135									
155									
TOTAL									

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 24. Available soil water by soil depth of the CORN phase in the WCF rotation at Sterling and Stratton, and the SORGHUM phase of the WSF rotation at Walsh in 2006.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	------------mm/30cm------------			------------mm/30cm------------			-----------mm/30cm------------		
STERLING:									
15	25	5	20	22	17	5	15	17	(2)
45	12	0	12	19	0	19	19	0	19
75	5	1	4	11	0	11	0	0	0
105	20	20	0	19	0	19	0	0	0
135	-	-	-	-	-	-	0	0	0
155	-	-	-	-	-	-	0	0	0
TOTAL	**62**	**26**	**36**	**71**	**17**	**54**	**34**	**17**	**17**
STRATTON:									
15	2	0	2	23	20	3	28	25	3
45	8	0	8	20	0	20	41	9	32
75	7	0	7	8	0	8	42	4	38
105	8	0	8	8	0	8	36	0	36
135	5	0	5	12	9	3	34	0	34
155	7	0	7	4	15	(11)	15	3	12
TOTAL	**37**	**0**	**37**	**75**	**44**	**31**	**196**	**41**	**155**
WALSH:									
15	23	0	23	16	0	16	32	0	32
45	16	0	16	17	0	17	25	0	25
75	16	0	16	18	0	18	10	3	7
105	12	0	12	6	6	0	2	5	(3)
135	4	0	4	0	4	(4)	8	0	8
155	0	0	0	5	8	(3)	28	14	14
TOTAL	**71**	**0**	**71**	**62**	**18**	**44**	**105**	**22**	**83**

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 25. Available soil water by soil depth of the CORN phase in the WWCM rotation at Sterling and Stratton, and the SORGHUM phase of the WWSM rotation at Walsh in 2006.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	------------mm/30cm------------			------------mm/30cm------------			------------mm/30cm------------		
STERLING:									
15	17	8	9	28	12	16	23	9	14
45	4	0	4	20	9	11	22	0	22
75	0	0	0	17	9	8	1.5	0	1.5
105	6	12	(6)	23	31	(8)	.5	2	(1.5)
135	-	-	-	-	-	-	0	0	0
155	-	-	-	-	-	-	0	8	(8)
TOTAL	**27**	**20**	**7**	**88**	**61**	**27**	**47**	**19**	**28**
STRATTON:									
15	6	18	(12)	23	6	17	39	21	18
45	7	0	7	21	0	21	56	19	37
75	6	0	6	21	0	21	37	15	22
105	3	0	3	20	0	20	42	11	31
135	3	0	3	15	1	14	27	22	5
155	3	1	2	11	7	4	30	17	13
TOTAL	**28**	**19**	**9**	**111**	**14**	**97**	**231**	**105**	**126**
WALSH:									
15	13	0	13	22	0	22	29	0	29
45	8	0	8	19	0	19	9	0	9
75	7	0	7	0	0	0	5	7	(2)
105	0	0	0	0	0	0	0	0	0
135	0	0	0	0	3	(3)	0	0	0
155	0	0	0	0	4	(4)	0	0	0
TOTAL	**28**	**0**	**28**	**41**	**7**	**34**	**43**	**7**	**36**

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 26. Available soil water by soil depth of the MILLET phase in the WWCM rotation at Sterling, Stratton, and Walsh in 2006.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	------------mm/30cm------------			------------mm/30cm------------			------------mm/30cm------------		
STERLING:									
15	26	19	7	30	0	30	33	18	15
45	17	0	17	48	4	44	39	1	38
75	32	0	32	35	3	32	22	0	22
105	50	13	37	34	0	34	21	2	19
135	-	-	-	-	-	-	11	0	11
155	-	-	-	-	-	-	13	0	13
TOTAL	**125**	**32**	**93**	**147**	**7**	**140**	**139**	**21**	**118**
STRATTON:									
15	0	0	0	11	0	11	21		
45	0	0	0	19	0	19	34		
75	0	0	0	14	0	14	38		
105	0	0	0	6	6	0	29		
135	0	0	0	10	17	(7)	16		
155	0	0	0	10	19	(9)	5		
TOTAL	**0**	**0**	**0**	**70**	**42**	**28**	**143**		
WALSH:									
15	21	0	21	19	0	19	19	0	19
45	6	0	6	0	0	0	8	0	8
75	0	0	0	0	0	0	3	5	(2)
105	0	0	0	0	0	0	2	0	2
135	0	0	0	0	0	0	4	8	(4)
155	0	0	0	0	5	(5)	12	15	(3)
TOTAL	**27**	**0**	**27**	**19**	**(5)**	**14**	**48**	**28**	**20**

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 27. Nitrate-N content of the soil profile at Planting for each crop during 2005-2006 crop year.

Site & Rotation	SLOPE POSITION											
	SUMMIT				SIDESLOPE				TOESLOPE			
	Crop and Time				Crop and Time				Crop and Time			
	Wheat Fall 2005	Corn S 2006	Millet S 2006		Wheat Fall 2005	Corn S 2006	Millet S 2006		Wheat S 2005	Corn S 2006	Millet S 2006	
	------------kg NO3-N ha $^{-1}$------------				----------kg NO3-N ha $^{-1}$------------				-------------kg NO3-N ha $^{-1}$-----------			
STERLING												
WCF	85	155			50	60			60	60		
WCM		100				80				155		
WWCM		80				25				55		
W(W)CM	105				60				70			
STRATTON												
WCF	60	200			90	80			30	75		
WCM		150				90				55		
WWCM		70				40				10		
W(W)CM	155				135				120			
WALSH												
WSF	75				70				110			
WCB	40				55				100			
(W)WSB	20				40				25			
WWSB	20				25				40			

Table 28. Nitrogen fertilizer application by soil and crop for 2007.

					ROTATION		
SITE	**SOIL**	**CROP**	**W'WCM**	**WW'CM**	**WCM**	**WCF**	**OPP**
Sterling	Summit	Wheat	40 lb.	40 lb.	40 lb.	40 lb.	40 lb.
	Sideslope	"	40 lb.	40 lb.	40 lb.	40 lb.	40 lb.
	Toeslope	"	40 lb.	40 lb.	40 lb.	40 lb.	40 lb.
	Summit	Corn	70 lb.	70 lb.	70 lb.	70 lb.	-
	Sideslope	"	70 lb.	70 lb.	70 lb.	70 lb.	-
	Toeslope	"	70 lb.	70 lb.	70 lb.	70 lb.	-
	Summit	Millet	40 lb.	40 lb.	40 lb.	-	-
	Sideslope	"	40 lb.	40 lb.	40 lb.	-	-
	Toeslope	"	40 lb.	40 lb.	40 lb.	-	-
			W'WCM	WW'CM	WCM	WCF	OPP
Stratton	Summit	Wheat	40 lb.	40 lb.	40 lb.	40 lb.	40 lb.
	Sideslope	"	40 lb.	40 lb.	40 lb.	40 lb.	40 lb.
	Toeslope	"	40 lb.	40 lb.	40 lb.	40 lb.	40 lb.
	Summit	Corn	70 lb.	70 lb.	70 lb.	70 lb.	-
	Sideslope	"	70 lb.	70 lb.	70 lb.	70 lb.	-
	Toeslope	"	70 lb.	70 lb.	70 lb.	70 lb.	-
	Summit	Millet	40 lb.	40 lb.	40 lb.	-	-
	Sideslope	"	40 lb.	40 lb.	40 lb.	-	-
	Toeslope	"	40 lb.	40 lb.	40 lb.	-	-
			WWSM	WSM	WSF	WCM	CONT. CROP
Walsh	Summit	Wheat	6 lb.	6 lb.	6 lb.	6 lb.	-
	Sideslope	"	6 lb.	6 lb.	6 lb.	6 lb.	-
	Toeslope	"	6 lb.	6 lb.	6 lb.	6 lb.	-
	Summit	Sorghum	6 lb.	6 lb.	6 lb.	-	-
	Sideslope	"	6 lb.	6 lb.	6 lb.	-	-
	Toeslope	"	6 lb.	6 lb.	6 lb.	-	-
	Summit	Corn	-	-	-	6 lb.	6 lb.
	Sideslope	"	-	-	-	6 lb.	6 lb.
	Toeslope	"	-	-	-	6 lb.	6 lb.
	Summit	Millet	-	-	-	-	-
	Sideslope	"	-	-	-	-	-
	Toeslope	"	-	-	-	-	-

Table 29. Crop Variety, seeding rate, and planting date for each site in the 2006-2007 season.

Site	Crop	Variety	Seeding Rate	Planting Date	Harvest Date
Akron	Wheat	Ankor	60 lb./acre	10/01/06	
	Triticale/Peas	Wintri/NT422T	40lb./40 lb./acre	10/03/06	
	Corn	Pioneer 38H66	14K seeds/acre	05/18/07	
	Barley	Otis/Stoneham	57 lb./acre	04/04/07	
	Proso Millet	Huntsman	15 lb./acre	07/02/07	
	Foxtail Millet	Golden German	15 lb./acre	07/02/07	
Briggsdale	Wheat	Hatcher	60 lb./acre	09/26/06	07/10/07
	Triticale/Peas	Wintri/NT422T	40lb./40 lb./acre	09/26/06	06/18/07
	Barley	Otis/Stoneham	50 lb./acre	03/27/07	07/10/07
	Proso Millet	Huntsman	18 lb./acre	06/19/07	09/26/07
	Forage Sorghum	Grazex/Golden German	12 lb./6 lb./acre	06/21/07	09/26/07
Lamar	Wheat	Hatcher/Jagalene	45 lb./acre	09/15/06	06/26/07
	Forage Sorghum	Canex BMR 208	7 lb./acre	06/08/07	09/18/07
	Proso Millet	Huntsman	15 lb./acre	06/18/07	09/10/07
Sterling	Wheat	Hatcher	60 lb./acre	09/14/06	07/11/07
	Corn	DKC 38-33RR	16 K seeds/acre	05/17/07	10/10/07
	Proso Millet	Huntsman	18 lb./acre	06/19/07	10/04/07
Stratton	Wheat	Hatcher	60 lb./acre	09/28/07	07/16/07
	Corn	DKC 38-33RR	16 K seeds/acre	05/16/07	10/16/07
	Proso Millet	Huntsman	18 lb./acre	06/20/07	09/20/07
Walsh	Wheat	Hatcher	50 lb./acre	10/04/06	07/03/07
	Corn	Mycogen 2E762	15 K seeds/acre	05/31/07	10/26/07
	Grain Sorghum	Mycogen 1G600	40 K seeds/acre	05/31/07	11/16/07
	Proso Millet	Huntsman	17 lb./acre	06/18/07	09/18/07

Table 30a. Monthly precipitation for the original sites for the 2006 - 2007 growing season.

	LOCATION					
	STERLING		STRATTON		WALSH	
MONTH	Inches	Inches	Inches	Inches	Inches	Inches
2006	2006	Normals[1]	2006	Normals[1]	2006	Normals[1]
JULY	1.95	3.23	1.93	2.80	2.30	2.62
AUGUST	3.33	1.90	1.56	2.60	3.94	1.96
SEPTEMBER	2.03	1.04	0.83	1.45	1.42	1.74
OCTOBER	1.01	0.76	1.14	0.85	1.79	0.89
NOVEMBER	0.01	0.50	0.01	0.62	0.00	0.53
DECEMBER	0.09	0.40	0.07	0.28	0.98	0.31
SUBTOTAL	8.42	7.83	5.54	8.60	10.43	8.05
2007	2007	Normals[1]	2007	Normals[1]	2007	Normals[1]
JANUARY	0.10	0.33	0.01	0.28	0.36	0.27
FEBRUARY	1.07	0.33	0.17	0.30	0.08	0.28
MARCH	1.07	1.07	0.21	0.76	0.52	0.81
APRIL	2.00	1.60	2.40	1.23	0.58	1.15
MAY	0.77	3.27	1.56	2.70	0.15	2.69
JUNE	2.00	3.00	2.37	2.45	0.19	2.29
SUBTOTAL	7.01	9.60	6.72	7.72	1.88	7.49
2007	2007	Normals[1]	2007	Normals[1]	2007	Normals[1]
JULY	4.00	3.23	0.82	2.80	0.38	2.62
AUGUST	3.62	1.90	1.54	2.60	0.62	1.96
SEPTEMBER	2.30	1.04	1.65	1.45	0.44	1.74
OCTOBER	0.47	0.76	0.52	0.85	0.00	0.89
NOVEMBER	0.00	0.50	0.15	0.62	0.00	0.53
DECEMBER	0.00	0.40	0.64	0.28	0.00	0.31
SUBTOTAL	10.39	7.83	5.32	8.60	1.44	8.05
YEAR TOTAL	17.40	17.43	12.04	16.32	3.32	15.54
18 MONTH TOTAL	25.82	25.26	17.58	24.92	13.75	23.59

[1] Normals = 1961 - 1990 database

Table 30b. Monthly precipitation for the three new sites for the 2006 - 2007 growing season.

