INTRODUCING GRAZABLE COVER CROP TO WHEAT SYSTEMS IN OKLAHOMA

By

KYLE HORN

Bachelor of Science in Plant and Soil Sciences

Oklahoma State University

Stillwater, Oklahoma

2016

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
December, 2019

INTRODUCING GRAZABLE COVER CROP TO

WHEAT SYSTEMS IN OKLAHOMA

Thesis Approved:

Dr. Alex Rocateli

Thesis Adviser

Dr. Jason Warren

Dr. Kenneth E. Turner

Name: KYLE HORN

Date of Degree: DECEMBER, 2019

Title of Study: INTRODUCING GRAZABLE COVER CROP TO WHEAT SYSTEMS IN OKLAHOMA

Major Field: Plant and Soil Science

Abstract:

Winter wheat is a valuable crop in Southern Great Plains (SGP) of the U.S. that grows from fall to spring; then the cropland is kept fallow during summer. Introducing cover crops to this system may reduce soil erosion and weeds. Moreover, grazing cover crops might increase farm profitability. The objective of this work was to evaluate different cover crops' grazing potential and their effect on the following wheat crop in the SGP. Nine summer cover crops including three legumes, three grasses and two mixes were established late spring 2016 and 2017 in Chickasha and Perkins, OK. At 6 weeks after planting (WAP), three simulated grazing regimes such as severe, proper grazing, and dedicated cover crops (no grazing) were performed in all cover crops. Cover crops regrowth were chemically terminated at 14 WAP, and winter wheat seeded over standing residues. Finally, wheat was harvested in May 2017 and 2018. Cover crop available forage dry matter (AFDM), ADFM species composition, forage nutritive value parameters, daily steer gain (DSG), and total steers gain per area (TSGA) were measured at 6 WAP. Final dry matter residue (FDMR), and FDMR species composition were measured at 14 WAP; and wheat grain yield and wheat grain protein content were also measured. Results indicated that triple treat sorghum-sudan (TTSS, *Sorghum bicolor x S. bicolor var. sudanese)* produced the highest ADFM under no water limiting conditions, and all tested grasses except for pearl millet [PM, *Pennisetum glaucum (L.) R. Br.*] produced enough FDMR for total soil coverage. Overall, grasses and mixes were more effective in controlling weeds than legumes; however, the cover crop's weed suppression varied according to rainfall and soil fertility. Under low rainfall, cover crop produced limited amount of ADFM and FDMR (less than 2 Mg ha^{-1}) which did not allow enough forage nor final residue. Even though TTSS showed the highest ADFM potential, other cover crops such as mungbeans (MB, *Vigna radiata*) and PM+MB in Perkins and Chickasha, respectively allowed the highest DSG and TSGA. Finally, wheat yield and quality variations among site-year were mainly affected by weather and soil fertility rather than previous cover crop.

TABLE OF CONTENTS

Chapter Page

LIST OF TABLES

Tables for Chapter IV Page

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Winter wheat (*Triticum aestivum* L.) is the primary cash crop in Oklahoma with regards to acreage and profit. In 2015, wheat was planted on 2.14 million ha $^{-1}$ statewide for grain and/or forage production in Oklahoma, contributing 489 million dollars to the state's economy (Oklahoma Department of Agriculture, Food, and Forestry, 2016). In Oklahoma, a considerable amount of the winter wheat is grown in a monoculture system where the field is planted in the fall and harvested in the spring, then the field left fallow over summer; consequently, prone to erosion, weeds, and water losses. Instead of leaving the field fallow, planting summer cover crops may be a strategy to reduce wind and water soil erosion, decrease herbicide use with lower weed pressure, and increase soil health. However, the use of cover crops in the Southern Great Plains (SGP) is a relatively new practice which needs to be adapted to the region according to its soils and climate.

Cover crop cost is a factor that cannot be neglected when adapting this technology to the SGP. Even though cover crops are managed as low input crops, they still add cost to the system without any guarantee of immediate economic return. Moreover, cover crop benefits such as increased organic matter may not immediately result in beneficial changes to the soil such as improved aggregate stability. As cited by Benjamin et al.

(2008), the lack of soil residue incorporation into the soil delays the residue decomposition to aggregate-stabilizing compounds

After an extensive review performed across U.S., Snapp et. al. (2005) concluded that cover crop direct costs (e.g., planting) and indirect costs (e.g., management issues, cash crop yield losses) associated with lack of on-farm short-term benefits are the main issues associated with low cover crop adoption by producers in U.S. This statement might be valid when adopting cover crops in the winter-wheat systems in the SGP. Furthermore, the wheat commodity price fluctuation may reduce profit margin to a point where implementing cover crops results in a very low or no profitable system which is economically unsustainable. In response to the wheat prices fluctuations, producers shift from dedicated grain production to a more diversified system such as grain and beef cattle production, i.e., dual-purpose wheat system. This diversification results in a more economic resilient system. However, the dual-purpose wheat system provides cattle feedstock only during fall and early spring. In this context, grazing the summer cover crops implemented in the winter-wheat systems might be an alternative to increasing the total system profitability by adding animal gain during the summer months. Moreover, grazing cover crops make it an attractive system for producers because it adds both short-term economic benefits and implements conservation practices improving soil conditions in the long-term.

Although grazing cover crops may alleviate the costs inherent to cover crops, the amount of biomass removed by grazing may reduce the soil conversation benefits of cover crops. The potential cover crop benefits are intrinsically related to the amount of residue that it can produce to protect against erosion, suppress weeds, decrease soil water evaporation, increase soil organic matter, water infiltration, and biological activity (Biederbeck, 1998). Consequently, depending on the grazing intensity, cover crop residue can be drastically reduced nullifying its conservation benefits.

Objectives

Under this context, the main goal of this proposed project is to assess the feasibility of integrating commonly cultivated legumes, grasses, and mixes of summer cover crops under different grazing regimes to the winter-wheat systems of Oklahoma. The specific objectives are:

1) To determine cover crops potential as cattle feedstock by specifying:
    a. forage quantity and quality for each cover crop, and
    b. theoretical stocking rate and animal gain at different grazing regimes.
2) To quantify final summer residue production for each cover crop x grazing regime.
3) To evaluate the efficacy of the cover crops x grazing regimes on:

a. suppressing summer weeds,

b. improving soil water and nutrients to the following winter-wheat crop,

4) To assess the effect of cover crop residue on the winter-wheat development and grain production.

CHAPTER 2

LITERATURE REVIEW

The Oklahoma winter-wheat systems; importance and challenges

Winter wheat (*Triticum aestivum L.*) is the primary cash crop in Oklahoma. In 2015, wheat was planted on 2,144,834 ha $^{-1}$, contributing 489 million dollars to the state's economy (Oklahoma Department of Agriculture Food and Forestry, 2016). Continuous winter-wheat is considered the conventional system in Oklahoma, which consists of leaving the field fallow during summer months following the harvest of wheat grain.

Summer fallow is an old adopted practice with the objective of maximizing soil water storage and plant nutrient availability and minimizing energy and economic input (Greb, 1979). To date, summer fallow is still employed in most of the Oklahoma wheat fields. However, in the last few decades, an additional approach consisting of minimal or no tillage after grain harvest is increasingly being adopted. This new approach called "no-till system" reduces soil erosion and improves soil quality by increasing soil organic carbon (SOC) in the 0-5cm depth (Schillinger et al., 2007). The no-till short-term benefits are related to plant residue retention at the top of the soil, which provides soil coverage. Sharratt and Feng (2009) assert that wind erosion takes place when the friction velocity exceeds the threshold friction velocity; this threshold is linked to the characteristics of the soil such as soil moisture, texture, crust cover, and roughness. Summer fallow cultivation provides less roughness than an actively growing crop. Consequently, water and soil erosion are expected during the summer months when wheat is not actively growing. Maintaining the wheat residue during summer fallow was mentioned as a beneficial practice by Greb (1979). However, this practice was feasible in large-scale only in the last decades thanks to the advent of non-selective herbicides and no-till planters which allowed summer fallow weed control and wheat planting without tilling the soil (Lal et al., 2007). The benefits of the no-till systems are already well-documented in the SGP. Soil losses were reduced 18-fold, and, consequently, N and P losses were reduced respectively four- and three-fold when no-till replaced conventional tillage systems in a vast area of the SGP which comprised Oklahoma, Kansas, and Texas (Sharpley and

Halvorson, 1994). Moreover, other studies also indicated no-till systems as a beneficial practice for Oklahoma because it maintained soil residue from the previous crop, which reduced soil erosion, and did not significantly decreased wheat grain production (Patrignani et al. 2012; Heer et al. 1989).

Dual-purpose wheat (i.e., fall-spring grazed then grain harvested) is the most popular practice among Oklahoma producers. Hossain et al. (2004) reported that 49% of the Oklahoma wheat acreage was managed as dual-purpose followed by 31 and 20% of the acreage that was managed as grain-only and forage-only, respectively. Dual-purpose wheat is planted early in the fall, then grazed from late fall to early spring In this system, the cattle must be removed from the field before wheat reaches first hollow stem (i.e., wheat jointing stage). Grazing past jointing stage removes the wheat growing points responsible for grain formation, which dramatically lowers yield. However, minimal effect on grain yield is expected when cattle are removed right before jointing, and if adequate soil moisture follows wheat stem elongation, heading, and seed ripening (Redmon et al., 1995). This management was confirmed by Edwards et al. (2011) who reported a slight 7% yield reduction in dual-purpose wheat when compared to the grain-only system during a nine-year-long study in Oklahoma. Even though grazing slightly reduces grain yield, the economic benefits associated with animal gain offset the grain yield reduction most of the time depending on the beef, grain, and straw prices (Ates et al., 2017). Furthermore, according to (Lollato, 2017), winter wheat can be potentially grazed from 120 to 150 days offering a considerable amount of on-farm feedstock that

can reduce costs such as hay purchase and/or cattle transportation by increasing the number of grazing days from late fall to early spring when warm-season pastures are not productive.

Farm product diversification and management flexibility are the main advantages of dual-purpose wheat. The wheat prices in the last five years has decreased drastically. The 2012 and 2016 average wheat prices per metric tons were $273 and $126, respectively (USDA, 2017). During this four-year period there was a reduction of 46% in potential farm profit. In response to low wheat grain prices, many producers grazed out the wheat planted in 2017 because the beef market was more profitable, at that time. Statistical data from USDA (2017) showed this production shift from grain to beef; the total 2017 planted wheat area was 1,821,000; however, only 65% of the planted area (i.e., 1,174,000 ha) was grain harvested. Even though other factors such as crop failure must be accounted when analyzing this 35% reduction from planted to harvested area, it is hypothesized that the main factor responsible for this reduction was the intentional producer option for graze-out wheat rather than harvesting grain due to the low wheat prices. According to Lollato (2017), when the wheat price is low, and the beef price is high, producers may give up the grain harvest and graze the wheat out.

Potential summer cover crops benefits for the Oklahoma winter-wheat system

The Naturatl Resourse Conservation Service (NRCS) defines cover crop as a grass, legume, and forb planted for vegetative cover with the purpose to add benefits to

cropping systems. Those benefits are reduced soil erosion and water quality degradation, increased soil health and organic matter, suppression of weeds and pests, improved soil water use, and soil compaction alleviation (NRCS, 2016). The use of cover crops in the SGP is a relatively new practice where its adaptation to the region is essential for success. Cover crop selection is region dependent. In the cooler locations, the winter cover crop complements a summer cash crop and a summer cover crop in the warmer zones complements a winter cash crop (Snapp et al., 2005). Cover crops are considered a thriving practice in different U.S. regions (Blanco-Canqui et al., 2012). The adoption of cover crops according to (Franzluebbers, 2007) has increased in the Southeastern area of the United States due to sufficient precipitation ($\geq$ 750 mm) throughout the year. However, in this section, the main focus will be given to cover crop studies conducted in the SGP.

Short-term benefits by planting cover crops were reported by several authors. Pandey et al. (2017) was able to maintain N in the system, therefore, reducing N inputs with the addition of N-fixing legume cover crops. Watson et al. (2002) states that biological activity and the structure of the soil have increased with the addition of legumes. Another aspect that was improved in the short term with cover crops was lower vulnerability to erosive events.D. Meyer et al. (1999) reported that erosion was slowed by decreasing runoff when using cover crops. The short-term value is intrinsically related to the amount of cover crop residue which physically protects and insulates the soil against wind and water erosion.

A field left fallow combined with the high wind speeds in the SGP can result in significant soil losses. Summer fallow which starts in June and ends in September is the period that fields are highly prone to wind erosion. Winds become erosive when they achieve 21 kilometers per hour (USDA, 2011). In Chickasha, OK, the maximum wind speed exceeded 21 km h^{-1} an average of 110 times (2007-2016) from June 1 to November 1, and in Perkins, OK, the wind speed exceeded 21 km h^{-1} an average of 108 times for the same period (McPherson et al., 2007). If the field is left fallow, erosive events could occur ≥ 108 times in both locations due to bare soil conditions. The NRCS classifies soils into wind erodibility groups (WEG) based on their physical properties such as texture (sand, silt, and clay) and soil aggregates. Following the WEG classification, the representative soil in Chickasha is a loam (27.5% sand, 48% silt, and 24.5% clay) which is classified into WEG 6. An open field in WEG 6 is estimated to lose 48 Mg of soil $acre^{-1}$ $year^{-1}$. The representative soil in Perkins is also a loam; however, it is composed of 49.4% sand, 35% silt, and 15.6% clay. This soil composition classifies Perkins field into WEG 5 that loses approximately 56 Mg of soil $acre^{-1}$ $year^{-1}$ if left unprotected. Both fields are prone to significant soil losses, which can negatively impact soil fertility, and, consequently, decreases crop productivity.

Such production losses were already estimated for wheat in the Great Plains (GP). According to (Lyles and Tatarko, 1988), the Chickasha and Perkins locations could expect soil losses of up to 108 and 126 Mg ha^{-1} yr^{-1}, respectively, if the soil is left bare. Lyles, 1977 estimated that wheat yields could be reduced by 4.8-6 kg ha^{-1} yr^{-1} as a result

of this magnitude soil loss from wind erosion in western Kansas, eastern Colorado and central OK. To alleviate wheat yield losses, more fertilizer inputs would be necessary to compensate the soil nutrients carried away by the wind. This fact demonstrates how important is to maintain soil cover during throughout the year which can be achieved by combining no-till systems with summer cover crops in Oklahoma; where the no-till wheat residue left in the top of the soil could provide initial soil protection until the cover crop is completely established. Mendez and Buschiazzo (2015) found that using no-till systems combined with a sunflower cover crop between corn rotations reduced wind soil erosion up to 10 times when compared to conventional and vertical tillage.

Water soil erosion is another concerning issue in the SGP. According to predictive models, water erosion of soil is expected to increase in the next decades due to the occurrences of larger storms in the SGP (climate change effect). Using the Water Erosion Prediction Project (WEPP) model, Zhang (2012) predicted that from 2010 to 2039 soil runoff would increase by 19.5% and soil loss by 43.5% in fields located in nearby El Reno, OK, if the current management practices such as conventionally tilled wheat remain the same. This study also found that tillage has an influence on water runoff and soil loss. When comparing intensively tilled to no-till, the mean annual runoff was reduced 18% and the mean soil loss 95% (intensively tilled: 98mm of water runoff and 8,033 kg ha^{-1} yr^{-1}, and no-till: 80 mm and 405 kg ha^{-1} yr^{-1}).

Weed suppression is another benefit associated with the implementation of cover crops. Cover crop would directly compete with weeds for water, sunlight, and nutrients during the summer months, consequently decreasing weed incidence in the following years. A fallow field is prone to develop weeds which use soil nutrients and water that should be stored for the next cash crop (Zeleke, 2017). The same resources that weeds currently deplete could be better used by cover crops that offer improved residue cover and, perhaps, N fixation (if a legume crop) into the soil. Hairy vetch (*Vicia villosa*), a winter cover crop, planted into a prepared seedbed for three consecutive years in Maryland decreased weed biomass by 40% when compared to fallow (Teasdale and Daughtry, 1993). Similar results were reported by Dorn (2015) in Switzerland with two vetches, two peas, and two mixes where the weeds were suppressed ≥ 96% without antagonistic yield effects to the cash crops: corn (*Zea mays* L.) and sunflower (*Helianthus annus* L.).

Long-term benefits of planting cover crops were observed by several authors. All cited long-term benefits were a result of cover crop residue decomposition and incorporation to the soil over several years. For instance, in Kansas, hairy vetch and Austrian winter pea *(Pisum arvense*) planted into a winter wheat grain - sorghum rotation over two seasons increased soil organic carbon (SOC) and N concentrations, which reduced N fertilization needs to the following crops (Janke et al., 2002). Other authors reported similar results. In a twelve-year study, Indianhead lentils (*Lens culinaris Medikus* cultivar Indianhead) planted as a cover crop between wheat cycles increased

SOC by 9.1% when compared to fallow. This higher SOC level increased soil water holding capacity and N availability to plants in the top 15-cm soil layer (Allen et al., 2011). Furthermore, in Saskatchewan, Canada, black lentil (*Lens culinaris Medikus*), Tangier flatpea (*Lathyrus tingitanus* L.), chickling vetch (*Lathyrus sativus* L.*)* and feedpea (*Pisum sativum* L.) were grown in a six-year wheat rotation; all four legumes increased liable N along with other soil quality attributes such as biochemical and physical aspects in the 10-cm soil top layer (Biederbeck et al., 1998). Planting of cover crops retains nutrients as well as increase ecological stability and functioning by increasing plant diversity in the system. Ecosystems that had higher plant diversity had lower nutrient losses and were more productive (Tilman et al., 1996). In the long-term, cover crops increase soil nutrients and soil functioning as a result to higher levels of SOC. Those benefits may increase farm profitability by improving environmental and N cycling that can decrease inputs (Roth et al., 2018).

Although solid and consistent short- and long-term cover crop benefits were observed in several studies, the short-term effects might not always be beneficial. In Akron, Colorado over a six-year study, Nielsen and Vigil (2005) reported low wheat grain yields when summer fallow was replaced with cover crops (field pea, black lentil, and hairy vetch) the authors speculated that cover crops decreased soil water, which otherwise would be stored for wheat development. Other studies reported similar results. In Kansas, the use of legume cover crops in a dry year reduced sorghum grain yields due to lack of soil water available for the following sorghum crop development. Conversely,

good sorghum stands were observed in wet years because water was not a limitation and the legumes could provide extra N to the sorghum crop (Janke et al., 2002). The detrimental short-term cover crops effects on the cash crop appear to be mostly influenced by the amount of soil water left after cover crop termination. A multi-location study, performed in Akron, CO, and Sidney, NE, reported that corn rotated with forage triticale (*Triticosecale*) cover crop had lower grain yields than corn following fallow. The authors concluded that forage triticale used a substantial amount of the soil water that that would otherwise be stored for the cash crop. Nevertheless, the addition of triticale as a cover crop, which was partially harvested as hay, increased the net income by 17% when compared to winter corn fallow (Nielsen et al., 2017). Under water limiting conditions, the use of a cover crop may decrease the cash crop yield, but the overall profitability may increase if cover crops have an extra purpose such as forage production.