	LOCATION					
	BRIGGSDALE		AKRON		LAMAR	
MONTH	**Inches**	**Inches**	**Inches**	**Inches**	**Inches**	**Inches**
2006	2006	Normals[1]	2006	Normals[1]	2006	Normals[1]
JULY	2.16	2.51	3.37	2.67	3.35	2.23
AUGUST	0.86	1.81	4.39	2.11	6.45	1.85
SEPTEMBER	1.97	1.28	1.19	1.24	2.18	1.32
OCTOBER	0.00	0.66	0.65	0.90	4.23	0.71
NOVEMBER	0.00	0.45	0.00	0.55	0.00	0.56
DECEMBER	0.59	0.27	0.09	0.40	0.47	0.40
SUBTOTAL	5.58	6.98	8.50	7.87	16.68	7.07
2007	2007	Normals[1]	2007	Normals[1]	2007	Normals[1]
JANUARY	0.11	0.30	0.04	0.33	0.23	0.42
FEBRUARY	0.00	0.19	0.34	0.35	0.52	0.41
MARCH	0.69	0.78	0.71	0.84	0.00	0.90
APRIL	0.72	1.28	2.38	1.64	1.36	1.15
MAY	2.26	1.94	2.24	2.96	0.47	2.50
JUNE	0.96	2.07	1.40	2.47	2.08	2.18
SUBTOTAL	4.74	6.56	7.78	8.59	4.66	7.56
2007	2007	Normals[1]	2007	Normals[1]	2007	Normals[1]
JULY	1.62	2.51	1.87	2.64	1.37	2.23
AUGUST	2.56	1.81	3.56	2.12	1.26	1.85
SEPTEMBER	0.59	1.28	0.75	1.24	0.32	1.32
OCTOBER	0.18	0.66	0.16	0.93	0.70	0.71
NOVEMBER	0.10	0.45	0.06	0.53	0.00	0.56
DECEMBER	0.49	0.27	0.68	0.40	0.27	0.40
SUBTOTAL	5.54	6.98	7.08	7.86	3.92	7.07
YEAR TOTAL	10.28	13.54	14.86	16.45	8.58	14.63
18 Month Total	15.86	20.52	23.36	24.32	25.26	21.70

[1] Normals = 1961 - 1990 database

Table 30c. Precipitation by growing season segments for Sterling from 1987-2007.

Year	WHEAT Vegetative Sep - Mar Inches	WHEAT Reproductive APRIL-JUNE Inches	CORN Preplant JULY-APRIL Inches	CORN Growing Season MAY-OCT. Inches
1987-88	5.2	9.9	11.1	15.8
1988-89	3.1	6.5	10.5	14.3
1989-90	5.1	4.7	11.8	13.0
1990-91	3.8	7.2	12.3	11.7
1991-92	4.5	4.8	9.1	14.8
1992-93	4.5	6.2	15.5	10.6
1993-94	6.4	3.0	10.2	6.1
1994-95	7.3	14.4	9.6	17.2
1995-96	4.2	9.2	7.5	18.0
1996-97	4.7	7.0	10.6	21.4
1997-98	5.5	4.9	16.7	13.8
1998-99	5.8	7.7	13.5	12.8
1999-00	5.7	3.0	12.6	8.6
2000-01	6.8	8.2	11.5	13.8
2001-02	4.2	1.9	8.2	8.1
2002-03	5.2	7.6	12.9	8.4
2003-04	1.3	5.3	6.4	10.1
2004-05	3.5	6.6	10.5	8.5
2005-06	2.7	1.3	5.0	9.3
2006-07	5.4	4.8	12.7	13.2
Long Term Average	4.7	6.2	10.9	12.5

Table 30d. Precipitation by growing season segment for Stratton from 1987-2007.

Year	WHEAT Vegetative Sep - Mar Inches	WHEAT Reproductive APRIL-JUNE Inches	CORN Preplant JULY-APRIL Inches	CORN Growing Season MAY-OCT. Inches
1987-88	4.3	7.2	8.8	12.6
1988-89	3.0	9.4	5.3	15.5
1989-90	5.3	6.1	11.0	13.4
1990-91	4.4	4.1	10.7	14.7
1991-92	3.3	6.1	14.2	13.6
1992-93	3.3	3.8	11.8	14.7
1993-94	4.3	7.8	16.7	13.5
1994-95	7.0	10.0	14.8	13.7
1995-96	3.5	6.0	8.1	14.5
1996-97	2.9	6.2	12.2	23.2
1997-98	8.0	5.9	22.6	13.9
1998-99	4.4	8.5	15.6	12.3
1999-00	6.2	3.9	14.2	8.8
2000-01	4.7	4.3	9.8	10.6
2001-02	3.8	2.2	9.5	6.9
2002-03	4.1	8.7	8.6	10.9
2003-04	5.1	3.8	9.8	6.3
2004-05	3.5	6.7	7.1	13.9
2005-06	4.3	4.8	9.5	9.7
2006-07	7.8	6.3	8.3	8.5
Long Term Average	4.7	6.1	11.4	12.6

Table 30e. Precipitation by growing season segment for Walsh from 1987-2007.

Year	WHEAT Vegetative Sep - Mar Inches	WHEAT Reproductive APRIL-JUNE Inches	CORN Preplant JULY-APRIL Inches	CORN Growing Season MAY-OCT. Inches
1987-88	4.3	7.6	7.4	11.1
1988-89	4.1	11.5	8.1	20.2
1989-90	5.7	7.4	14.1	12.5
1990-91	5.0	7.7	11.7	12.2
1991-92	2.7	5.8	7.1	13.2
1992-93	6.1	9.2	13.8	14.5
1993-94	3.2	5.3	8.7	16.3
1994-95	4.6	7.2	16.6	7.2
1995-96	1.7	3.5	1.9	17.1
1996-97	5.8	5.3	17.2	11.3
1997-98	6.9	2.3	12.3	13.3
1998-99	8.2	7.4	19.4	14.5
1999-00	7.9	3.2	15.8	10.0
2000-01	9.0	7.9	13.4	9.6
2001-02	1.7	2.2	2.9	11.8
2002-03	6.7	11.4	15.8	12.5
2003-04	3.2	10.1	8.2	13.5
2004-05	3.0	4.7	8.5	8.3
2005-06	2.6	3.0	5.7	11.7
2006-07	5.2	0.9	12.0	1.8
Long Term Average	4.9	6.2	11.0	12.1

Table 30f. Precipitation by growing season segment for Briggsdale from 1997-2007.

Year	WHEAT Vegetative Sep - Mar Inches	WHEAT Reproductive APRIL-JUNE Inches	CORN Preplant JULY-APRIL Inches	CORN Growing Season MAY-OCT. Inches
1997-98	3.9	3.9	11.6	11.9
1998-99	4.6	8.4	15.3	12.4
1999-00	4.7	3.7	11.4	4.9
2000-01	2.9	8.0	5.6	10.4
2001-02	3.2	2.2	5.9	6.7
2002-03	3.8	4.9	8.1	7.1
2003-04	1.2	4.3	6.5	6.7
2004-05	3.1	5.6	5.6	8.7
2005-06	3.1	0.6	4.4	5.5
2006-07	3.4	3.9	7.1	8.2
Long Term Average	3.4	4.6	8.1	8.2

Table 30g. Precipitation by growing season segment for Akron from 1997-2007.

Year	WHEAT Vegetative Sep - Mar Inches	WHEAT Reproductive APRIL-JUNE Inches	CORN Preplant JULY-APRIL Inches	CORN Growing Season MAY-OCT. Inches
1997-98	5.6	2.1	11.1	6.5
1998-99	2.8	7.9	11.4	17.1
1999-00	6.0	2.7	16.3	9.9
2000-01	6.4	6.3	12.1	12.7
2001-02	3.5	2.7	8.8	8.3
2002-03	5.9	10.9	11.9	11.3
2003-04	1.9	6.1	6.3	13.3
2004-05	4.5	7.2	10.7	15.9
2005-06	4.1	3.9	10.1	12.4
2006-07	3.0	6.0	12.0	10.0
Long Term Average	4.4	5.6	11.1	11.7

Table 30h. Precipitation by growing season segment for Lamar from 1997-2007.

Year	WHEAT Vegetative Sep - Mar Inches	WHEAT Reproductive APRIL-JUNE Inches	CORN Preplant JULY-APRIL Inches	CORN Growing Season MAY-OCT. Inches
1997-98	10.5	2.6	19.4	15.9
1998-99	7.5	9.2	22.5	11.0
1999-00	4.5	2.4	9.9	4.4
2000-01	3.6	7.0	5.7	10.2
2001-02	1.6	1.6	5.1	4.8
2002-03	4.5	6.0	6.8	8.5
2003-04	2.1	8.2	7.7	12.9
2004-05	7.7	6.7	14.8	11.8
2005-06	2.8	3.9	8.3	10.8
2006-07	7.6	3.9	18.8	6.2
Long Term Average	5.2	5.2	11.9	9.6

Table 31. Grain and stover yields for WHEAT at Sterling, Stratton, and Walsh in 2007.

SITE & ROTATION	SLOPE POSITION											
	SUMMIT				SIDESLOPE				TOESLOPE			
	GRAIN		*STOVER*		*GRAIN*		*STOVER*		*GRAIN*		*STOVER*	
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
STERLING:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCF	29.6	23.6	4018	3733	29.3	35.0	4636	5547	46.7	32.2	7814	6814
WCM	10.0	9.3	1976	1852	14.3	12.7	2802	2012	16.4	14.2	7009	5119
W1WCM	14.2	16.2	2192	3335	13.2	20.0	2093	3980	30.6	23.4	5254	3974
WW2CM	31.4	24.8	4904	3929	20.4	16.7	3215	2684	32.4	33.0	7530	5719
OPP	10.8	12.9	596	2133	18.7	20.0	2965	3263	27.7	28.8	5278	7913
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	N~~185~~P*	NP
STRATTON:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCF	37.1	31.6	7196	3981	21.1	40.0	1009	1468	45.2	79.4	6068	6309
WCM	25.7	52.0	2356	10061	19.5	19.0	1040	3133	43.6	63.2	6922	8492
W1WCM	26.7	23.8	1116	2809	13.3	53.4	1265	3877	47.3	37.1	5642	4173
WW2CM	33.4	12.3	9338	4795	18.4	21.5	1383	9430	33.4	72.7	5324	5468
OPP	16.8	48.0	1254	3200	31.3	26.0	2022	1135	40.5	25.1	10394	1207
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
WALSH:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WSF	41.3	34.7	5549	4978	39.5	41.0	5876	6558	48.0	44.3	7338	7908
WCM	32.6	45.9	4807	6827	40.2	40.6	6691	6395	40.3	37.8	7951	6880
W1WCM	27.2	30.1	3778	4491	33.4	36.5	4339	5740	38.9	35.8	7639	6592
WW2CM	44.6	45.4	7043	6708	44.7	46.5	7201	7786	48.2	46.3	7703	6992

1. Wheat grain yield expressed at 12% moisture.

* Only receives phosphorus in wheat phase of each rotation.

Table 32. Wheat grain yields by rotation at Briggsdale, Akron, & Lamar in 2007.

Site	Rotation	Grain Yield[1] by Variety	
		---------------bu/acre--------------	
Akron		Ankor	
	WF	35.4	
	WMF	30.4	
	WBCF	20.2	
Briggsdale		Hatcher	
	WF	31.5	
	WMF	35.9	
	WBMF	38.4	
Lamar		Jagalene	Hatcher
	WF	38.4	50.5
	WSF	27.6	36.1
	WCF	40	57.6

[1] Grain adjusted to 12.5 moisture

[2] Wheat/Corn/Sunflower/Fallow

[3] Wheat/Wheat/Soybean/Corn/Sunflower/Fallow

Table 33. Grain and stover yields for CORN AND SORGHUM at Sterling, Stratton, and Walsh in 2007.

SITE & ROTATION	SLOPE POSITION											
	SUMMIT				SIDESLOPE				TOESLOPE			
	GRAIN		*STOVER*		*GRAIN*		*STOVER*		*GRAIN*		*STOVER*	
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
STERLING:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCF	44	22	1930	1563	49	47	1703	1461	69	73	3338	2681
WCM	27	14	4414	1761	34	61	1117	2179	85	72	3486	3105
WWCM	17	15	2998	2283	42	39	1831	1933	34	31	2697	1457
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
STRATTON:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCF	29	39	1022	1403	40	59	2033	2166	57	49	2500	1969
WCM	32	31	1232	1407	24	50	1376	1567	34	55	1734	1652
WWCM	16	12	668	416	40	37	1623	1518	43	47	1321	1940
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
WALSH:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WSF	41	41	3582	3592	45	42	3859	3671	46	46	3987	3990
WCM	29	25	824	689	33	31	949	855	29	29	734	764
WWSM	28	42	2440	3637	38	31	3280	2665	52	45	4513	3860
OPP	18	18	459	495	26	23	1548	578	17	19	365	426
CC Corn	30	21	845	602	20	25	370	567	25	15	614	282
CC SOR	36	35	3157	3044	48	46	4123	3964	47	47	4086	4078

1. Corn grain yield expressed at 15.5% moisture.
2. Sorghum grain yield expressed at 14% moisture.

* Only receives phosphorus in wheat phase of each rotation.

Table 34. Grain and stover yields for MILLET at Sterling, Stratton, and Walsh in 2007.

SITE & ROTATION	SLOPE POSITION											
	SUMMIT				SIDESLOPE				TOESLOPE			
	GRAIN		STOVER		GRAIN		STOVER		GRAIN		STOVER	
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
STERLING:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCM	35.6	27.2			43.6	50.3			32.6	46.8		
WWCM	25.9	34.2			36.6	34.7			41.8	50.4		
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
STRATTON:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCM	14.3	8.8			13.0	13.0			25.3	13.1		
WWCM	13.3	9.3			25.6	14.0			27.0	16.1		
	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP	NP*	NP
WALSH:	------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------		------ Bu./A. ------		------ lbs./A. ------	
WCB	0.3	1.7	17	84	1.1	2.2	56	111	9.3	9.6	235	242
WWCM	0.6	0.8	29	41	0.7	1.1	33	54	5.7	7.5	289	379

1. Millet grain yield expressed at 10% moisture.

* Only receives phosphorus in wheat phase of each rotation.

Table 35. Akron, Briggsdale, and Lamar summer crop yields in 2007.

Location	Crop	Yield/acre
Akron	Corn	failure
Akron	Triticale	4.5 ton
Briggsdale	Triticale	1.6 ton
Akron	Proso Millet	failure
Briggsdale	Proso Millet	6.3 bu
Lamar	Proso Millet	20.0 bu
Akron	Foxtail Millet	2.1 ton
Briggsdale	Forage Sorghum	1.4 ton
Lamar	Forage Sorghum	1.1 ton
Akron	Spring Barley-Otis	36.1 bu
Akron	Spring Barley-Stoneham	40.3 bu
Briggsdale	Spring Barley	4.5 bu

Table 36a. Total Nitrogen content of WHEAT GRAIN at Sterling, Stratton, and Walsh in the 2007 crop.

	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
SITE &	*N Side**	*NP Side*	*N Side**	*NP Side*	*N Side**	*NP Side*
ROTATION	**N**	**NP**	**N**	**NP**	**N**	**NP**
STERLING:	------------- %	-------------	------------- %	-------------	------------- %	-------------
WCF	2.7	2.8	2.6	2.6	2.7	2.5
WWM	2.7	3.0	2.9	2.8	2.8	2.8
WWCM	2.8	2.8	2.6	2.6	2.7	2.7
W(W)CM	2.7	2.9	2.6	2.6	2.6	2.5
OPP	3.0	3.0	2.6	2.7	2.8	2.8
	N	**NP**	**N**	**NP**	**N**	**NP**
STRATTON:	------------- %	-------------	------------- %	-------------	------------- %	-------------
WCF	2.5	2.3	2.3	2.3	2.0	2.1
WWM	2.7	2.6	2.6	2.4	2.2	2.2
WWCM	2.7	2.9	2.4	2.5	2.1	2.1
W(W)CM	2.0	2.2	2.0	2.3	2.3	2.0
OPP	2.8	3.0	2.4	2.6	2.2	2.2
	N	**NP**	**N**	**NP**	**N**	**NP**
WALSH:						
	------------- %	-------------	------------- %	-----------	------------- %	-------------
WCF	1.8	1.9	2.1	1.9	3.0	2.0
WWM	1.8	2.0	2.2	2.1	2.2	2.1
WWCM	2.1	1.8	2.1	2.0	2.1	2.0
W(W)CM	1.9	1.7	1.8	1.8	2.1	1.7

* Only receives phosphorus in wheat phase of each rotation.

Table 36b. Total Nitrogen content of WHEAT STRAW at Sterling, Stratton, and Walsh in the 2007 crop.

	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
SITE & ROTATION	*N Side**	*NP Side*	*N Side**	*NP Side*	*N Side**	*NP Side*
	N	NP	N	NP	N	NP
STERLING:	------------- % -------------		------------- % -------------		------------- % -------------	
WCF	1.2	1.5			0.9	0.9
WWM	1.6	1.5	1.3		0.7	0.7
WWCM	1.0	1.6		1.2	1.1	0.9
W(W)CM	1.2		1.0		0.8	
OPP	1.0	1.1		1.2	1.2	1.3
	N	NP	N	NP	N	NP
STRATTON:	------------- % -------------		------------- % -------------		------------- % -------------	
WCF	0.7	0.8	0.7	0.6	0.5	0.5
WWM	0.95	0.75	0.75	0.95	0.5	0.55
WWCM	1.0	1.15	0.75	0.75	0.55	0.45
W(W)CM	1.25	1.2	1.3	0.9	0.95	0.95
OPP	1.0	1.05	0.7	0.5	0.45	0.55
	N	NP	N	NP	N	NP
WALSH:						
	------------- % -------------		------------- % -----------		------------- % -------------	
WCF	0.4	0.5	0.45	0.45	0.35	0.5
WWM	0.4	0.4	0.8	0.55	0.6	0.75
WWCM	0.4	0.3	0.45	0.4	0.65	0.5
W(W)CM	0.5	0.5	0.45	0.4	0.3	0.45
OPP						

* Only receives phosphorus in wheat phase of each rotation.

Table 37a. Total Nitrogen content of CORN and SORGHUM GRAIN at Sterling, Stratton, and Walsh in the 2007 crop.

	SLOPE POSITION					
	SUMMIT		**SIDESLOPE**		**TOESLOPE**	
SITE & ROTATION	***N Side****	***NP Side***	***N Side****	***NP Side***	***N Side****	***NP Side***
	N	**NP**	**N**	**NP**	**N**	**NP**
STERLING:	-------------- % -------------		-------------- % -------------		-------------- % -------------	
WCF	1.66	1.80	1.54	1.59	1.52	1.58
WCM	1.75	1.80	1.62	1.65	1.76	1.61
WWCM	1.78	1.75	1.74	1.74	1.70	1.79
W(W)CM						
OPP						
	N	**NP**	**N**	**NP**	**N**	**NP**
STRATTON:	-------------- % -------------		-------------- % -------------		-------------- % -------------	
WCF	1.58	1.61	1.56	1.53	1.61	1.54
WCM	1.66	1.63	1.57	1.59	1.60	1.64
WWCM	1.64	1.64	1.55	1.60	1.63	1.56
W(W)CM						
OPP						
	N	**NP**	**N**	**NP**	**N**	**NP**
WALSH:						
	-------------- % -------------		-------------- % -----------		-------------- % -------------	
WSF	1.93	2.13	1.84	2.04	2.02	2.10
WSM						
WWSM	2.15	2.02	1.92	2.08	2.08	2.10
CC	2.17	2.05	2.15	2.11	2.04	2.04
CORN OPP	1.49	1.48	1.41	1.60	1.59	1.58
CC CORN	1.52		1.62	1.54	1.55	1.54

* Only receives phosphorus in wheat phase of each rotation.

Table 37b. Total Nitrogen content of CORN and SORGHUM STOVER at Sterling, Stratton, and Walsh in the 2007 crop.

SITE & ROTATION	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
	*N Side**	*NP Side*	*N Side**	*NP Side*	*N Side**	*NP Side*
	N	NP	N	NP	N	NP
STERLING:	------------- %	-------------	------------- %	-------------	------------- %	-------------
WCF	1.56	1.47	1.18	1.12	1.56	1.60
WCM	1.74	1.71	1.49	1.34	1.57	2.27
WWCM	1.49	1.34	1.31	1.01	1.59	1.43
	N	NP	N	NP	N	NP
STRATTON:	------------- %	-------------	------------- %	-------------	------------- %	-------------
WCF	1.10	1.34	0.95	1.51	2.14	0.85
WCM	1.25	1.13	1.40	1.23	1.16	1.13
WWCM	1.46	1.51	1.37	1.29	1.07	0.73
	N	NP	N	NP	N	NP
WALSH:						
	------------- %	-------------	------------- %	-----------	------------- %	-------------
WSF						
WSM	1.29	1.41	1.36	1.69	1.58	1.39
WWSM						
CC SORG						
CC CORN	1.31	1.29	1.39	1.39	1.56	1.71
OPP						

* Only receives phosphorus in wheat phase of each rotation.

Table 38a. Total Nitrogen content of MILLET GRAIN at Sterling, Stratton, and Walsh in the 2007 crop.

	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
SITE & ROTATION	*N Side**	*NP Side*	*N Side**	*NP Side*	*N Side**	*NP Side*
	N	NP	N	NP	N	NP
STERLING:	------------- % -------------		------------- % -------------		------------- % -------------	
WWM	2.46	2.59	2.30	2.37	2.29	2.20
WWCM	2.42	2.27	2.20	2.22	2.27	2.22
	N	NP	N	NP	N	NP
STRATTON:	------------- % -------------		------------- % -------------		------------- % -------------	
WWM						
WWCM						
	N	NP	N	NP	N	NP
WALSH:	------------- % -------------		------------- % -----------		------------- % -------------	
WWM						
WWSM						

* Only receives phosphorus in wheat phase of each rotation.

Table 38b. Total Nitrogen content of MILLET STOVER at Sterling, Stratton, and Walsh in the 2007 crop.

	SLOPE POSITION					
	SUMMIT		SIDESLOPE		TOESLOPE	
SITE & ROTATION	***N Side****	***NP Side***	***N Side****	***NP Side***	***N Side****	***NP Side***
	N	**NP**	**N**	**NP**	**N**	**NP**
STERLING:	------------- % -------------		------------- % -------------		------------- % -------------	
WWM						
WWCM						
	N	**NP**	**N**	**NP**	**N**	**NP**
STRATTON:	------------- % -------------		------------- % -------------		------------- % -------------	
WWM						
WWCM						
	N	**NP**	**N**	**NP**	**N**	**NP**
WALSH:						
	------------- % -------------		------------- % -----------		------------- % -------------	
WWM	1.91	1.59	1.80	1.84	2.28	1.48
WWSM	1.38	1.49	1.63	1.36	1.75	1.16

* Only receives phosphorus in wheat phase of each rotation.

Table 39. Nitrate-N content of the soil profile at planting for each crop during 2006-2007 crop year.

Site & Rotation	SLOPE POSITION											
	SUMMIT				SIDESLOPE				TOESLOPE			
	Crop and Time				Crop and Time				Crop and Time			
	Wheat Fall 2006	Corn S 2007	Millet S 2007		Wheat Fall 2006	Corn S 2007	Millet S 2007		Wheat S 2006	Corn S 2007	Millet S 2007	
	------------kg NO3-N ha $^{-1}$------------				----------kg NO3-N ha $^{-1}$------------				-------------kg NO3-N ha $^{-1}$-----------			
STERLING												
WCF	200	65			110	100			120	140		
WCM			205				125				160	
W(W)CM	75		135		60		70		90		115	
OPP-W	175				155				160			
STRATTON												
WCF	110	90			145	110			125	140		
WCM			85				80				50	
W(W)CM	40		105		30		160		30		80	
OPP-W	80				80				55			
WALSH												
WSF	50	25			70	50			130	60		
WCM			30				60				60	
(W)WSB	60	25	15		55	50	30		65	45	35	
CC (S)												

Table 40. Available soil water by soil depth of the WHEAT phase in the WCF rotation at Sterling and Stratton, and the WSF rotation at Walsh in 2007.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	mm/30cm			mm/30cm			mm/30cm		
STERLING:									
15	0	8	(8)	0	0	0	7	9	(2)
45	20	0	20	10	0	10	11	23	(12)
75	17	0	17	0	0	0	2	13	(11)
105	20	12	8	0	0	0	2	13	(11)
135	-	-	-	-	-	-	0	2	(2)
155	-	-	-	-	-	-	0	0	0
TOTAL	57	20	37	10	0	10	22	60	(38)
STRATTON:									
15	0	0	0	2	0	2	36	14	22
45	13	9	4	15	0	15	51	0	51
75	3	5	(2)	17	8	9	59	0	59
105	7	8	(1)	12	0	12	40	0	40
135	9	16	(7)	19	0	19	34	0	34
155	9	26	(17)	17	0	17	0	0	0
TOTAL	41	64	(23)	82	8	74	220	14	206
WALSH:									
15	0	0	0	0	0	0	0	0	0
45	8	0	8	13	0	13	18	4	14
75	14	0	14	10	0	10	20	0	20
105	19	0	19	.5	0	0.5	14	0	14
135	18	1	17	0	0	0	15	7	8
155	0	0	0	0	21	(21)	25	0	25
TOTAL	59	1	58	23.5	21	2.5	92	11	81