Water-use efficiency of the whole wheat crop systems in Oklahoma might be improved by replacing summer fallow by cover crops. In conventional wheat systems, a substantial amount of the rainfall received after wheat harvest is lost by evaporation during the fallow period. Adding cover crops after wheat could replace soil water evaporative losses with plant growth resulting in biomass production for both soil enhancement and livestock production.

Potential summer cover crops candidates for Oklahoma

Cowpea (*Vigna unguiculata*) is an annual summer legume with indeterminate growth characteristics that originated in Central Africa. Today, cowpea is grown worldwide including Africa, India, Brazil, USA, and Australia. Cowpea is cultivated for grain, and livestock fodder while improving soil quality after the decay of its roots (Singh et al., 1997). In the United States, cowpea can grow and yield well in the south and gradually lessening northward as the temperature drops below. According to the Oklahoma Cooperative Extension Service (2016), cowpea has the potential to grow ubiquitously in Oklahoma with little soil pH constrictions (pH range of 5.5-7.0), and with yields of 4.9 to 9.9 Mg ha^{-1} in the eastern region of the state. Cowpea can tolerate mild droughts producing very little seeds and a moderate amount of hay (Wheeler, 1950). The ability to resist drought is extremely important in Oklahoma because drought periods are frequent in the region especially during summer months. The deep rooting system of cowpea is responsible for the plant drought tolerance; this trait allowed cowpea to be adopted in semi-desert regions such as African Sahel and northeastern Brazil (Singh et al., 1997). Wheeler (1950), reported that cowpea cultivated for hay production has a high feed value when cutting at the right growth stage. Gonçalves et al. (2016) cited that cowpea seeds had a protein level of 203 to 394 g kg^{-1} and the leaves had a crude protein ranging from 215 to 437g kg^{-1} [as cited by Ohler and Mitchell (1996), and Towett et al. (2013)]. The variety chosen in the current study was Chinese red cowpea. According to Johnston Seed Company (2018a), the Chinese red cowpea is a bush-type (less than 1

meter in height), fast establishing legume with good forage traits, blooming and setting seeds early.

Forage soybean (*Glycine max*), is a summer legume that originated from Southeast Asia (Caldwell et al., 1973). Soybean not only delivers high protein and energy for livestock but also adds benefits to the following crop due to N fixation (Asekova et al., 2014). The climate requirements for soybean such as temperature and water are similar to that of corn; however, forage soybean is more drought resistant and less sensitive to excess soil moisture than corn (Wheeler, 1950). Forage soybean can be cultivated in a soil pH from 5.5 to 7.0 which comprises most of the Oklahoman soils. However, forage soybean may not grow in Western Oklahoma due to limited rainfall. Otherwise, Eastern Oklahoma is the most adaptable region for forage soybean adoption because neither soil fertility nor rainfall are limiting factors. (Oklahoma Cooperative Extension Service, 2016). MacKown et al. (2007), listed multiple forage soybean benefits such as improved soil N and soil conservation while producing quality forage, i.e., (crude protein of 129 - 220 g kg^{-1}) when double cropping forage soybean with winter wheat in El Reno, OK. Other positive results were found when forage soybeans were introduced in rotation with winter wheat in Akron, Colorado, where Nielsen (2011) established that forage soybean produced enough biomass to break even 90% of the time. Nielsen, explains that meeting this breakeven point was calculated based on the water usage of the forage soybeans which has a linear relationship with growth, this was then compared to long-term precipitation records. For the present study, KS5004N Soybean Cyst Nematode

Variety was selected, KS5004N is an F4 plant selection from the cross of KS5292 x SC91-2007 bred and developed by Kansas State University. The KS5004N plant has white flowers, gray pubescence, tan pods at maturity, determinate growth habit, and seeds with imperfect brown hilum and shiny seed coats (Kansas State University, 2009).

Mungbean (*Vigna radiata*) is a warm-season annual legume originating from India, and today grows across the world with the majority of production focused in South and East Asia (Nair et al., 2013). Similar to soybean, mung bean is cultivated for its high protein seeds that can be used for either human or animal consumption. The ground composition of the Mungbean seed has 4.91% sugars, 1.6% oil content, and 24.3% protein (Bhardwaj and Hamama, 2016). It also has a diverse soil pH range 5.5-7.0 for establishment and growth and has been grown across Oklahoma with yields of 2.2-4.5 Mg ha^{-1} (Oklahoma Cooperative Extension Service, 2016). In El Reno, OK, mungbean added 70 kg ha^{-1} of N to the soil from the 2004 to 2006 growing seasons while providing quality forage with In Vitro Digestible Dry Matter (IVDDM) of 1681 kg ha^{-1}(Rao and Northup, 2009a). In another study conducted in El Reno, OK, Rao and Northup (2009b) reported that mungbean and cowpea had the shortest growth seasons compared with three other legumes. The shorter mungbean and cowpea growth seasons allowed soil moisture received in September and October to be conserved and stored for winter wheat planting. Mungbean has rapid summer growth and can produce forage in a short time after planting, among three locations for two years, the average forage yield was 5.4 Mg ha-1 in South Dakota (Boe et al., 1991). For this current study, Berken was the selected

mungbean variety. Berken is a medium to large, evenly sized, bright green plant that produces large sprouts. According to Oklahoma Foundation Seed Stocks, Berken was developed for the region, and it is also know as OK2000 when it was released in 1999 as a public variety. The important characteristics include large seeds, and good lodging and shattering resistance (Oklahoma Foundation Seed Stocks, 2018).

Pearl millet [*Pennisetum glaucum (L.) R. Br.*] is an annual cereal grass that is primarily grown in semi-arid environments of Africa and Asia. Millets are vital as a source for human consumption and animal fodder, specifically, pearl millet which accounts for > 50% of global millet production (Singh et al., 2017). Pearl millet is tall growing, similar to corn and sorghum, but has improved drought resistance. Pearl millet originated in western Africa, a water limited environment, where it has naturally developed drought hardy characteristics, allowing it to be grown in environments where other crops are likely to fail (Serba and Yadav, 2016). Another characteristic of pearl millet is its low inputs requirements;, Ali (2010) stated that pearl millet was successful in poor environments with low soil nutrient availability and limited rainfall. Moreover, pearl millet has higher water-use efficiency, contains more leafy structures, and is more suitable for forage production than a grain crop (Rai et al., 2004). In Mississippi, steers forage utilization of pearl millet (0.80 kg d^{-1}) was the highest among two other fodders such as kenaf *(Hibiscus cannabinus L.*;0.67 kg d^{-1}), and perennial pastures (0.65 kg d^{-1}), i.e., a mix of bermudagrass [*Cynodon dactylon* (L.) Pers.] and dallisgrass (*Paspalum dilatatum* Poir.).

Sorghum-sudangrass (*Sorghum bicolor x S. bicolor var. sudanese*) is an annual grass that is adapted to the United States and southern Canada growing environments . Sorghum-sudangrass is the result of crossing sorghum with sudangrass in order to increase forage quality and yield. Sorghum-Sudangrass is used in many different regions as it grows in a wide variety of soils from heavy clays to sand (United States, 1978). Sorghum-sudan, as a forage hybrid, produces high biomass tonnage due to its extended vegetative growth (Bean et al., 2013). Furthermore, steers gains of 1 kg d^{-1} was observed in sorghum-sudan pastures grazed for 84 consecutive days in Bushland, TX during a two-year study (McCuistion et al., 2011). Similarly, average animal gains of 0.71 kg ha^{-1} was observed when animals were fed with three sorghum-sudan varieties in Mississippi. However, animals gains were above 1 kg ha^{-1} during the first 28 days of sorghum-sudan growth due to its low plant maturity (Parish et al., 2013).

Two different varieties of sorghum-sudangrass were selected for the current study; the first is AS 6402. The AS 6201 cultivar is a summer-annual hybrid with the same agronomic characteristics found in a conventional sorghum-sudangrass hybrid. It is widely adapted, and features increased utilization and efficiency from the BMR-6 gene (Alta Seeds, 2018). The second cultivar, Triple Treat, is a three-way cross sorghum-sudangrass hybrid that grows extremely fast and delivers exceptional regrowth (Johnston Seed Company, 2018b).

CHAPTER 3

MATERIALS AND METHODS

Site Description

A study was initiated in June of 2016 and was conducted for 2 years in two different locations: Perkins (Site 1): Cimarron Valley Research Station, Oklahoma State University, Perkins, OK (35º 59’ 20’’N, 97º 02’ 47’’W), and Chickasha (Site 2): South Central Research Station, Oklahoma State University, Chickasha, OK (35º 02’ 08’’ N, 97º 54’ 40’’W). Sites 1 and 2 were respectively mapped as Teller loam, 0 to 1 percent

slopes (Fine-loamy, mixed, active, thermic Udic Argiustolls) and Reinach silt loam, 0 to 1 slopes, rarely flooded (Coarse-silty, mixed, superactive, thermic Pachic Haplustolls) (Soil Survey Staff et al.). Site 1 was previously cropped in 2016 with winter wheat (*Triticum aestivum* L.), 2015 was left fallow. Site 2 was previously cropped with winter wheat (*Triticum aestivum* L.) for consecutive two years.

Cultural Practices and Treatments

In early-June of 2016, soil samples were taken at each location to assess the soil fertility in both locations (Table 1); however, fertilization was not performed to evaluate the performance of each cover crop in two contrasting soil fertility levels. No fertilization of cover crop was applied in 2017. In mid-June of 2016, sites 1 and 2 were disked then culti-packed. Site 1 was prepared using a Massey Ferguson offset disk at a depth of 10 cm, and a Kewanee cultipacker was used to prepare the cover crop seedbed one week prior to planting. Site 2 was prepared using John Deere offset disk at a depth of 10 cm, a Kraus field cultivator, and a Kewanee cultipacker. Two culti-pack operations were necessary for Site 2 due to high incidence of clods at the soil surface. Then, cover crop was planted based on recommended seeding rate for each crop as a forage (Table 2) using a Truax FLEX II no-till drill in 2016. Differently, from 2016, the cover crop was planted using a Great Plains 606NT drill in 2017 at the same seeding rate into winter-wheat stubble after grain harvest.