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 41. Available soil water by soil depth of the WHEAT1 phase in the WWCM rotation at Sterling and Stratton, and the WWSM rotation at Walsh in 2007.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	-------------mm/30cm-------------			-------------mm/30cm-------------			------------mm/30cm-------------		
STERLING:									
15	19	9	10	0	3	(3)	7	12	(5)
45	0	0	0	0	0	0	0	16	(16)
75	0	17	(17)	0	0	0	0	9	(9)
105	13	42	(29)	0	0	0	0	8	(8)
135	-	-	-	-	-	-	0	4	(4)
155	-	-	-	-	-	-	0	0	0
TOTAL	32	68	(36)	0	0	(3)	7	49	(42)
STRATTON:									
15	0	0.5	(0.5)	0	0	0	0	35	(35)
45	0	4	(4)	0	0	0	0	48	(48)
75	0	2	(2)	0	0	0	0	38	(38)
105	0	6	(6)	6	8	(2)	0	29	(29)
135	0	9	(9)	17	0	17	0	30	(30)
155	0	19	(19)	19	0	19	0	0	0
TOTAL	0	40.5	(40.5)	42	8	34	0	180	180
WALSH:									
15	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	5	0	5
105	0	0	0	0	0	0	0	0	0
135	0	13	(13)	0	0	0	8	22	(14)
155	0	0	0	0	0	0	15	62	(47)
TOTAL	0	13	(13)	0	0	0	28	841	(56)

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 42. Available soil water by soil depth of the WHEAT2 phase in the WWCM rotation at Sterling and Stratton, and the WWSM rotation at Walsh in 2007.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	-------------mm/30cm-------------			-------------mm/30cm-------------			------------mm/30cm-------------		
STERLING:									
15	7	11	(4)	0	0	0	27	10	17
45	15	0	15	11	3	8	0	17	(17)
75	0	5	(5)	7	0	7	0	9	(9)
105	1	27	(26)	3	5	(2)	8	18	(10)
135	-	-	-	-	-	-	7	6	1
155	-	-	-	-	-	-	5	0	5
TOTAL	23	43	(20)	21	8	(13)	47	60	(13)
STRATTON:									
15	0.5	0	0.5	7	0	7	29	0	29
45	0	5	(5)	0	0	0	24	35	(11)
75	0	7	(7)	0	0	0	0	10	(10)
105	0	8	(8)	0	0	0	0	13	(13)
135	0	12	(12)	0	0	0	0	32	(32)
155	0	0	0	0	0	0	0	0	0
TOTAL	0.5	32	(31.5)	7	0	7	53	90	(37)
WALSH:									
15		0			0			0	
45		0			0			0	
75		0			0			0	
105		0			8			0	
135		0			12			23	
155		0			0			0	
TOTAL		0			20			23	

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 43. Available soil water by soil depth of the WHEAT phase in the OPP rotation at Sterling and Stratton, and CORN in the OPP rotation at Walsh in 2007.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	-------------	mm/30cm	-------------	-------------	mm/30cm	-------------	------------	mm/30cm	------------
STERLING:									
15		13			9			13	
45		6			23			14	
75		7			22			5	
105		41			38			7	
135	-	-	-	-	-	-		0	
155	-	-	-	-	-	-		0	
TOTAL		67			92			39	
STRATTON:									
15	7	0	7	13	0	13	20	0	20
45	0	9	(9)	4	0	4	6	5	1
75	0	3	(3)	0	0	0	11	21	(10)
105	0	9	(9)	0	0	0	2	49	(47)
135	0	0	0	0	0	0	16	25	(9)
155	0	0	0	0	0	0	24	43	(19)
TOTAL	7	21	(14)	17	0	17	79	143	(64)
WALSH:									
15	14	0	14	6	0	6	6	0	6
45	40	0	40	62	0	62	75	0	75
75	64	0	64	92	4	88	91	0	91
105	85	4	81	91	2	89	86	0	86
135	77	0	77	79	0	79	78	0.5	77.5
155	134	0	134	71	0	71	91	0	91
TOTAL	414	4	410	401	6	395	427	0.5	426.5

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 44. Available soil water by soil depth of the CORN phase in the WCM rotation at Sterling and Stratton, andSorghum in the WSM rotation at Walsh in 2007.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	------------mm/30cm------------			------------mm/30cm------------			-----------mm/30cm------------		
STERLING:									
15	4	12	(8)	0	0	0	1	5	(4)
45	22	1	21	53	10	43	40	22	18
75	13	3	10	55	0	55	50	21	29
105	31	0	31	81	1	80	39	19	20
135	-	-	-	-	-	-	16	7	9
155	-	-	-	-	-	-	0	20	(20)
TOTAL	70	16	54	189	11	178	146	94	52
STRATTON:									
15	21	7	14	0	0	0	36	43	(7)
45	33	7	26	65	10	55	87	49	38
75	28	9	19	55	32	23	93	36	57
105	25	12	13	43	0	43	85	63	22
135	29	26	3	61	0	61	82	63	19
155	31	0	31	0	0	0	0	0	0
TOTAL	167	61	106	224	42	182	383	254	129
WALSH:									
15		0			0			0	
45		0			0			0	
75		0			0			3	
105		0			7			0	
135		0			13			0	
155		2			19			0	
TOTAL		2			39			3	

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 45. Available soil water by soil depth of the CORN phase in the WCF rotation at Sterling and Stratton, and the Sorghum in the WCF rotation at Walsh in 2007.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	-------------mm/30cm-------------			-------------mm/30cm-------------			------------mm/30cm-------------		
STERLING:									
15	0	7	(7)	29	3	26	5	13	(8)
45	29	1	28	53	23	30	40	41	(1)
75	31	7	24	51	21	30	57	35	22
105	9	34	(25)	34	47	(13)	59	40	19
135	-	-	-	-	-	-	42	20	22
155	-	-	-	-	-	-	45	24	21
TOTAL	69	49	20	167	94	73	248	173	75
STRATTON:									
15	18	7	11	8	16	(8)	31	40	(9)
45	37	5	32	50	0	50	87	47	40
75	36	10	26	22	0	22	90	35	55
105	35	12	23	19	0	19	85	62	23
135	30	18	12	6	0	6	91	68	23
155	37	0	37	0	0	0	0	0	0
TOTAL	193	52	141	105	16	89	384	252	132
WALSH:									
15	0	0	0	17	0	17	0	0	0
45	7	0	7	70	0	70	46	0	46
75	5	0	5	85	0	85	46	0	46
105	15	0	15	72	0	72	37	0	37
135	18	0	18	60	0	60	60	0	60
155	0	0	0	78	15	63	72	0	72
TOTAL	45	0	45	382	15	367	261	0	261

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 46. Available soil water by soil depth of the CORN phase in the WWCM rotation at Sterling and Stratton, and SORGHUM in the WWSM rotation at Walsh in 2007.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	------------mm/30cm------------			------------mm/30cm------------			------------mm/30cm------------		
STERLING:									
15	0	7	(7)	0	0	0	23	17	6
45	31	5	26	34	4	30	52	25	27
75	21	20	1	57	0	57	40	22	18
105	29	52	(23)	50	0	50	31	22	9
135	-	-	-	-	-	-	23	21	2
155	-	-	-	-	-	-	11	19	(8)
TOTAL	81	84	(3)	141	4	137	180	126	54
STRATTON:									
15	18	8	10	10	0	10	73	25	48
45	23	3	20	46	0	46	77	45	32
75	13	5	8	45	0	45	66	0	66
105	9	6	3	42	10	32	63	2	61
135	9	8	1	75	28	47	61	42	19
155	21	0	21	0	0	0	73	56	17
TOTAL	93	30	63	218	38	180	413	170	243
WALSH:									
15	14	0	14	20	0	20	21	0	21
45	8	0	8	69	6	63	34	0	34
75	10	0	10	73	0	73	56	0	56
105	9	0	9	0	0	0	49	0	49
135	0	0	0	0	0	0	45	0	45
155	0	0	0	0	10	(10)	53	48	5
TOTAL	41	0	41	162	16	146	258	48	210

1. To convert from millimeters of H20/30 centimeters of soil to inches of H20/foot of soil multiply by 0.04.
2. ( ) Indicates a positive change in available soil water.

Table 47. Available soil water by soil depth of the MILLET phase in the WWCM rotation at Sterling and Stratton, and the WWSM rotation at Walsh in 2007.

SITE & DEPTH (cm)	SLOPE POSITION								
	SUMMIT			SIDESLOPE			TOESLOPE		
	Planting	Harvest	Change	Planting	Harvest	Change	Planting	Harvest	Change
	-------------mm/30cm-------------			-------------mm/30cm-------------			------------mm/30cm-------------		
STERLING:									
15	32			31					
45	46			56					
75	25			72			NO		
105	42			10			DATA		
135	-	-	-	-	-	-			
155	-	-	-	-	-	-			
TOTAL									
STRATTON:									
15	28	9	19	39	0	39	55	3	52
45	51	21	30	41	0	41	74	30	44
75	46	21	25	32	23	9	61	18	43
105	44	25	19	39	56	(17)	38	19	19
135	44	30	14	74	25	49	38	31	7
155	37	0	37	0	0	0	57	51	6
TOTAL	250	106	144	225	104	121	323	152	171
WALSH:									
15		0			7			0	
45		11			30			15	
75		20			16			54	
105		26			6			46	
135		17			13			48	
155		0			34			56	
TOTAL		74			106			219	

APPENDIX A
ANNUAL HERBICIDE PROGRAMS FOR EACH SITE

Table A1. Weed control methods including herbicide rate, cost and date applied at STERLING in 2006.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Cost	Date Applied
Rotation: Wheat-Corn-Fallow					
Wheat:	Alley Extra	0.1 oz/ac	7.0 g/ha	$1.04/acre	28-Apr-06
	2,4-D LV6	5.7 oz/ac	0.4 l/ha	$0.91/acre	28-Apr-06
(Stubble)	Credit Extra	20 oz/ac	1.4 l/ha	$2.98/acre	7-Aug-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	7-Aug-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	29-Aug-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	29-Aug-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	3-Nov-06
	Atrazine 4F	32 oz/ac	2.2 l/ha	$2.56/acre	3-Nov-06
Corn (RR):	Rt Master II	22 oz/ac	1.5 l/ha	$3.74/acre	28-Apr-06
(Pre-Plant)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	18-May-06
(Post-Emerg)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	6-Jun-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	12-Jul-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	29-Aug-06
Fallow:	Rt Master II	22 oz/ac	1.5 l/ha	$3.74/acre	28-Apr-06
	Roundup Ultra Max II	22 oz/ac	1.5 l/ha	$3.08/acre	18-May-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	6-Jun-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	12-Jul-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	12-Jul-06
	Credit Extra	20 oz/ac	1.4 l/ha	$2.98/acre	7-Aug-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	7-Aug-06
	Roundup	16 oz/ac	1.1 l/ha	$4.64/acre	29-

	Weather Max				Aug-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	29-Aug-06
(Pre-Plant)	Roundup Weather Max	44 oz/ac	3.1 l/ha	$12.76/acre	15-Sep-06
Rotation: Wheat-Corn-Millet					
Wheat:	Alley Extra	0.1 oz/ac	7.0 g/ha	$1.04/acre	28-Apr-06
	2,4-D LV6	5.7 oz/ac	0.4 l/ha	$0.91/acre	28-Apr-06
(Stubble)	Credit Extra	20 oz/ac	1.4 l/ha	$2.98/acre	7-Aug-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	7-Aug-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	29-Aug-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	29-Aug-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	3-Nov-06
	Atrazine 4F	32 oz/ac	2.2 l/ha	$2.56/acre	3-Nov-06
Corn (RR):	Rt Master II	22 oz/ac	1.5 l/ha	$3.74/acre	28-Apr-06
(Pre-Plant)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	18-May-06
(Post-Emerg)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	6-Jun-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	12-Jul-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	29-Aug-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	3-Nov-06
	Atrazine 4F	32 oz/ac	2.2 l/ha	$2.56/acre	3-Nov-06
Millet:	Rt Master II	22 oz/ac	1.5 l/ha	$3.74/acre	28-Apr-06
	Roundup Ultra Max II	22 oz/ac	1.5 l/ha	$3.08/acre	18-May-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	6-Jun-06
Rotation: Wheat-Wheat-Corn-Millet					
Wheat1:	Alley Extra	0.1 oz/ac	7.0 g/ha	$1.04/acre	28-Apr-06
	2,4-D LV6	5.7 oz/ac	0.4 l/ha	$0.91/acre	28-Apr-

					06
(Stubble)	Credit Extra	20 oz/ac	1.4 l/ha	$2.98/acre	7-Aug-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	7-Aug-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	29-Aug-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	29-Aug-06
Wheat2:	Alley Extra	0.1 oz/ac	7.0 g/ha	$1.04/acre	28-Apr-06
	2,4-D LV6	5.7 oz/ac	0.4 l/ha	$0.91/acre	28-Apr-06
(Stubble)	Credit Extra	20 oz/ac	1.4 l/ha	$2.98/acre	7-Aug-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	7-Aug-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	29-Aug-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	29-Aug-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	3-Nov-06
	Atrazine 4F	32 oz/ac	2.2 l/ha	$2.56/acre	3-Nov-06
Corn (RR):	Rt Master II	22 oz/ac	1.5 l/ha	$3.74/acre	28-Apr-06
(Pre-Plant)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	18-May-06
(Post-Emerg)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	6-Jun-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	12-Jul-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	29-Aug-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	3-Nov-06
	Atrazine 4F	32 oz/ac	2.2 l/ha	$2.56/acre	3-Nov-06
Millet:	Rt Master II	22 oz/ac	1.5 l/ha	$3.74/acre	28-Apr-06
	Roundup Ultra Max II	22 oz/ac	1.5 l/ha	$3.08/acre	18-May-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	6-Jun-06
Rotation: Opportunity					

Millet:	**Rt Master II**	**22 oz/ac**	**1.5 l/ha**	**$3.74/acre**	**28-Apr-06**
	Roundup Ultra Max II	**22 oz/ac**	**1.5 l/ha**	**$3.08/acre**	**18-May-06**
	Roundup Weather Max	**22 oz/ac**	**1.5 l/ha**	**$6.38/acre**	**6-Jun-06**

Table A2. Weed control methods including herbicide rate, cost and date applied at STRATTON in 2006.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Cost	Date Applied
Rotation: Wheat-Corn-Fallow					
Wheat:	Alley Extra	0.1 oz/ac	7.0 g/ha	$1.04/acre	2-May-06
	2,4-D LV6	5.7 oz/ac	0.4 l/ha	$0.91/acre	2-May-06
(Stubble)	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	18-Jul-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	18-Jul-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	18-Jul-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	18-Jul-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	6-Nov-06
	Atrazine 4F	32 oz/ac	2.2 l/ha	$2.56/acre	6-Nov-06
Corn (RR):	Roundup Ultra Max II	22 oz/ac	1.5 l/ha	$3.08/acre	2-May-06
(Pre-Plant)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	19-May-06
(Post-Emerg)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	16-Jun-06
	Distinct	4 oz/ac	0.3 l/ha	$11.13/acre	16-Jun-06
Fallow:	Roundup Ultra Max II	22 oz/ac	1.5 l/ha	$3.08/acre	2-May-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	19-May-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	16-Jun-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	16-Jun-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	18-Jul-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	18-Jul-06
(Pre-Plant)	Credit Extra	61 oz/ac	4.3 l/ha	$6.04/acre	29-Sep-06
Rotation: Wheat-Corn-Millet					
Wheat:	Alley Extra	0.1 oz/ac	7.0 g/ha	$1.04/acre	2-May-06
	2,4-D LV6	5.7 oz/ac	0.4 l/ha	$0.91/acre	2-May-06
(Stubble)	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	18-Jul-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	18-Jul-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	18-Jul-06

	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	18-Jul-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	6-Nov-06
	Atrazine 4F	32 oz/ac	2.2 l/ha	$2.56/acre	6-Nov-06
Corn (RR):	Roundup Ultra Max II	22 oz/ac	1.5 l/ha	$3.08/acre	2-May-06
(Pre-Plant)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	19-May-06
(Post-Emerg)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	16-Jun-06
	Distinct	4 oz/ac	0.3 l/ha	$11.13/acre	16-Jun-06
Millet:	Roundup Ultra Max II	22 oz/ac	1.5 l/ha	$3.08/acre	2-May-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	19-May-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	16-Jun-06
	2,4-D LV6	12 oz/ac	0.8 l/ha	$1.92/acre	16-Jun-06
Rotation: Wheat-Wheat-Corn-Millet					
Wheat1:	Alley Extra	0.1 oz/ac	7.0 g/ha	$1.04/acre	2-May-06
	2,4-D LV6	5.7 oz/ac	0.4 l/ha	$0.91/acre	2-May-06
(Stubble)	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	18-Jul-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	18-Jul-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	18-Jul-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	18-Jul-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	6-Nov-06
	Atrazine 4F	32 oz/ac	2.2 l/ha	$2.56/acre	6-Nov-06
Wheat2:	Alley Extra	0.1 oz/ac	7.0 g/ha	$1.04/acre	2-May-06
	2,4-D LV6	5.7 oz/ac	0.4 l/ha	$0.91/acre	2-May-06
(Stubble)	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	18-Jul-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	18-Jul-06
	Roundup Weather Max	16 oz/ac	1.1 l/ha	$4.64/acre	18-Jul-06
	Weedmaster	16 oz/ac	1.1 l/ha	$3.52/acre	18-Jul-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	6-Nov-06
	Atrazine 4F	32 oz/ac	2.2 l/ha	$2.56/acre	6-Nov-

					06
Corn (RR):	Roundup Ultra Max II	22 oz/ac	1.5 l/ha	$3.08/acre	2-May-06
(Pre-Plant)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	19-May-06
(Post-Emerg)	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	16-Jun-06
	Distinct	4 oz/ac	0.3 l/ha	$11.13/acre	16-Jun-06
Millet:	Roundup Ultra Max II	22 oz/ac	1.5 l/ha	$3.08/acre	2-May-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	19-May-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	16-Jun-06
	2,4-D LV6	12 oz/ac	0.8 l/ha	$1.92/acre	16-Jun-06
Rotation: Opportunity					
Millet:	Roundup Ultra Max II	22 oz/ac	1.5 l/ha	$3.08/acre	2-May-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	19-May-06
	Roundup Weather Max	22 oz/ac	1.5 l/ha	$6.38/acre	16-Jun-06
	2,4-D LV6	12 oz/ac	0.8 l/ha	$1.92/acre	16-Jun-06

Table A3. Weed control methods including herbicide rate, cost and date applied at WALSH in 2006.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Cost	Date Applied
Rotation: Wheat-Sorghum-Fallow					
Wheat:	Express	0.3 oz/acre	0.02 l/ha	$6.30/acre	31-Mar-06
	2,4-D LowVol	6 oz/acre	0.4 l/ha	$0.96/acre	31-Mar-06
(Stubble)	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	26-Jul-06
	2,4-D LowVol	16 oz/acre	1.1 l/ha	$2.56/acre	26-Jul-06
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	26-Jul-06
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	29-Aug-06
Grain Sorghum:	Atrazine 4F	24 oz/acre	1.7 l/ha	$1.92/acre	26-May-06
	Saber	12 oz/acre	0.8 l/ha	$1.92/acre	30-Jun-06
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	30-Jun-06
Fallow:	Glystar Plus	20 oz/acre	1.4 l/ha	$2.40/acre	17-May-06
	2,4-D LowVol	16 oz/acre	1.1 l/ha	$2.56/acre	17-May-06
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	26-Jul-06
	2,4-D LowVol	16 oz/acre	1.1 l/ha	$2.56/acre	26-Jul-06
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	26-Jul-06
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	29-Aug-06
Rotation: Wheat-Corn-Millet					
Wheat:	Express	0.3 oz/acre	0.02 l/ha	$6.30/acre	31-Mar-06
	2,4-D LowVol	6 oz/acre	0.4 l/ha	$0.96/acre	31-Mar-06
(Stubble)	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	26-Jul-06
	2,4-D LowVol	16 oz/acre	1.1 l/ha	$2.56/acre	26-Jul-06
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	26-Jul-06
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	29-Aug-06
Corn (RR):	Select	6 oz/acre	0.4 l/ha	$6.18/acre	17-May-06
	2,4-D LowVol	16 oz/acre	1.1 l/ha	$2.56/acre	17-May-06
	Roundup Weather Max	16 oz/acre	1.1 l/ha	$4.64/acre	30-Jun-06
	Saber	12 oz/acre	0.8 l/ha	$1.92/acre	30-Jun-06
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	30-Jun-06
Proso Millet:	Glystar Plus	20 oz/acre	1.4 l/ha	$2.40/acre	17-May-06
	2,4-D LowVol	16 oz/acre	1.1 l/ha	$2.56/acre	17-May-06
	Saber	12 oz/acre	0.8 l/ha	$1.92/acre	30-Jun-06
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	30-Jun-06

Rotation: Wheat-Wheat-Sorghum-Millet					
Wheat1:	Express	0.3 oz/acre	0.02 l/ha	$6.30/acre	31-Mar-06
	2,4-D LowVol	6 oz/acre	0.4 l/ha	$0.96/acre	31-Mar-06
(Stubble)	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	26-Jul-06
	2,4-D LowVol	16 oz/acre	1.1 l/ha	$2.56/acre	26-Jul-06
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	26-Jul-06
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	29-Aug-06
Wheat2:	Express	0.3 oz/acre	0.02 l/ha	$6.30/acre	31-Mar-06
	2,4-D LowVol	6 oz/acre	0.4 l/ha	$0.96/acre	31-Mar-06
(Stubble)	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	26-Jul-06
	2,4-D LowVol	16 oz/acre	1.1 l/ha	$2.56/acre	26-Jul-06
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	26-Jul-06
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	29-Aug-06
Grain Sorghum:	Atrazine 4F	24 oz/acre	1.7 l/ha	$1.92/acre	26-May-06
	Saber	12 oz/acre	0.8 l/ha	$1.92/acre	30-Jun-06
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	30-Jun-06
Proso Millet:	Glystar Plus	20 oz/acre	1.4 l/ha	$2.40/acre	17-May-06
	2,4-D LowVol	16 oz/acre	1.1 l/ha	$2.56/acre	17-May-06
	Saber	12 oz/acre	0.8 l/ha	$1.92/acre	30-Jun-06
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	30-Jun-06

Table A4. Weed control: herbicides, rates, cost and date applied at Akron for the 2006 season.

Crop	Herbicide	Rate (English)	Rate (Metric)	Cost	Date Applied
Rotation: Wheat-Fallow					
Wheat:	Roundup Ultra Max	24oz/A	1.75 l/ha	$10.99/A	28 Sept 2005
	Starane + Salvo	22 oz/A	1.60 l/ha	$11.41/A	26 April 2006
Fallow:	Roundup WeatherMax	22 oz/A	1.60 l/ha	$10.70/A	27 April 2006
	Roundup + 2,4-D	22+24oz/A	1.6+1.7 l/ha	$12.18/A	04 June 2006
	Roundup UltraMax	24 oz/A	1.75 l/ha	$10.99/A	08 Aug 2006
Rotation: Wheat-Proso-Flex					
Wheat:	Roundup Ultra Max	24oz/A	1.75 l/ha	$10.99/A	28 Sept 2005
	Starane + Salvo	22 oz/A	1.60 l/ha	$11.41/A	26 April 2006
Proso:	Roundup WeatherMax	22 oz/A	1.60 l/ha	$10.70/A	27 April 2006
	Roundup + 2,4-D	22+24 oz/A	1.6+1.7 l/ha	$12.18/A	04 June 2006
Flex:	Roundup WeatherMax	22 oz/A	1.60 l/ha	$10.70/A	27 April 2006
	Roundup + 2,4-D	22+24oz/A	1.6+1.7 l/ha	$12.18/A	04 June 2006
	Roundup UltraMax	24 oz/A	1.75 l/ha	$10.99/A	08 Aug 2006
Rotation: Trit/Pea-Foxtail-Flex					
Wheat:	Roundup Ultra Max	24oz/A	1.75 l/ha	$10.99/A	28 Sept 2005
	Starane + Salvo	22 oz/A	1.60 l/ha	$11.41/A	26 April 2006
Proso:	Roundup WeatherMax	22 oz/A	1.60 l/ha	$10.70/A	27 April 2006
	Roundup + 2,4-D	22+24 oz/A	1.6+1.7 l/ha	$12.18/A	04 June 2006
Flex:	Roundup WeatherMax	22 oz/A	1.60 l/ha	$10.70/A	27 April 2006
	Roundup + 2,4-D	22+24oz/A	1.6+1.7 l/ha	$12.18/A	04 June 2006
	Roundup UltraMax	24 oz/A	1.75 l/ha	$10.99/A	08 Aug 2006
Rotation: Wheat-Barley-Corn-Flex					
Wheat:	Roundup Ultra Max	24oz/A	1.75 l/ha	$10.99/A	28 Sept 2005
	Starane + Salvo	22 oz/A	1.60 l/ha	$11.41/A	26 April 2006
Barley:	Starane + Salvo	22 oz/A	1.60 l/ha	$11.41/A	26 April 2006
Corn:	Roundup WeatherMax	22 oz/A	1.60 l/ha	$10.70/A	27 April 2006
	Roundup + Bicep II	20+48oz/A	1.5+3.5 l/ha	$19.14/A	31 May 2006