Each cover crop was planted in four replicated main plots (6-m long and 4-m wide) every year. Each cover crop (main plot) were randomly split in 6-m long and 1.3-m wide subplots accommodating three simulated grazing regimes such as severe, proper, and non-grazed. The severe regime consisted of cutting the legumes and grasses at 0.025 m- (1 inch) and 0.076 m- (3 inch) stubble height, and the proper regime consisted of cutting the legumes and grasses at 0.076m (3 inch) and 0.15-m (6 inch) stubble height. Both proper and severe regimes were compared to non-grazed which consisted of cover crops with no cutting.

In 2016, the cover crops were cut at 6 weeks after planting (WAP) which was the period necessary for all cover crops in all locations reach the minimum height for grazing. Unfortunately, the simulated grazed was not performed in 2017. High incidence of weeds during seed emergence and low precipitation during the cover crop's early development resulted in crop failure in Perkins and very low forage production in Chickasha making it impossible to simulate severe and proper grazing. The cover crop were replanted at Site1 in mid-July after herbicide application; then it was applied Sharpen ® (suflufenacil: N'-[2-chloro-4-fluoro-5-(3-methyl-2,6-dioxo-4-(trifluoromethyl)-3,6-dihydro-1(2H)-pyrimidinyl)benzoy]-N-methylsulfamide) at a rate of .15 L ha^{-1}, and Glyphosate (N-(phosphonomethyl)-glycine) at a rate of 4.67 L ha^{-1}. To assure re-growth of the cover crops, Site 1 received a total of 50 mm of water as supplemental irrigation immediately after planting. The cover crops were chemically terminated and kept standing at 14 WAP by applying Glyphosate (N-(phosphonomethyl)-glycine) at a rate of 3.6 L ha^{-1} in 2016 and 2017

In November (17 WAP) of 2016 and 2017, Gallagher red, hard winter-wheat was no-till planted at 78.5 kg ha^{-1}. 22.68 kg of N as urea (46-0-0) was applied in the early spring (46-0-0). Aproach™ (Picoxystrobin: (αE)-α-(methoxymethylene-2-[[[6-(trifluoromethyl)-2-pyridinyl]oxy]methyl]benzeneacetate) insecticide at a rate of 0.25 L ha^{-1} was applied on early spring 2016 due to high incidence of rains to control aphid populations. In April 2017, winter wheat was sprayed with Tebucure Fungicide 3.6 (tebuconazole) at a rate of .118 L ha^{-1} to control tan spot and leaf rust. The application of fungicides was made using a CO_2 backpack sprayer with a 1.5 m boom calibrated to deliver 187 L ha^{-1} spray solution. Finally, the wheat grain was harvested on late-May using a Kincaid 8-XP combine harvester.

Data Collection

Summer cover crop measurements

Plant species composition (cover crop vs. weeds)

Summer cover crop dry matter was determined 6 WAP and 13 WAP in 2016 and 2017. Three 0.5 m^2 quadrats were used to sample the total aboveground biomass from each experimental unit. Those samples were oven-dried at 55°C until constant weight, then the total weight was recorded. Afterward, the samples were manually sorted in cover crop and weed biomass; and both pools were weighed separately. Finally, the cover crop and weeds percentage for each sample were respectively calculated using equations 1 and 2, then the calculated values within the same experimental units were averaged.

$$GC\% = \frac{GC_{DM}}{DM_{total}} 100 \quad [1]$$

$$Weed\% = \frac{Weed_{DM}}{DM_{total}} 100 \quad [2]$$

where GC% and Weed% are, respectively, the percentages of cover crop and weeds for the sample; GC_{DM} and $Weed_{DM}$ are, respectively, the cover crop and weeds dry matter weight (g) in the sample, and the DM_{total} is the total dry matter weight (g) of the sample.

Summer Cover Crops Available Forage Dry Matter

Available forage dry matter (AFDM) was harvested at 6 WAP in 2016 and 2017. In 2016, the forage biomass of each subplot was harvested at the specified stubble height according to its randomly assigned simulated grazing regime as outlined earlier. In 2017, proper grazing could not be simulated because of the high incidence of weeds during seeds emergence, low precipitation during cover crop early development, the cover crop failure in Perkins, and low forage production in Chickasha. Thus only total AFDM was sampled in all main plots in 2017. A modified Carter Harvester was used to harvest and weigh the wet forage biomass of a 1-m strip from the center row of each subplot. Total wet weight was recorded, and a grab sample of at least 750 g was collected, weighed, dried at 55º C in a forced-air overn until constant weight, and reweighed to determine forage moisture content on a wet basis (equation 3). Then, the dry forage biomass of each subplot was estimated based on the calculated forage moisture content and converted to metric tons per ha^{-1}.

$$MC\%_{forage} = \frac{Biomass_{wet} - Biomass_{dry}}{Biomass_{wet}} 100 \quad [3]$$

where $Biomass_{wet}$ and $Biomass_{dry}$ are, respectively, the wet forage biomass and dry biomass (g) in the subsample; $MC\%_{forage}$ is the forage moisture content on a wet basis.

Summer Cover Crops Final Dry Matter Residue

Final dry matter residue (FDMR) was estimated by averaging the three aboveground biomass measurements in each experimental unit at 14 WAP in 2016 and 2017; the same techniques were followed for the three subsamples collected 6WAP.

Forage quality

Dry matter (DM), crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), and in vitro dry matter digestibility (IVDMD) were determined for all cover crops at 6 WAP and 14 WAP in 2016 and 2017. Forage nutritive value parameters were analyzed in the forage quality laboratory located at the USDA, ARS, Grazinglands Research Laboratory, El Reno, OK. Samples from each subplot were dried at 55ºC in a forced-air oven, and used to estimate dry forage biomass production. Samples were then ground through a 2-mm screen in a Wiley mill and used to determine nutritive value parameters. Samples were analyzed for dry matter (AOAC, 1999), and total N was determined using a combustion analyzer (Elementar Americas, Inc., Mt. Laurel, NJ, USA). Percent CP was calculated by multiplying % total N by 6.25. The NDF and ADF in forage samples were determined by procedures outlined for a batch fiber analyzer (ANKOM Technology, Macedon, NY, USA). Total digestible nutrients (TDN) were estimated for legumes (equation 4) and grasses (equation 5) using the ADF values.

$$TDN_{legume} = 88.875 - (0.812 * ADF) \quad [4]$$

$$TDN_{grass} = 98.625 - (1.048 * ADF)$$ [5]

The In vitro dry matter digestibility (IVDMD) was determined by using procedures for a Daisy Incubator (ANKOM Technology, Macedon, NY, USA). Rumen fluid was collected from two rumen cannulated steers maintained on bermudagrass [*Cynodon dactylon* (L.) Pers.] pasture and offered supplemental hay. Supplemental hays were bermudagrass and native grassland hay which was predominately big bluestem (*Andropogon gerardii* Vitman), little bluestem [*Schizachyrium halepense* (Michx.) Nash.] and indiangrass [*Sorghastrum nutans* (L.) Nash]. All animal care and use procedures were reviewed and approved by the Institutional Animal Care and Use Committee, Grazinglands Research Laboratory, El Reno, OK. Rumen fluid donor steers were cared for in accordance with the standards of the Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching (Vaughn, 2012).**Daily steer Gain and Total Steer Gain per Area.**

In order to assess the value of the forages based on the potential for animal weight gain, the Beef Cattle Nutrient Requirements Model 2016 (BCNRM, version 1.0.37.10) (Galyean et al., 2016; National Academies of Sciences and Medicine, 2016) was employed. The model requires forage quality indicators and descriptive livestock inputs in order to properly estimate the daily weight gain of a steer (DSG, kg steer^{-1} d^{-1}). The forage quality indicators CP, TDN , and IVDMD were used for each experimental unit under the BCNMR user's feed library.

The descriptive livestock information was input under the BCNRM Inputs tab. The described livestock was defined as a ten-month-old Angus steer, initially weighing

226.7 kg, and an assumed moderate body score of 5 (BCNRM cattle score: 1 is emaciated, and 9 is very fat) which is a common beef stocker steer scenario for the SGP. All other inputs used the default specifications. The BCNRM outputs metabolized energy (ME), metabolized protein (MP), allowable daily weight gain, and predicted dry matter intake. These outputs were recorded for each experimental unit. The daily steer gain was considered the lower value between ME and MP allowable animal daily gain. Finally, the total steer gain per area (TSGA, kg steer ha^{-1}) was calculated based on the predicted DMI, DSG,, and AFDM for each experimental unit. No animal harvest efficiency was considered in the calculations; therefore the TSGA assumes a steer ADFM utilization of 100%(no forage waste).

Winter-wheat measurements: grain yield and quality

Upon maturity, winter wheat grain was harvested mechanically using a Kincaid 8-XP combine (Kincaid Equipment, Haven, KS). Grain moisture, test weight, and harvested weight were collected from each sub plot. Harvest for both years happened to fall on the same day, June 5/6 in 2017 and 2018, where Chickasha was first harvested, followed by Perkins. Subsamples of grain were analyzed for protein and moisture using a Perten Model DA7200 diode array infrared instrument (Perten Instruments, Hagersten, Sweeden). Grain moisture was adjusted to 12.5%.

Weather data

Daily maximum, minimum temperature and precipitation were acquired from the OK Mesonet website that has stations in Perkins and Chickasha. Both experimental field

site locations are within 1.6 km of their respective Mesonet stations (McPherson et al., 2007).

Soil Moisture Measurements

Soil Moisture was collected at cover crop planting, 6 WAP, and before wheat planting in 2016 and 2017. In each experimental unit, one soil sample 1.2 m deep was taken using a Giddings probe and separated in four depth intervals; 0 - 30.48 cm, 30.48 - 60.96 cm, 60.96 - 91.44 cm, and 91.44 - 121.92 cm. After separation, the samples were placed in sealed plastic bags, then weighed. Sealed plastic bags were maintained approximately at 0º C in field coolers. Then, soil samples were transferred to paper bags and oven-dried at 105º C in Stillwater, Oklahoma at the ovens located in the farm until constant weight was achieved. Finally, the dry soil samples were re-weighed, and gravimetric soil water was estimated. The data collected from soil is added in the appendix.

Experimental Design and Statistical Analysis

Cover crop and simulated grazing regimes are the two main factors evaluated in this study. Eight cover crops [Forage soybeans (FS), Mung beans (MB), Cowpeas (CW), Sorghum-Sudan (SS), Triple Treat Sorghum-Sudan (TTSS), Pearl Millet (PM), Triple Treat Sorghum-Sudan + Cowpeas (TTSS+CW), Pearl Millet + Mung beans (PM+MB)], and mechanical fallow (control) are the main plots. Two simulated grazing regimes [severe (SEV), proper (PRP), and no-grazing] are the sub-plots (splits). The SEV regime consisted of cutting the legumes and grasses at 0.025 m (1 inch) and 0.076 m (3 inches), and the PRP regime consisted of cutting the legumes and grasses at 0.076 m (3 inches)

and 0.15 m (6 inches), respectively. Both cutting regimes were compared to no-grazing which consisted of cover crops absent of cutting.

In both sites, the experimental area (about 48 m long by 42 m wide) were separated into four blocks (40.5 m long by 8 m wide) to isolate soil variations within the area. Each block was divided into nine main plots (8 m long by 4.5 m wide) and randomly assigned to the cover crops and fallow. Then, each main plot was sub-divided into three subplots (1.5 m long by 4 m wide) and randomly assigned to one of the simulated grazing regimes. The blocks were separated using borders 48-m long by 5-m wide which were kept absent of weeds during the study.

Data collected after planting the cover crop and before applying the simulated grazing regimes in all years were evaluated in a randomized complete block design (RCB) where the only factor was cover crop. After implementing the simulated regimes, data were evaluated in a split-plot design where cover crop was the main-plot factor and the simulated grazing the subplot factor resulting in a 9 x 3 factorial with four replications. This factor arrangement, i.e., cover crop as the main-plot factor and simulated grazing regimes as subplot factor, was chosen because the effect of cover crop is expected to be larger and easier to detect than the simulated grazing regimes effect (Gomez, 1976).

All data were analyzed using the appropriate RCB and split-plot design with PROC MIXED of the Statistical Analysis System (SAS; Littell et al., 1996). Cover crop, simulated grazing regimes, and locations effects and their interactions were considered random effects; conversely, replications were considered fixed effects. Data were

analyzed and discussed considering all years, except when a significant (P <) year x treatment interaction occurred. Data were then analyzed by year. Treatment means were separated by the LSMEANS procedure (SAS 9.4; SAS Institute, Cary, NC, USA) when protected by F-tests significant at α of 0.05.

CHAPTER 4

RESULTS

Precipitation patterns

Average air temperature and annual cumulative precipitation totals are presented in Figure 1. Annual cumulative precipitation was numerically higher in 2017 than 2016 in both locations. Perkins had slightly higher annual cumulative precipitation in 2016 (742 mm) and 2017 (948 mm) than Chickasha (2016: 742 mm, 2017: 1051mm). The 30-year normal average for Perkins and Chickasha was, respectively, 946 ±97mm and 936 ±103mm; therefore 2016 and 2017 was considered a slight dry year and a normal year, respectively. During the summer cover crop growing season, i.e., mid-June to mid-September, the cumulative precipitation in 2016 was 254 mm and 200 mm in Perkins and Chickasha, respectively. During the same period in 2017, higher cumulative precipitation was observed in both Perkins (289 mm) and Chickasha (306 mm). This higher cumulative precipitation during summer months in 2017 did not translate in improved conditions for plant growth. In 2017, effective precipitations (≥ 5 mm) was only observed two weeks after planting; and about half of the total precipitation in Perkins (131 mm) and Chickasha (171 mm) was concentrated at 8 WAP causing soil waterlog, runoff, and anaerobic conditions for cover crop regrowth. Conversely, well-distributed rainfall starting a few days after planting conferred good plant growth conditions in 2016. Fig 1.

illustrates the monthly cumulative rainfall and average temperature at both sites during the period of the study.

From summer cover crops termination (mid-September) through wheat planting (mid-October), total precipitation of 67 mm in 2016 and 149 mm in 2017 was observed in Perkins. Similar total precipitation during the same period was also observed in Chickasha: 71 mm in 2016 and 178 in 2017. Consequently, the soil profile was replenished water before wheat planting resulting in good wheat emergence in all evaluated sites and years. Furthermore, an appropriate amount and well-distributed precipitation of 601 and 452 mm were observed in Perkins and Chickasha in 2016-2017 wheat growing season. However, lack of precipitation from January to March in 2018 resulted in a total precipitation of 309 and 300 mm in Perkins and Chickasha, respectively, during 2017-2018 wheat growing season.

Summer Cover Crops Available Forage Dry Matter

Dry matter production of cover crops (Mg ha^{-1}) at 6 and 14 weeks after planting in 2016 and 2017 is displayed in Figure 2. In 2016, cover crops had adequate conditions for growth, however, in 2017, disadvantageous conditions such as lack of precipitation for the two weeks after planting and high weed infestation led to poor summer cover crop development in Perkins and Chickasha. In 2016, there were significant differences when comparing the average total amount of dry forage matter (AFDM) between Perkins (2.87 Mg ha^{-1}) and Chickasha (4.40 Mg ha^{-1}) locations ($P < 0.01$). Therefore, locations were

analyzed separately. Furthermore, the amount of weeds present was much higher in Perkins (32.11%) than Chickasha (5.48%, $P < 0.01$) in both years.

At Perkins, the cover crop ($P < 0.01$), simulated grazing ($P < 0.01$), and interaction ($P=0.03$) effects were significant in 2016. Using the average yield from the severe and proper cutting, the TTSS (4.8 Mg ha^{-1}) was the highest yielding cover crop, which was higher than the other cover crop treatments. Following TTSS, SS (3.8 Mg ha^{-1}), TTSS+CP (3.4 Mg ha^{-1}), PM+MB (3.4 Mg ha^{-1}) were not different from each other; however, they were higher than MB (2.4 Mg ha^{-1}), PM (2.2 Mg ha^{-1}), and CW (1.6 Mg ha^{-1}). Finally, FS (1.2 Mg ha^{-1}), the lowest yielding cover crop, was different from all the others, except for CW. An interesting observation is that the PM+MB mix resulted in a higher AFDM yield than when both cover crops were solely planted. In 2016, PM plants in plots in Perkins was presenting N deficiency visual symptoms such as poor plant growth, and yellow leaves; however, PM+MB plots had pearl millet plants that did not present N-deficiency symptoms at the same location. It is hypothesized that higher forage production in PM+MB than PM plots in Perkins was observed N fixation by mung bean which enhanced soil N availability for pearl millet growth. Weeds incidence, which is a fraction of AFDM, was significantly lower in TTSS (18.3%), TTSS+CW (22.13%), and PM+MB (24.1%) SS (24.8%) than in FS (51.2%, Table 3). The other cover crops such as MB (29.0%), PM (33.4%), and CW (42.4%) were not different from all tested summer cover crops. Moreover, the legume AFDM fraction in both mixes, TTSS+CW and PM+MB, were lower than 2% of the total AFDM; therefore the proportion of triple treat sorghum sudan and pearl millet in TTSS (81.7%) and PM (66.6%) plot stands was not higher than its respective mixes TTSS+CW (76.7 %) and PM+MB (62.9%).

Even though severe grazing (5.14 Mg ha^{-1}) increased AFDM when compared to proper grazing (3.65 Mg ha^{-1}, $p<0.01$) in Perkins, 2016, the interaction between cover crop and simulated grazing revealed that only PM, TTSS and TTSS+CW cover crops had higher AFDM availability when severe than proper grazed. Pearl Millet, TTSS, and TTSS+CW cover crops AAFDM were respectively 3.03, 5.78, and 4.08 Mg ha^{-1} when severely grazed, and 1.44, 3.82 and 4.10 Mg ha^{-1} when proper grazed.

At Chickasha, the cover crop ($P < 0.01$), simulated grazing ($P < 0.01$), were significant, however the interaction effect ($P = 0.10$) were not statistically significant in 2016. The average among severe and proper cutting resulted in TTSS cover crop producing the highest yield (7.0 Mg ha^{-1}) but was not different from the other grass cover crops, such as SS (6.6 Mg ha-1), PM (6.1 Mg ha^{-1}), and the mixture PM+MB (6.1 Mg ha^{-1}). The other mixed treatment TTSS+CP (5.3 Mg ha^{-1}) had an intermediate yield between the grass cover crops and the legumes. The legumes cover crops generated the lowest yields and were not different from each other, the numerically highest yielding among legumes was MB (1.5 Mg ha^{-1}), followed by CW (1.3 Mg ha^{-1}), and the lowest was FS (1.0 Mg ha^{-1}). Differently, from Perkins, PM plots in Chickasha had higher AFDM production than PM+MB. The soil total N concentration in Chickasha was initially 0.03% higher than in Perkins (Table 1). This fact may strengthen our assumption that N fixation by mung beans could improve pearl millet production in Perkins. However, mung beans might not have improved pearl millet forage production in Chickasha because initial soil N was already sufficient for pearl millet growth. Weed incidence in AFDM was less than 1% and not different from each other among all grasses and mixes of summer cover crops such as PM, SS, TTSS, PM+MB, and CW+MB. Nevertheless,

CW (7.5%) and MB (8.4%) had higher weed incidence than all grasses and mixes and these were lower than FS (23.5%). The legume proportion in both mixes were very low (less than 1%), and consequently, their grass fractions were not different from each other.