Table A5. Weed control methods including herbicide rate, cost and date applied at Briggsdale in 2006 season.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Cost	Date Applied
Rotation: Wheat-Fallow					
Wheat:	Ally Extra	0.4 oz/ac	28 g/ha	$3.96/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
(Stubble)	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	7 July 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	7 July 2005
Fallow:	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
	Clarity	2 oz/ac	0.15 l/ha	$1.50/ac	3 April 2005
	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	22 June 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	22 June 2005
	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	28 July 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	28 July 2005
(Wheat Planting)	RT Master II	20 oz/ac	1.46 l/ha	$4.00/ac	4 Oct. 2005
Rotation: Wheat-Millet-Fallow					
Wheat:	Ally Extra	0.4 oz/ac	28 g/ha	$3.96/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
(Stubble)	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	7 July 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	7 July 2005
Millet:	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
	Clarity	2 oz/ac	0.15 l/ha	$1.50/ac	3 April 2005
	RT Master II	22 oz/ac.	1.61 l/ha	$4.40/ac	22 June 2005
Fallow:	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
	Clarity	2 oz/ac	0.15 l/ha	$1.50/ac	3 April 2005
	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	22 June 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	22 June 2005
	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	28 July 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	28 July 2005
(Wheat Planting)	RT Master II	20 oz/ac	1.46 l/ha	$4.00/ac	4 Oct. 2005
Rotation: Wheat-Corn-Fallow:					
Wheat:	Ally Extra	0.4 oz/ac	28 g/ha	$3.96/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
(Stubble)	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	7 July 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	7 July 2005
	RT Master II	20 oz/ac	1.46 l/ha	$4.00/ac	4 Oct. 2005
	Atrazine 4F	32 oz/ac	2.34 l/ha	$2.56/ac	4 Oct. 2005
Corn:	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
	Clarity	2 oz/ac	0.15 l/ha	$1.50/ac	3 April 2005
	Round-up Ultra Max II	22 oz/ac	1.61 l/ha	$7.92/ac	22 June 2005
	Atrazine 4F	24 oz/ac	1.75 l/ha	$1.92/ac	22 June 2005
Fallow:	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
	Clarity	2 oz/ac	0.15 l/ha	$1.50/ac	3 April 2005
	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	22 June 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	22 June 2005
	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	28 July 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	28 July 2005
(Wheat Planting)	RT Master II	20 oz/ac	1.46 l/ha	$4.00/ac	4 Oct. 2005

Rotation: Barley-Triticale-Millet:					
Barley:	Ally Extra	0.4 oz/ac	28.0 l/ha	$3.96/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
	RT Master II	20 oz/ac	1.46 l/ha	$4.00/ac	4 Oct. 2005
Triticale:	Ally Extra	0.4 oz/ac	28 g/ha	$3.96/ac	3 April 2005
(Wheat in 2005)	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	7 July 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	7 July 2005
Millet:	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
	Clarity	2.0 oz/ac	0.15 l/ha	$1.50/ac	3 April 2005
	RT Master II	22 oz/ac.	1.61 l/ha	$4.40/ac	22 June 2005
Rotation: Opportunity					
Fallow:	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	3 April 2005
	2,4-D LV6	5.3 oz/ac	0.39 l/ha	$0.80/ac	3 April 2005
	Clarity	2.0 oz/ac	0.15 l/ha	$1.50/ac	3 April 2005
	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	22 June 2005
	Weedmaster	16 oz/ac	1.17 l/ha	$3.36/ac	22 June 2005
	RT Master II	16 oz/ac	1.17 l/ha	$3.20/ac	28 July 2005
	Weedmaster/Outlaw	16 oz/ac	1.17 l/ha	$3.36/ac	28 July 2005
(Wheat Planting)	RT Master II	20 oz/ac	1.46 l/ha	$4.00/ac	4 Oct. 2005
The appropriate adjuvant was applied with herbicides according to label directions.					

Table A6. Weed control methods including herbicide rate, cost and date applied at Lamar during the 2005-2006 growing season.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Weed Pressure	Cost	Date Applied
Rotation: Wheat-Fallow						
Wheat:	Ally Extra 2,4-D Amine	0.4 oz/A 1 pt/A	28.06 g/ha 1.17 l/ha	I I	5.76	12 April 2006
Fallow:	Paramount	3 oz/A	210.5 g/ha	I	10.89	24 Oct 2005
Fallow	RT Master 2,4-D Low Vol	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	9.49	25 May 2006/ 5 Jun 2006
Fallow	Sweep			I	5.00	17 Jul 2006
Rotation: Wheat-Forage Sorghum-Fallow						
Wheat:	Ally Extra 2,4-D Amine	0.4 oz/A 1 pt/A	28.06 g/ha 1.17 l/ha	I I	5.76	12 April 2006
Fallow:	Paramount	3 oz/A	210.5 g/ha	I	10.89	25 Oct 2005
Fallow:	RT Master 2,4-D Low Vol	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	9.49	25 May 2006
Fallow:	Sweep			I	5.00	17 Jul 2006
Forage Sorghum	Dual Magnum Glyphosate	1.5 pt/A 24 oz/A	1.75 l/ha 1.75 l/ha	I I	23.53	25 May 2006/ 5 Jun 2006
Rotation: Wheat-Millet-Fallow						
Wheat:	Ally Extra 2,4-D Amine	0.4 oz/A 1 pt/A	28.06 g/ha 1.17 l/ha	I I	5.76	12 April 2006
Fallow:	Paramount	3 oz/A	210.5 g/ha	I	10.89	25 Oct 2005
Fallow:	RT Master 2,4-D Low Vol	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	9.49	25 May 2006
Fallow:	Sweep			I	5.00	17 Jul 2006
Millet:	Fallowmaster	32 oz/A	2.33 l/ha	I	2.24	12 April 2006
Millet:	RT Master 2,4-D Low Vol	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	9.49	25 May 2006/ 5 Jun 2006

*Applied 17 lbs. Ammonium Sulfate/100 gallons water with Round-up products.

Weed Pressure Ratings: I =Farmer would need to spray. II = Farmer would delay application. III =Farmer would not plan a spray application.

Table A7. Weed control methods including herbicide rate, cost and date applied at STERLING in 2007.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Cost	Date Applied
Rotation: Wheat-Corn-Fallow					
Wheat:	Alley Extra	0.4 oz/ac	0.03 l/ha	$3.75/acre	17-Apr-07
(Stubble)	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	1-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	1-Aug-07
	Atrazine 4F	48 oz/acre	3.4 l/ha	$3.84/acre	1-Aug-07
Corn (RR):	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	17-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	17-Apr-07
(Post-Emerg)	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	5-Jun-07
	Distinct	6 oz/acre	0.4 l/ha	$17.46/acre	5-Jun-07
	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	5-Jul-07
	Atrazine 4L	32 oz/acre	2.2 l/ha	$2.88/acre	22-Oct-07
Fallow:	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	17-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	17-Apr-07
	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	5-Jun-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	5-Jun-07
	Select Max	8 oz/acre	0.6 l/ha	$7.92/acre	5-Jun-07
	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	5-Jul-07
	Brash	22 oz/acre	1.5 l/ha	$4.84/acre	5-Jul-07
	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	1-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	1-Aug-07
	Brash	16 oz/acre	1.1 l/ha	$3.52/acre	27-Aug-07
(Pre-Plant)	Roundup Weather Max	48 oz/acre	3.4 l/ha	$14.88/acre	5-Oct-07
Rotation: Wheat-Corn-Millet					
Wheat:	Alley Extra	0.4 oz/ac	0.03 l/ha	$3.75/acre	17-Apr-07
(Stubble)	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	1-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	1-Aug-07
	Atrazine 4F	48 oz/acre	3.4 l/ha	$3.84/acre	1-Aug-07
Corn (RR):	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	17-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	17-Apr-07
(Post-Emerg)	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	5-Jun-07
	Distinct	6 oz/acre	0.4 l/ha	$17.46/acre	5-Jun-07
(Stubble)	Atrazine 4L	32 oz/acre	2.2 l/ha	$2.88/acre	22-Oct-07
Millet:	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	17-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	17-Apr-07
(Pre-Plant)	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	5-Jun-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	5-Jun-07
(Post-Emerg)	2,4-D Amine	12 oz/acre	0.8 l/ha	$1.20/acre	5-Jul-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	5-Jul-07
(Pre-Plant)	Roundup Weather	48 oz/acre	3.4 l/ha	$14.88/acre	5-Oct-07

	Max				
Rotation: Wheat-Wheat-Corn-Millet					
Wheat1:	Alley Extra	0.4 oz/ac	0.03 l/ha	$3.75/acre	17-Apr-07
(Stubble)	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	1-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	1-Aug-07
	Brash	16 oz/acre	1.1 l/ha	$3.52/acre	27-Aug-07
(Pre-Plant)	Roundup Weather Max	48 oz/acre	3.4 l/ha	$14.88/acre	5-Oct-07
Wheat2:	Alley Extra	0.4 oz/ac	0.03 l/ha	$3.75/acre	17-Apr-07
(Stubble)	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	1-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	1-Aug-07
	Atrazine 4F	48 oz/acre	3.4 l/ha	$3.84/acre	1-Aug-07
Corn (RR):	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	17-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	17-Apr-07
(Post-Emerg)	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	5-Jun-07
	Distinct	6 oz/acre	0.4 l/ha	$17.46/acre	5-Jun-07
(Stubble)	Atrazine 4L	32 oz/acre	2.2 l/ha	$2.88/acre	22-Oct-07
Millet:	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	17-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	17-Apr-07
(Pre-Plant)	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	5-Jun-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	5-Jun-07
(Post-Emerg)	2,4-D Amine	12 oz/acre	0.8 l/ha	$1.20/acre	5-Jul-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	5-Jul-07
(Pre-Plant)	Roundup Weather Max	48 oz/acre	3.4 l/ha	$14.88/acre	5-Oct-07
Rotation: Opportunity					
Wheat:	Alley Extra	0.4 oz/ac	0.03 l/ha	$3.75/acre	17-Apr-07
(Stubble)	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	1-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	1-Aug-07
	Atrazine 4F	48 oz/acre	3.4 l/ha	$3.84/acre	1-Aug-07

Table A8. Weed control methods including herbicide rate, cost and date applied at STRATTON in 2007.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Cost	Date Applied
Rotation: Wheat-Corn-Fallow					
Wheat:	Alley Extra	0.4 oz/ac	0.03 l/ha	$3.75/acre	20-Apr-07
(Stubble)	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	16-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	16-Aug-07
	Atrazine 4F	32 oz/acre	2.2 l/ha	$2.56/acre	16-Aug-07
	Brash	16 oz/acre	1.1 l/ha	$3.52/acre	28-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	28-Aug-07
	Roundup Weather Max	16 oz/acre	1.1 l/ha	$4.96/acre	24-Oct-07
Corn (RR):	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	30-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	30-Apr-07
(Post-Emerg)	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	4-Jun-07
	Distinct	6 oz/acre	0.4 l/ha	$17.46/acre	4-Jun-07
	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	3-Jul-07
	Atrazine 4L	32 oz/acre	2.2 l/ha	$2.88/acre	24-Oct-07
Fallow:	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	30-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	30-Apr-07
	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	4-Jun-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	4-Jun-07
	Select Max	10 oz/acre	0.7 l/ha	$9.90	4-Jun-07
	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	3-Jul-07
	Brash	22 oz/acre	1.5 l/ha	$4.84/acre	3-Jul-07
	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	16-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	16-Aug-07
(Pre-Plant)	Roundup Weather Max	48 oz/acre	3.4 l/ha	$14.88/acre	25-Sep-07
Rotation: Wheat-Corn-Millet					
Wheat:	Alley Extra	0.4 oz/ac	0.03 l/ha	$3.75/acre	20-Apr-07
(Stubble)	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	16-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	16-Aug-07
	Atrazine 4F	32 oz/acre	2.2 l/ha	$2.56/acre	16-Aug-07
	Brash	16 oz/acre	1.1 l/ha	$3.52/acre	28-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	28-Aug-07
	Roundup Weather Max	16 oz/acre	1.1 l/ha	$4.96/acre	24-Oct-07
Corn (RR):	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	30-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	30-Apr-07
(Post-Emerg)	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	4-Jun-07