The absence of rainfall during the two weeks that followed summer cover crop planting negatively affected AFDM production in both locations during 2017. No summer cover crop AFDM production was observed in Perkins at 6 WAP; therefore they were re-seeded and growth measured at 14 weeks after first planting. In Chickasha, low AFDM, grand mean of 1.44 Mg ha^{-1}, was observed for all summer cover crops making unfeasible proper grazing testing.

Consequently, only total AFDM were measured in Chickasha, 2017. The total AFDM were respectively 1.98, 1.91, 1.58, 1.50, 1.35, 1.29, 1.01 and 0.88 Mg ha^{-1} for TTSS+CW, PM+MB, TTSS, SS, PM, CW, and FS ($P < 0.01$). The FS and CW not only had the lowest AFDM but also had the highest weed AFDM fraction of 89.3% and 78.3%, respectively. In 2017, FS and CW summer cover crop failed in Chickasha. Other cover crops such as MB, PM, and TTSS did not fail completely, but their actual AFDM fraction was lower than 50%. This demonstrated the low weed suppression potential of these cover crops under water restrictions. Conversely, both mixes such as TTSS+CW and PM+MB were the two highest yielding summer cover crops. Higher AFDM production in both mixes occurred due to good legume growth. Differently, from 2016, a substantial amount of legumes were found in both PM+MB (28.54%) and TTSS+CW (27.0%) in Chickasha, 2017. This greater AFDM legume fraction not only contributed to higher total AFDM but also replaced weeds rather than grasses in both mixes when compared to grasses cover crops PM and TTSS solely. The grass AFDM fraction for PM

(36.4), TTSS (47.2), PM+MB (47.0), and TTSS+CW (46.8) were not different from each other (Table 3); however the weed AFDM fraction was greater in TTSS (52.8%) and SS (45.7.7%) than in TTSS+CW (39.0%) and PM+MB (38.0%). Higher total dry matter was also found when cowpea was intercropped into forage sorghum under limited water conditions in South Africa (Chimonyo et al., 2016). According to the authors, cowpeas were able to improve soil water availability to sorghum by minimizing water evaporation, improving nutrient availability and root functioning. Among all tested solely grasses and legumes cover crops, TTSS was higher than SS, PM, MB. Mungbean was the highest AFDM yielding legume in Chickasha, 2017 which was higher than CW and FS.

Summer Cover Crops Forage Quality

Summer cover crop forage quality was assessed using the following parameters: Crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), total digestible nutrients (TDN), and in vitro true digestibility (IVTD). Forage quality indicators are separated into site-year, site 1 (Perkins) is presented in Table 5 and site 2 (Chickasha) in Table 6. As previously discussed, in 2017, summer cover crops failed in Perkins due to no precipitation after seeding; therefore, forage quality is discussed only for Chickasha in 2017. Cover crop effect was significant for all discussed forage quality indicators at a 95% confidence interval for all locations and years. However, simulated grazing and the interaction effects were not significant for all forage quality indicators regardless of site-year.

Crude Protein

In 2016, CP was different among cover crops ($P < 0.01$) in Perkins. As expected, the legumes had higher CP than grasses and mixes. Cowpeas (188.7 kg ha^{-1}) and MB (181.7 kg ha^{-1}) had higher CP than FS (161.6 kg ha^{-1}). The CP for PM+MB, SS, TTSS+CW, TTSS, and PM were, respectively, 116.1 g kg^{-1}, 108.9 g kg^{-1}, 106.5 g kg^{-1}, 105.5 g kg^{-1}, and 96.7 g kg^{-1}; however differences among grasses and mixes were found between PM+MB and PM, only. This statistical difference among PM and PM+MB reinforced our previously assumption that low soil N in Perkins affected PM plant development because PM was not only lower in forage yield but also 20% lower in CP when planted solely. Therefore, combining PM with MB improved both forage yield and nutritive value in low fertile soils.

At Chickasha, the CP was also significantly different among cover crops ($P < 0.01$) in 2016. Legumes were also higher than all grasses and mixes. The CP concentrations in MB (148.0 g kg^{-1}), CW (146.3 g kg^{-1}), and FS (138.4 g kg^{-1}) were not different. However, among grasses and mixes, PM (74.5 g/Kg) had the highest CP followed by PM+MB (73.4 g/Kg), TTSS+CW (65.9 g/Kg), and TTSS (60.4 g/Kg). Sorghum-sudan contained the lowest CP (56.2 g/Kg) and was significantly different from all summer cover crops. No differences among mixes, PM+MB, TTSS+CW, and TTSS was expected in Chickasha, 2016, because species composition data indicated that the pearl millet and triple treat sorghum sudan composition in their respective dedicated plots (PM and TTSS) and mixes (PM+MB and TSS+CW) were, respectively, 99.9% and 99.2%. This data shows that the grasses and mixes treatments were dominated only for grasses; therefore no forage quality differences were expected.

When comparing results across location in 2016, the average CP among all cover crops were 37.8 g kg^{-1} higher in Perkins (133.2 g kg^{-1}) than in Chickasha (95.4 g kg^{-1}; $P < 0.01$). Several factors explain this abrupt difference in quality: 1. Cover crops in Chickasha were more advanced in their phenologic stage than in Perkins (visual observations). High fertility in Chickasha allowed cover crops to develop faster and produce higher forage yields; nevertheless plants were more mature, and, consequently, had lower CP; 2. Incidence and types of weeds favored cover crop quality in Perkins. Even though Perkins had higher weeds incidence than Chickasha, the weeds observed in Perkins were mainly crabgrass (*Digitaria sanguinalis* L.) rather than pigweed (*Amaranthus* L.) and stink grass [*Eragrostis cilianensis* (All.) Vign. Ex Janchen] found in Chickasha. Crabgrass differs from pigweed and stinkgrass in that crabgrass is considered an excellent forage with CP of 18 g kg^{-1} at 6 WAP (Ogden et al., 2005).

In 2017, CP was not different among summer cover crops ($P = 0.13$) in Chickasha. Cowpea (98.4 g kg^{-1}) was numerically the highest and TTSS (77.2 g kg^{-1}) was the lowest in CP content. Differently from 2016, findings in both locations, legumes treatments did not have higher CP than grasses and mixes. The explanation for this unexpected result also relies on species composition data. The number of seeded legumes in FS, CW, and MB plots were, respectively, < 1, 26.7, and 41.9 %, showing that the majority of the plants were grassy weeds (visual observations only) which probably contained lower CP than legumes.

Neutral Detergent Fiber

Neutral detergent fiber which includes all cell wall fiber, is the main forage quality indicator that limits forage intake by livestock. The higher the NDF content, the longer the rumen filling time which limits forage intake (Mertens, 1994).

In 2016, NDF was significantly different among summer cover crops ($P < 0.01$) in Perkins. The highest amount of NDF was in grasses and mixes summer cover crops. The mixture TTSS+CP (659.9 g kg^{-1}) had the highest NDF. However TTSS+CP was not different from TTSS (654.0 g kg^{-1}), PM (652.7 g kg^{-1}), and PM+MB (634.2 g kg^{-1}). The NDF in SS (632.0 g kg^{-1}) was lower than TTSS+CP and significantly higher than all legumes. Among the legumes, MB (416.1 g kg^{-1}) and CW (403.7 g kg^{-1}) were higher in NDF than FS (518.7 g kg^{-1}). Within the same year, NDF results in Chickasha were somewhat similar to Perkins. Grasses and mixes summer cover crops also had higher NDF concentrations than legumes ($P < 0.01$). The SS (690.4 g kg^{-1}) had the highest NDF concentration, but it was not different from PM (672.3 g kg^{-1}), TTSS (667.13 g kg^{-1}), TTSS+CP (660.8 g kg^{-1}), and PM+MB (658.79 g kg^{-1}). The legumes such as FS (530.2 g kg^{-1}), CW (516.4 g kg^{-1}), and MB (499.6 g kg^{-1}) were lower in NDF than grasses and mixes; however, they were not different from each other.

In 2017, NDF differences among summer cover crops were also found in Chickasha ($P < 0.01$). Forage soybeans (609.2 g kg^{-1}) had the highest NDF concentration, however, it was not different from PM (590.6 g kg^{-1}). The NDF concentration of PM was not different i from TTSS (558.8 g kg^{-1}), SS (552.7 kg g^{-1}), and PM+MB (551.8 kg g^{-1}); but PM was considered to have higher NDF concentration than CW (527.8 g kg^{-1}) and

TTSS+CW (523.3 g kg^{-1}). Finally, MB (489.6 g kg^{-1}) had the lowest NDF concentration which was different from all other summer cover crops.

Grasses cell walls typically have 3 to 4 times as much as hemicellulose as legumes (Barnes et al., 2003). Therefore, higher NDF values are expected in grasses than legumes as we found in Perkins and Chickasha during the 2016 season. However, legumes summer cover crops such as forage soybeans showed higher NDF than grasses in Chickasha, 2017. This unexpected result can be explained by differences in summer cover crops species compositions. In the specific case of FS in 2017, The actual forage soybean and weeds composition were, respectively, 10.7% and 89.3% weeds; therefore the NDF of FS mostly reflect the cell wall fiber concentration of the weeds such as stink grass and pigweed rather than the NDF of the actually seeded forage soybean. Furthermore, the NDF values discussed for Chickasha during the 2016 season mostly represent the NDF of the seeded grasses and legumes because of the high legume and grass composition (> 90%) were found at that location-year. However, they do not well represent the NDF concentrations of the mixes because mixes were 99.2% dominated by seeded grasses.

Acid Detergent Fiber

Acid detergent fiber, which includes cellulose, lignin, cutin, silica, and lignified N, is the forage nutritive value parameter that limits cellulose and hemicellulose breakdown in the rumen and is best related to forage digestibility (Van Soest, 1994).

At Perkins, in 2016, TTSS+CW (450.0 kg g^{-1}), TTSS (420.8 kg g^{-1}), and SS (391.6 kg g^{-1}) had the highest ADF concentration. However, TTSS+CW were the only

summer cover crop that was higher than PM+MB (384.5 kg g^{-1}) and PM (375.6 kg g^{-1}). All legumes such as MB (348.9 kg g^{-1}), FS (316.7 kg g^{-1}), and CW (308.6 kg g^{-1}) were not different from each other. Furthermore, MB was the only legume not different from most of the grasses and mixes. A similar ADF pattern was found in Chickasha, 2016. Grasses and mixes tend to have higher ADF concentration than legumes. The TTSS (386.5 kg g^{-1}) treatment had the highest ADF concentration; however, it was not different from the other grasses and mixes such as TTSS+CW (377.5 kg g^{-1}), PM+MB (356.1 kg g^{-1}), and PM (356.0 kg g^{-1}) and SS (342.3 kg g^{-1}). Among the legumes, CW (326.8 kg g^{-1}) had the highest ADF content and was different from MB (308.7 kg g^{-1}) and FS (275.2 kg g^{-1}); but CW was not different from most of the grasses and mixes.

In 2017, a different ADF pattern was found among summer cover crops in Chickasha. Forage soybeans (386.2 kg g^{-1}), PM (360.0 kg g^{-1}), CW (357.9 kg g^{-1}), and PM+MB (351.9 kg g^{-1}) had the highest ADF concentration; however, FS was the only summer cover crop different from TTSS (348.5 kg g^{-1}), MB (346.2 kg g^{-1}), SS (326.9 kg g^{-1}), TTSS+CW (323.5 kg g^{-1}).

The low incidence of legumes in all mixes for all location-years explains the lack of significant differences in ADF concentration among most of the grasses and mixes. In 2016, grasses and mixes (high proportion of grasses) tended to have higher ADF concentration than legumes in both locations. The fact that grasses tend to have higher ADF concentration is well documented by several authors (Broderick et al., 20012; Cherney et al., 2004; and Hoffman et al., 1998); therefore the 2016 results were expected. Conversely, the 2017 results in Chickasha were not expected. Legumes plots had higher or equal ADF concentrations than grasses. The high concentration of weedy plants due to

the poor summer cover crop growth under 2017 drought favored grassy weed growth in the legumes plots increasing their ADF content.

In Vitro Dry Matter Digestibility

In vitro dry matter digestibility results from Perkins and Chickasha in 2016 showed that the legume summer cover crops tended to be more digestible than grasses and mixes when they were successfully established. In Perkins, 2016, CW (822.7 g kg^{-1}), MB (819.5 g kg^{-1}) had the highest IVDMD; however, they were not significantly different from SS (814.7 g kg^{-1}). Forage soybean (760.0 g kg^{-1}) had lower IVDMD than the other legumes. Only 48.6% of the plants composing FS plots were seeded forage soybeans; in other words, more than 50% of the plants found in FS plots were mainly grassy weeds (visual observations, only) which explained low IVDMD of FS. Grasses and mixes such as PM (784.4 g kg^{-1}) and SS (814.7 g kg^{-1}) were not different from each other. Finally, TTSS+CW was significantly lower than all other summer cover crops. In Chickasha, 2016, MB (836.4 g kg^{-1}), CW (818.6 g kg^{-1}), and FS (817.6 g kg^{-1}) had the highest IVDMD concentrations; however CW and FS were not different from SS (621.3 g kg^{-1}), and PM (797.5 g kg^{-1}). Finally, all grasses and mixes such as SS, PM, PM+MB (787.3 g kg^{-1}), TTSS+CW (786.1 g kg^{-1}), and TTSS (780. 9 g kg^{-1}), were not different from each other.

In 2017, IVDMD results in Chickasha did not agree with the 2016's results. Grasses and mixes had higher IVDMD concentrations than legumes. Sorghum sudan (822.7 g kg^{-1}), PM (785.4 g kg^{-1}), TTSS+CW (806.2 g kg^{-1}), TTSS (778.4 g kg^{-1}), PM+MB (777.9 g kg^{-1}) were not significant different from each other. All legumes such

as MB (772.9 g kg^{-1}), CW (750.7 g kg^{-1}), and FS (740.0 g kg^{-1}) had lower IVDMD concentrations than grasses and mixes; however, only FS and CW had lower IVDMD than grasses and mixes. These unexpected results found in 2017 is also explained by the high concentration of weeds in legumes plots which increased the total ADF concentration in the AFDM which consequently decreased their IVDMD concentrations.

Daily Steer Gain and Total Steers Gain per Area

Daily steer gain and total steer gain per area are presented in Table 5 for site 1 and Table 6 for site 2. In 2016, predicted daily steer gain (DSG) was significantly higher in Perkins (0.34 kg $steer^{-1}$ d^{-1}) than in Chickasha (0.28 kg $steer^{-1}$ d^{-1}) among summer cover crops ($P = 0.03$). As previously discussed, overall, Perkins had higher summer forage quality such as higher CP, and lower ADF than Perkins. Two factors explain these findings: 1. Summer cover crops were in earlier phenologic stages (visual observations) in Perkins which results in higher Perkins' forage quality. 2. The weedy plants in Perkins were mostly crabgrass which is considered a high-quality forage; on the other hand, the weedy plants observed in Chickasha were mostly stink grass and pigweed which are not considered as good a forage option due to its lower palatability and quality. Conversely, total steer gain per area (TSGA) was higher in Chickasha (172.3 kg ha^{-1}) than in Perkins (166.75 kg ha^{-1},$P = 0.04$). Higher ADFM values found in Chickasha compensated the Chickasha's low forage quality. Significant differences among simulated grazing treatments in 2016 were only found in Chickasha for TSGA variable ($P < 0.01$) where severe grazing (195.6 kg ha^{-1}) had 23.8% higher TSGA than proper grazing (148.9 kg ha^{-1}).

Cowpea (0.58 kg steer^{-1} d^{-1}) showed the highest DSG among all summer cover crops in Perkins, 2016. However, CW was not significantly different from FS (0.58 kg steer^{-1} d^{-1}). The FS and MB (0.46 kg steer^{-1} d^{-1}) treatments had no significant DSG differences. All legumes had higher DSG then grasses and mixes. Moreover, no significant differences among all grasses and mixes were found. Sorghum Sudan, PM+MB, PM, TTSS, and TTSS+CW showed DSG values of 0.27, 0.25, 0.24, 0.21 and 0.21 kg steer^{-1} d^{-1}, respectively. Furthermore, TSGA in Perkins, 2016 was the highest on MB fields (206.4 kg ha^{-1}) which was different from FS (117.9 kg ha^{-1}) and PM (104.8 kg ha^{-1}). All other summer cover crops such as TTSS (201. 8 kg ha^{-1}), SS (197.0 kg ha^{-1}), CW (181.8 kg ha^{-1}), PM+MB (170.7 kg ha^{-1}), and TTS+CW (153.5 kg ha^{-1}) were not different from each other or MB. In soils with nutrients limitations, as represented by Perkins location in this study, legumes that show a reasonable success during establishment such as MB and CW can allow better or equal steer performance than high yielding grasses such as TTSS and SS.

In Chickasha, 2016, all legumes such as FS (0.50 kg steer^{-1} d^{-1}), MB (0.49 kg steer^{-1} d^{-1}), and CW (0.46 kg steer^{-1} d^{-1}) had significantly higher DSG than all grasses and mixes. Pearl millet (0.21 kg steer^{-1} d^{-1}), PM+MB (0.21 kg steer^{-1} d^{-1}), SS (0.14 kg steer^{-1} d^{-1}), TTSS +CW (0.14 kg steer^{-1} d^{-1}) had no significant DSG differences from each other. Finally, TTSS (0.13 kg steer^{-1} d^{-1}) was lower than PM ad PM+MB. Moreover, PM+MB (251.7 kg ha^{-1}) and PM (242.0 kg ha^{-1}) showed the highest TSGA values in Chickasha, 2016; however they were not different from SS (179.7 kg ha^{-1}), and TTSS (179.6 kg ha^{-1}). The TTSS+CW (155.2 kg ha^{-1}) was different from PM and PM+MB. Finally, all legumes were significantly lower TSGA values where MB, CW, and FS were

respectively 148.9, 119.9, 101.2 kg ha^{-1}. Even though legumes had a higher overall quality which led individual steers to have a higher daily gain when grazing legumes rather than grasses and mixes in Chickasha during summer of 2016; the total steers gain per area was higher under grass and mixes treatments. Much higher forage quantity produced by grasses and mixes overcame their lower quality resulting in higher total steers gain per area regardless of the herd size. Overall, higher individual animal performance (predicted weight gain) was found when grazing legumes; however higher total animal gain was found when grazing grasses and mixes.