	Distinct	6 oz/acre	0.4 l/ha	$17.46/acre	4-Jun-07
	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	3-Jul-07
(Stubble)	Atrazine 4L	32 oz/acre	2.2 l/ha	$2.88/acre	24-Oct-07
Millet:	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	30-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	30-Apr-07
(Pre-Plant)	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	4-Jun-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	4-Jun-07
(Post-Emerg)	2,4-D Amine	12 oz/acre	0.8 l/ha	$1.20/acre	3-Jul-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	3-Jul-07
(Pre-Plant)	Roundup Weather Max	48 oz/acre	3.4 l/ha	$14.88/acre	25-Sep-07
Rotation: Wheat-Wheat-Corn-Millet					
Wheat1:	Alley Extra	0.4 oz/ac	0.03 l/ha	$3.75/acre	20-Apr-07
(Stubble)	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	16-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	16-Aug-07
	Brash	16 oz/acre	1.1 l/ha	$3.52/acre	28-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	28-Aug-07
(Pre-Plant)	Roundup Weather Max	48 oz/acre	3.4 l/ha	$14.88/acre	25-Sep-07
Wheat2:	Alley Extra	0.4 oz/ac	0.03 l/ha	$3.75/acre	20-Apr-07
(Stubble)	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	16-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	16-Aug-07
	Atrazine 4F	32 oz/acre	2.2 l/ha	$2.56/acre	16-Aug-07
	Brash	16 oz/acre	1.1 l/ha	$3.52/acre	28-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	28-Aug-07
	Roundup Weather Max	16 oz/acre	1.1 l/ha	$4.96/acre	24-Oct-07
Corn (RR):	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	30-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	30-Apr-07
(Post-Emerg)	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	4-Jun-07
	Distinct	6 oz/acre	0.4 l/ha	$17.46/acre	4-Jun-07
	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	3-Jul-07
(Stubble)	Atrazine 4L	32 oz/acre	2.2 l/ha	$2.88/acre	24-Oct-07
Millet:	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	30-Apr-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	30-Apr-07
(Pre-Plant)	Roundup Weather Max	32 oz/acre	2.2 l/ha	$9.92/acre	4-Jun-07
	2,4-D LV4	12 oz/acre	0.8 l/ha	$2.16/acre	4-Jun-07
(Post-Emerg)	2,4-D Amine	12 oz/acre	0.8 l/ha	$1.20/acre	3-Jul-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	3-Jul-07
(Pre-Plant)	Roundup Weather Max	48 oz/acre	3.4 l/ha	$14.88/acre	25-Sep-07
Rotation: Opportunity					
Wheat:	Alley Extra	0.4 oz/ac	0.03 l/ha	$3.75/acre	20-Apr-07
(Stubble)	Roundup Weather Max	22 oz/acre	1.5 l/ha	$6.82/acre	16-Aug-07

	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	16-Aug-07
	Atrazine 4F	32 oz/acre	2.2 l/ha	$2.56/acre	16-Aug-07
	Brash	16 oz/acre	1.1 l/ha	$3.52/acre	28-Aug-07
	Aim EW	1 oz/acre	0.07 l/ha	$6.57/acre	28-Aug-07
	Roundup Weather Max	16 oz/acre	1.1 l/ha	$4.96/acre	24-Oct-07

Table A9. Weed control methods including herbicide rate, cost and date applied at WALSH in 2007.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Cost	Date Applied
Rotation: Wheat-Sorghum-Fallow					
Wheat:	Ally Extra	0.3 oz/acre	0.02 l/ha	$2.81/acre	26-Mar-07
	2,4-D Low Vol	8 oz/acre	0.6 l/ha	$1.44/acre	26-Mar-07
(Stubble)	Roundup Ultra Max	20 oz/acre	1.4 l/ha	$2.80/acre	29-Aug-07
	2,4-D Low Vol	10 oz/acre	0.7 l/ha	$1.80/acre	29-Aug-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	29-Aug-07
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	9-Oct-07
	2,4-D Low Vol	12 oz/acre	0.8 l/ha	$2.16/acre	9-Oct-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	9-Oct-07
Grain Sorghum:	Glystar Plus	20 oz/acre	1.4 l/ha	$2.40/acre	4-May-07
	2,4-D Low Vol	8 oz/acre	0.6 l/ha	$1.44/acre	4-May-07
	Banvel	3 oz/acre	0.2 l/ha	$1.53/acre	4-May-07
	Roundup Ultra Max	20 oz/acre	1.4 l/ha	$2.80/acre	1-Jun-07
	2,4-D Ester	10 oz/acre	0.7 l/ha	$1.10/acre	1-Jun-07
Fallow:	Glystar Plus	20 oz/acre	1.4 l/ha	$2.40/acre	4-May-07
	2,4-D Low Vol	8 oz/acre	0.6 l/ha	$1.44/acre	4-May-07
	Banvel	3 oz/acre	0.2 l/ha	$1.53/acre	4-May-07
	Roundup Ultra Max	20 oz/acre	1.4 l/ha	$2.80/acre	1-Jun-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	1-Jun-07
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	9-Oct-07
	2,4-D Low Vol	12 oz/acre	0.8 l/ha	$2.16/acre	9-Oct-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	9-Oct-07
Rotation: Wheat-Corn-Millet					
Wheat:	Ally Extra	0.3 oz/acre	0.02 l/ha	$2.81/acre	26-Mar-07
	2,4-D Low Vol	8 oz/acre	0.6 l/ha	$1.44/acre	26-Mar-07
(Stubble)	Roundup Ultra Max	20 oz/acre	1.4 l/ha	$2.80/acre	29-Aug-07
	2,4-D Low Vol	10 oz/acre	0.7 l/ha	$1.80/acre	29-Aug-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	29-Aug-07
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	9-Oct-07
	2,4-D Low Vol	12 oz/acre	0.8 l/ha	$2.16/acre	9-Oct-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	9-Oct-07
Corn (RR):	Glystar Plus	20 oz/acre	1.4 l/ha	$2.40/acre	4-May-07
	2,4-D Low Vol	8 oz/acre	0.6 l/ha	$1.44/acre	4-May-07
	Banvel	3 oz/acre	0.2 l/ha	$1.53/acre	4-May-07
	Roundup Ultra Max	20 oz/acre	1.4 l/ha	$2.80/acre	1-Jun-07
Proso Millet:	Glystar Plus	20 oz/acre	1.4 l/ha	$2.40/acre	4-May-07
	2,4-D Low Vol	8 oz/acre	0.6 l/ha	$1.44/acre	4-May-07
	Banvel	3 oz/acre	0.2 l/ha	$1.53/acre	4-May-07
	Roundup Ultra Max	20 oz/acre	1.4 l/ha	$2.80/acre	1-Jun-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	1-Jun-07
(Stubble)	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	9-Oct-07
	2,4-D Low Vol	12 oz/acre	0.8 l/ha	$2.16/acre	9-Oct-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	9-Oct-07
Rotation: Wheat-Wheat-Sorghum-Millet					
Wheat1:	Ally Extra	0.3 oz/acre	0.02 l/ha	$2.81/acre	26-Mar-07

	2,4-D Low Vol	8 oz/acre	0.6 l/ha	$1.44/acre	26-Mar-07
(Stubble)	Roundup Ultra Max	20 oz/acre	1.4 l/ha	$2.80/acre	29-Aug-07
	2,4-D Low Vol	10 oz/acre	0.7 l/ha	$1.80/acre	29-Aug-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	29-Aug-07
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	9-Oct-07
	2,4-D Low Vol	12 oz/acre	0.8 l/ha	$2.16/acre	9-Oct-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	9-Oct-07
Wheat2:	Ally Extra	0.3 oz/acre	0.02 l/ha	$2.81/acre	26-Mar-07
	2,4-D Low Vol	8 oz/acre	0.6 l/ha	$1.44/acre	26-Mar-07
(Stubble)	Roundup Ultra Max	20 oz/acre	1.4 l/ha	$2.80/acre	29-Aug-07
	2,4-D Low Vol	10 oz/acre	0.7 l/ha	$1.80/acre	29-Aug-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	29-Aug-07
	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	9-Oct-07
	2,4-D Low Vol	12 oz/acre	0.8 l/ha	$2.16/acre	9-Oct-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	9-Oct-07
Grain Sorghum:	Glystar Plus	20 oz/acre	1.4 l/ha	$2.40/acre	4-May-07
	2,4-D Low Vol	8 oz/acre	0.6 l/ha	$1.44/acre	4-May-07
	Banvel	3 oz/acre	0.2 l/ha	$1.53/acre	4-May-07
	Roundup Ultra Max	20 oz/acre	1.4 l/ha	$2.80/acre	1-Jun-07
	2,4-D Ester	10 oz/acre	0.7 l/ha	$1.10/acre	1-Jun-07
Proso Millet:	Glystar Plus	20 oz/acre	1.4 l/ha	$2.40/acre	4-May-07
	2,4-D Low Vol	8 oz/acre	0.6 l/ha	$1.44/acre	4-May-07
	Banvel	3 oz/acre	0.2 l/ha	$1.53/acre	4-May-07
	Roundup Ultra Max	20 oz/acre	1.4 l/ha	$2.80/acre	1-Jun-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	1-Jun-07
(Stubble)	Glystar Plus	24 oz/acre	1.7 l/ha	$2.88/acre	9-Oct-07
	2,4-D Low Vol	12 oz/acre	0.8 l/ha	$2.16/acre	9-Oct-07
	Banvel	4 oz/acre	0.3 l/ha	$2.04/acre	9-Oct-07

Table A10. **Weed control: herbicides, rates, cost and date applied at Akron for the 2007 season.**

Crop	Herbicide	Rate (English)	Rate (Metric)	Cost	Date Applied
Rotation: Wheat-Fallow					
Wheat:	Roundup WeatherMax	28 oz/A	2.05 l/ha	$12.18/A	19 Sept 2006
	Ally	0.75 oz/A	1.60 l/ha	$21.12/A	01 April 2007
	Clarity	20 oz/A	1.45 l/ha	$12.50/A	
	2,4-D LV6	10.67 oz/A	0.77 l/ha	$1.17/A	
Fallow:	Roundup WeatherMax	20 oz/A	1.45 l/ha	$9.73/A	18 June 2007
	Roundup WeatherMax	22 oz/A	1.60 l/ha	$10.35/A	16 July 2007
	Roundup WeatherMax	32 oz/A	2.33 l/ha	$13.42/A	05 Aug 2007
	Clarity	12 oz/A	0.88 l/ha	$7.50/A	
	2,4-D LV6	4 oz/A	0.29 l/ha	$0.44/A	
	Roundup WeatherMax	32 oz/A	2.33 l/ha	$13.42/A	03 Oct 2007
	Clarity	12 oz/A	0.88 l/ha	$7.50/A	
	2,4-D LV6	4 oz/A	0.29 l/ha	$0.44/A	
Rotation: Wheat-Proso-Flex					
Wheat:	Roundup WeatherMax	28 oz/A	2.05 l/ha	$12.18/A	19 Sept 2006
	Ally	0.75 oz/A	1.60 l/ha	$21.12/A	01 April 2007
	Clarity	20 oz/A	1.45 l/ha	$12.50/A	
	2,4-D LV6	10.67 oz/A	0.77 l/ha	$1.17/A	
Proso:	Roundup WeatherMax	20 oz/A	1.45 l/ha	$9.73/A	18 June 2007
Flex:	Roundup WeatherMax	20 oz/A	1.45 l/ha	$9.73/A	18 June 2007
	Roundup WeatherMax	22 oz/A	1.60 l/ha	$10.35/A	16 July 2007
	Roundup WeatherMax	32 oz/A	2.33 l/ha	$13.42/A	05 Aug 2007
	Clarity	12 oz/A	0.88 l/ha	$7.50/A	
	2,4-D LV6	4 oz/A	0.29 l/ha	$0.44/A	
	Roundup WeatherMax	32 oz/A	2.33 l/ha	$13.42/A	03 Oct 2007
	Clarity	12 oz/A	0.88 l/ha	$7.50/A	
	2,4-D LV6	4 oz/A	0.29 l/ha	$0.44/A	
Rotation: Trit/Pea-Foxtail-Flex					
Trit/Pea:	Roundup WeatherMax	28 oz/A	2.05 l/ha	$12.18/A	19 Sept 2006
Foxtail:	Roundup WeatherMax	20 oz/A	1.45 l/ha	$9.73/A	18 June 2007

Flex:	Roundup WeatherMax	20 oz/A	1.45 l/ha	$9.73/A	18 June 2007
	Roundup WeatherMax	22 oz/A	1.60 l/ha	$10.35/A	16 July 2007
	Roundup WeatherMax	32 oz/A	2.33 l/ha	$13.42/A	05 Aug 2007
	Clarity	12 oz/A	0.88 l/ha	$7.50/A	
	2,4-D LV6	4 oz/A	0.29 l/ha	$0.44/A	
	Roundup WeatherMax	32 oz/A	2.33 l/ha	$13.42/A	03 Oct 2007
	Clarity	12 oz/A	0.88 l/ha	$7.50/A	
	2,4-D LV6	4 oz/A	0.29 l/ha	$0.44/A	
Rotation: Wheat-Barley-Corn-Flex					
Wheat:	Roundup WeatherMax	28 oz/A	2.05 l/ha	$12.18/A	19 Sept 2006
	Ally	0.75 oz/A	1.60 l/ha	$21.12/A	01 April 2007
	Clarity	20 oz/A	1.45 l/ha	$12.50/A	
	2,4-D LV6	10.67 oz/A	0.77 l/ha	$1.17/A	
Barley:	Roundup WeatherMax	24 oz/A	1.75 l/ha	$10.94/A	01 April 2007
Corn:	Roundup WeatherMax	20 oz/A	1.45 l/ha	$9.73/A	18 June 2007
Flex:	Roundup WeatherMax	20 oz/A	1.45 l/ha	$9.73/A	18 June 2007
	Roundup WeatherMax	22 oz/A	1.60 l/ha	$10.35/A	16 July 2007
	Roundup WeatherMax	32 oz/A	2.33 l/ha	$13.42/A	05 Aug 2007
	Clarity	12 oz/A	0.88 l/ha	$7.50/A	03 Oct 2007
	2,4-D LV6	4 oz/A	0.29 l/ha	$0.44/A	
	Roundup WeatherMax	32 oz/A	2.33 l/ha	$13.42/A	
	Clarity	12 oz/A	0.88 l/ha	$7.50/A	
	2,4-D LV6	4 oz/A	0.29 l/ha	$0.44/A	

Table A11. Weed control including herbicide rate, cost and date applied at Briggsdale in 2007.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Cost	Date Applied
Rotation: Wheat-Fallow					
Wheat Stubble:	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	9-Jul-07
	Brash	22 oz/ac	2.65 l/ha	$4.91/ac	9-Jul-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	8-Aug-07
	Aim EW	1 oz/ac	0.12 l/ha	$6.58/ac	8-Aug-07
	Roundup Weather Max	31 oz/ac	3.73 l/ha	$9.63/ac	11-Sep-07
Fallow:	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	7-May-07
	2,4-D LV4	16 oz/ac	1.92 l/ha	$2.34/ac	7-May-07
	Roundup Weather Max	32 oz/ac	3.84 l/ha	$9.94/ac	7-Jun-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	9-Jul-07
	Brash	22 oz/ac	2.65 l/ha	$4.91/ac	9-Jul-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	8-Aug-07
	Aim EW	1 oz/ac	0.12 l/ha	$6.58/ac	8-Aug-07
(Preplant Wheat)	Roundup Weather Max	31 oz/ac	3.73 l/ha	$9.63/ac	11-Sep-07
Rotation: Wheat-Proso Millet-Flex					
Wheat Stubble:	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	9-Jul-07
	Brash	22 oz/ac	2.65 l/ha	$4.91/ac	9-Jul-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	8-Aug-07
	Atrazine 4F	26 oz/ac	3.12 l/ha	$2.11/ac	8-Aug-07
	Aim EW	0.75 oz/ac	0.09 l/ha	$4.93/ac	8-Aug-07
	Roundup Weather Max	31 oz/ac	3.73 l/ha	$9.63/ac	11-Sep-07
Proso Millet:	Roundup Weather Max	22 oz/ac	2.65	$6.83/ac	7-May-07
	2,4-D LV4	16 oz/ac	1.92 l/ha	$2.34/ac	7-May-07
(Preplant)	Roundup Weather Max	32 oz/ac	3.84 l/ha	$9.94/ac	7-Jun-07
	2,4-D Amine	12 oz/ac	1.44 l/ha	$1.24/ac	9-Jul-07
	Banvel	4 oz/ac	0.48 l/ha	$2.02/ac	9-Jul-07
Flex:	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	7-May-07
	2,4-D LV4	16 oz/ac	1.92 l/ha	$2.34/ac	7-May-07
	Roundup Weather Max	32 oz/ac	3.84 l/ha	$9.94/ac	7-Jun-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	9-Jul-07
	Brash	22 oz/ac	2.65 l/ha	$4.91/ac	9-Jul-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	8-Aug-07
	Aim EW	1 oz/ac	0.12 l/ha	$6.58/ac	8-Aug-07
(Preplant Wheat)	Roundup Weather Max	31 oz/ac	3.73 l/ha	$9.63/ac	11-Sep-07
Rotation: Triticale/Austrian Winter Peas-Forage Sorghum/Foxtail Millet-Flex					

Triticale Stubble:	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	9-Jul-07
	Brash	22 oz/ac	2.65 l/ha	$4.91/ac	9-Jul-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	8-Aug-07
	Atrazine 4F	26 oz/ac	3.12 l/ha	$2.11/ac	8-Aug-07
	Aim EW	0.75 oz/ac	0.09 l/ha	$4.93/ac	8-Aug-07
	Roundup Weather Max	31 oz/ac	3.73 l/ha	$9.63/ac	11-Sep-07
Sorghum + Foxtail	Roundup Weather Max	22 oz/ac	2.65	$6.83/ac	7-May-07
	2,4-D LV4	16 oz/ac	1.92 l/ha	$2.34/ac	7-May-07
(Preplant)	Roundup Weather Max	32 oz/ac	3.84 l/ha	$9.94/ac	7-Jun-07
	2,4-D Amine	12 oz/ac	1.44 l/ha	$1.24/ac	9-Jul-07
	Banvel	4 oz/ac	0.48 l/ha	$2.02/ac	9-Jul-07
Flex:	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	7-May-07
	2,4-D LV4	16 oz/ac	1.92 l/ha	$2.34/ac	7-May-07
	Roundup Weather Max	32 oz/ac	3.84 l/ha	$9.94/ac	7-Jun-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	9-Jul-07
	Brash	22 oz/ac	2.65 l/ha	$4.91/ac	9-Jul-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	8-Aug-07
	Aim EW	1 oz/ac	0.12 l/ha	$6.58/ac	8-Aug-07
(Preplant Wheat)	Roundup Weather Max	31 oz/ac	3.73 l/ha	$9.63/ac	11-Sep-07
Rotation: Wheat-Barley-Forage Sorghum/Foxtail Millet-Flex					
Wheat Stubble:	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	9-Jul-07
	Brash	22 oz/ac	2.65 l/ha	$4.91/ac	9-Jul-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	8-Aug-07
	Aim EW	1 oz/ac	0.12 l/ha	$6.58/ac	8-Aug-07
	Roundup Weather Max	31 oz/ac	3.73 l/ha	$9.63/ac	11-Sep-07
Barley:	Bronate Advanced	16 oz/ac	1.92 l/ha	$8.52/ac	7-May-07
(Stubble)	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	9-Jul-07
	Brash	22 oz/ac	2.65 l/ha	$4.91/ac	9-Jul-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	8-Aug-07
	Atrazine 4F	26 oz/ac	3.12 l/ha	$2.11/ac	8-Aug-07
	Aim EW	0.75 oz/ac	0.09 l/ha	$4.93/ac	8-Aug-07
	Roundup Weather Max	31 oz/ac	3.73 l/ha	$9.63/ac	11-Sep-07
Sorghum + Foxtail	Roundup Weather Max	22 oz/ac	2.65	$6.83/ac	7-May-07
	2,4-D LV4	16 oz/ac	1.92 l/ha	$2.34/ac	7-May-07
(Preplant)	Roundup Weather Max	32 oz/ac	3.84 l/ha	$9.94/ac	7-Jun-07
	2,4-D Amine	12 oz/ac	1.44 l/ha	$1.24/ac	9-Jul-07
	Banvel	4 oz/ac	0.48 l/ha	$2.02/ac	9-Jul-07
Flex:	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	7-May-07
	2,4-D LV4	16 oz/ac	1.92 l/ha	$2.34/ac	7-May-07
	Roundup Weather Max	32 oz/ac	3.84 l/ha	$9.94/ac	7-Jun-07
	Roundup Weather	22 oz/ac	2.65 l/ha	$6.83/ac	9-Jul-07

	Max				
	Brash	22 oz/ac	2.65 l/ha	$4.91/ac	9-Jul-07
	Roundup Weather Max	22 oz/ac	2.65 l/ha	$6.83/ac	8-Aug-07
	Aim EW	1 oz/ac	0.12 l/ha	$6.58/ac	8-Aug-07
(Preplant Wheat)	Roundup Weather Max	31 oz/ac	3.73 l/ha	$9.63/ac	11-Sep-07

Table A12. Weed control methods including herbicide rate, cost and date applied at Lamar during the 2006-2007 growing season.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Weed Pressure	Cost	Date Applied
Rotation: Wheat-Fallow						
Wheat	Paramount Banvel	3 oz/A 4 oz/A	210.5 g/ha 0.29 l/ha	I I	12.65	7 Aug 2006
Wheat:	Ally Extra 2,4-D Amine	0.4 oz/A 1 pt/A	28.06 g/ha 1.17 l/ha	I I	5.76	9 Apr 2007
Wheat stubble	Roundup Weather Max Dicamba Atrazine 4L	32 oz/A 1 pt/A 2 pt/A	2.33 l/ha 1.17 l/ha 2.33 l/ha	I I I	19.20	9 Aug 2007
Fallow	Gramoxone Max Banvel	2 pt/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	15.36	26 Apr 2007
Fallow	Roundup Weather Max Banvel	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	16.96	4 Jun 2007
Fallow	Sweep			I	6.00	26 Jun 2007
Fallow	Roundup Weather Max Sterling (Dicamba)	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	16.64	30 Jul 2007
Rotation: Wheat-Forage Sorghum-Fallow						
Wheat	Paramount Banvel	3 oz/A 4 oz/A	210.5 g/ha 0.29 l/ha	I I	12.65	7 Aug 2006
Wheat:	Ally Extra 2,4-D Amine	0.4 oz/A 1 pt/A	28.06 g/ha 1.17 l/ha	I I	5.76	9 Apr 2007
Wheat stubble	Roundup Weather Max Dicamba Atrazine 4L	32 oz/A 1 pt/A 2 pt/A	2.33 l/ha 1.17 l/ha 2.33 l/ha	I I I	19.20	9 Aug 2007
Sorghum	Gramoxone Max Banvel	2 pt/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	15.36	26 Apr 2007
Sorghum	Roundup Weather Max Banvel	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	16.96	4 Jun 2007
Fallow	Gramoxone Max Banvel	2 pt/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	15.36	26 Apr 2007
Fallow	Roundup Weather Max Banvel	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	16.96	4 Jun 2007
Fallow:	Sweep			I	6.00	26 Jun 2007
Fallow	Roundup Weather Max Sterling (Dicamba)	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	16.64	30 Jul 2007

Table A1 continued next page

Table A12 (contd.). Weed control methods including herbicide rate, cost and date applied at Lamar during the 2006-2007 growing season.

Crop	Herbicide/Tillage	Rate (English)	Rate (Metric)	Weed Pressure	Cost	Date Applied
Rotation: Wheat-Millet-Fallow						
Wheat	Paramount Banvel	3 oz/A 4 oz/A	210.5 g/ha 0.29 l/ha	I I	12.65	7 Aug 2006
Wheat:	Ally Extra 2,4-D Amine	0.4 oz/A 1 pt/A	28.06 g/ha 1.17 l/ha	I I	5.76	9 Apr 2007
Wheat stubble	Roundup Weather Max Dicamba Atrazine 4L	32 oz/A 1 pt/A 2 pt/A	2.33 l/ha 1.17 l/ha 2.33 l/ha	I I I	19.20	9 Aug 2007
Millet	Gramoxone Max Banvel	2 pt/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	15.36	26 Apr 2007
Millet	Roundup Weather Max Banvel	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	16.96	4 Jun 2007
Fallow	Gramoxone Max Banvel	2 pt/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	15.36	26 Apr 2007
Fallow	Roundup Weather Max Banvel	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	16.96	4 Jun 2007
Fallow:	Sweep			I	6.00	26 Jun 2007
Fallow	Roundup Weather Max Sterling (Dicamba)	32 oz/A 1 pt/A	2.33 l/ha 1.17 l/ha	I I	16.64	30 Jul 2007

*Applied 17 lbs. Ammonium Sulfate/100 gallons water with Round-up products.

Weed Pressure Ratings: I = Farmer would need to spray. II = Farmer would delay application. III = Farmer would not plan a spray application.

APPENDIX B
PROJECT PUBLICATIONS

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