An interesting finding when analyzing 2016 animal performance data was that PM allowed the highest TSGA in Chickasha probably due to a balanced combination of forage yield and quality. On the other hand, PM had the lowest performance in Perkins. Perhaps, pearl millet summer cover crop might have the best grazing potential in fertile soils as represented by Chickasha location in this study; however, PM might not be recommended to low fertile soils (represented by Pekins). In low fertile soils, legumes summer cover crops such as CW and MB which can fix N may support more reasonable forage yield and quality

In 2017, no significant DSG differences among summer cover crop were found in Chickasha ($P = 0.45$). The average DSG average among all summer cover crops in Chickasha, 2017 was 0.26 kg $steer^{-1}$ d^{-1}. Consequently, the TSGA differences were mostly influenced by AFDM differences among summer cover crops. In this site-year, the mixes TTSS+CW (110.4 kg ha^{-1}) and PM+MB (103.3 kg ha^{-1}) had the highest TSGA; however, they were not different from SS (84.1 kg ha^{-1}). Sorghum sudam, MB (68.3 kg ha^{-1}), TTSS (67.3 kg ha^{-1}), PM (59.8 kg ha^{-1}) and CW (55.5 kg ha^{-1}) were not different

from each other. Finally, forage soybeans (36.4 kg ha^{-1}) had the lowest TSGA which was not different from TTSS, PM, and CW. As previously discussed, low AFDM and high weed incidence were found in Chickasha, 2017. Those two facts are probably the main cause of the low DSG and TSGA presented above. Furthermore, no inferences can be drawn from this site-year study. Animal performance data interpretation from this site-year must account for the high amount of weeds found in all summer cover crops treatments which are major confounding variables that preclude accurate inferences comparing cover crop. However, the data is presented to demonstrate the impact weed infestation on productivity in this low input summer cover crop system.

Summer Cover Crops Final Dry Matter Residue

Summer cover crops final dry matter residue (FDMR) was higher in 2016 than 2017 at both locations (Figure 2). Even though higher total precipitation during summer cover crop growing season was recorded in 2017, as previously discussed, better precipitation distribution in 2016 resulted in better summer cover crop regrowth conditions than in 2017. Furthermore, good soil water availability from 6 to 14 WAP at both locations allowed summer cover crop regrowth to be mainly limited by soil fertility in 2016. Consequently, the average FDMR across all tested cover crops was higher in Chickasha (2.49 Mg ha^{-1}) than in Perkins (1.89 Mg ha^{-1}, $P = 0.03$) because Chickasha soil fertility was greater than the Perkins site.

In Perkins, FDMR was only statistically significant among cover crops ($P < 0.01$) in 2016. Statistical significant differences were not found among severe, proper simulated grazing, and dedicated cover crops treatments ($p=0.09$),or cover crop x simulated

grazing interaction (P = 0.27). Among all cover crops, TTSS+CP (2.67 Mg ha^{-1}), TTSS (2.33 Mg ha^{-1}), MB (2.24 Mg ha^{-1}), PM+MB (2.21 Mg ha^{-1}), FS (2.05 Mg ha^{-1}), CP (1.99 Mg ha^{-1}), and SS (1.91 Mg ha^{-1}), the FDMR were all similar. However, PM (1.39 Mg ha^{-1}) was different from TTSS+CP, TTSS, MB, and PM+MB. Even though some legumes showed higher or equal FDMR and ground cover than grasses and mixes at termination day, soil protection from cover crop desiccation to wheat planting was superior in grasses and mixes as compared to legumes. According to visual observations, legumes tend to shatter leaves easily which are carried away by the wind. These ground cover losses are inherent due to legume leaf anatomy. Legume leaves are attached to stems by fragile petioles, which are susceptible to shattering after dissection. Conversely, grasses leaves embrace the stems with their sheaths conferring strong leaf-stem attachment not susceptible to shattering after desiccation. At same location-year, weed incidence in cover crops was much lower in all grasses and mixes than legumes, except PM. Pearl millet (82.2%) had the highest weed incidence followed by FS (61%). The other legumes such as MB and CW had 59.4 and 59.2%, respectively, of its FDMR composed of weeds. However, TTSS, TTSS+CW, PM+MB, and SS had, respectively, 24.4%, 25.4%, 25.9%, and 33.1% of its FDMR as weeds. Furthermore, the legume composition on both mixes was almost inexistent (< 1%).

In 2016, similar to Perkins, statistic significant FDMR differences were found only for cover crops (P < 0.01) at Chickasha. No differences were found for both simulated grazing regimes (P = 0.73) and cover crop x simulated grazing interaction (P = 0.12). After simulated grazing, at 6 WAP, favorable weather conditions, such as good amounts and distribution of rainfall, allowed simulated grazed cover crops to regrow

great amounts of FDMR which were similar to the non-grazed dedicated cover crops values. Among cover crops, grasses and mixes such as PM+MB (4.33 Mg ha^{-1}), TTSS (4.21 Mg ha^{-1}), TTSS+CP (4.20 Mg ha^{-1}), and SS (3.73 Mg ha^{-1}) were not significantly different from each other, except for PM (2.7 Mg ha^{-1}). Pearl Millet was different from all other cover crops. Moreover, all grasses and mixes were higher than legumes: CW (1.19 Mg ha^{-1}), MB (1.04 Mg ha^{-1}), and FS (0.98 Mg ha^{-1}). As previously discussed, Chickasha had lower weed incidence than Perkins at 6 WAP in 2016. High soil fertility allowed for the cover crops to compete against weeds might be the main factor that explains this observation. Similar results were also found after cover crop regrowth in 2016 where FDMR weed incidence also demonstrated lower incidence in Chickasha when compared to Perkins. All mixes and grasses had FDMR weed incidence lower than 1%, except for PM that only had 2.2% of its composition as weed. The contrasting performance of PM between both locations demonstrated that pearl millet might be a reasonable cover crop option in soils with good fertility

Conversely to 2016, low soil water availability during the same period make water rather than soil fertility the main limitation at both locations in 2017. In Perkins, all cover crops were replanted at six weeks after first planting in 2017; therefore, the FDMR results for this location-year are seven weeks of growth after second planting, and no simulated grazing regimes treatments were evaluated. At seven weeks after second planting, cover crops were different from each other ($P < 0.01$). Triple treat sorghum sudan + cowpea (2.12 Mg ha^{-1}) was higher in FDMR accumulation than all other cover crops followed by PM+MB (1.96 Mg ha^{-1}). Both TTSS (1.64 Mg ha^{-1}) and SS (1.59 Mg ha^{-1}) were not different from each other; however they were higher than MB (1.42 Mg ha^{-}

^{1}), CW (1.41 Mg ha^{-1}), and PM (1.38 Mg ha^{-1}). Finally, forage soybean (1.24 Mg ha^{-1}) was lower than all other cover crops. Both TTSS+CW and PM+MB mixes not only had the highest FDMR but also had the lowest incidence of weeds in their composition among all cover crops. Weed incidence were, respectively, 25.0 and 27.1% for TTSS+CW and PM+MB mixes. On the other hand, FS had the lowest FDMR and the highest incidence of weeds (49.6%) in its composition.

In 2017, cover crop regrowth at 14 WAP at Chickasha was also different from each other (P = 0.02). Both mixes, PM+MB (2.14 Mg ha^{-1}) and TTSS+CP (2.08 Mg ha^{-1}), and TTSS (1.95 Mg ha^{-1}) had the highest FDMR accumulation, and were not different from each other. Sorghum Sudan (1.68 Mg ha^{-1}), MB (1.58 Mg ha^{-1}), CW (1.55 Mg ha^{-1}) and PM (1.55 Mg ha^{-1}) had lower FDMR than the three top cover crops. Lastly, FS (1.29 Mg ha^{-1}) accumulated the least FDMR which was different from all other cover crops. Weeds incidence in Chickasha followed a similar pattern observed in Perkins. Both PM+MB (35.3%) and TTSS+CW (40.2%) showed the lowest weed incidence while FS (99.2%) showed the highest incidence. Furthermore, all grasses and legumes cover crops had a high incidence of weeds (> 50%).

Wheat Grain Yield

Wheat grain yields were higher in 2017 (1.53 Mg ha^{-1}) than in 2018 (1.08 Mg ha^{-1}) across locations (P < 0.01)(Table 7). These findings agree with a wheat variety trial performed at Chickasha where grain yields in 2018 were 49.1% lower than 2017 (Marburger et al., 2018). According to Marburger et al. (2018), three separate and widespread freeze events occurred during the first week of April in 2018 Oklahoma

statewide, resulting in significant wheat crop injury. This freeze events combined with lack of rainfall during grain filling in March resulted in suboptimal conditions for grain production in 2018. As expected, high soil fertility in Chickasha (1.60) resulted in significant higher wheat grain yields than in Perkins (1.00 Mg ha^{-1}) in both years ($P = 0.04$).

In 2017, wheat grain differences were found only for cover crops effect ($P < 0.01$) at Perkins. Fields previously cropped with legumes had the highest following wheat grain yields where MB, CW, and FS wheat grain yields were, respectively, 1.43, 1.42, and 1.26 Mg ha^{-1}. Forage soybean was the only legume that was not different from Fallow (1.28 Mg ha^{-1}), PM+MB (1.12 Mg ha^{-1}), TSS+CW (1.05 Mg ha^{-1}) and SS (1.05 Mg ha^{-1}). Finally, wheat grain yields were lower when cropped after TTSS (1.01 Mg ha^{-1}) and PM (0.99 Mg ha^{-1}). Conversely, no cover crop effect on the following wheat grain yield was found at Chickasha in 2017. Perhaps, the N fixation from legumes was sufficient to benefit the next wheat crop in low fertile soils such as Perkins. Furthermore, cutting regimes were significantly different from each other at Chickasha in 2017. Dedicated cover crops fields had the highest following wheat grain yields (2.15 Mg ha^{-1}) which were different from both proper (1.77 Mg ha^{-1}) and severe (1.69 Mg ha^{-1}) simulated grazing. These findings suggest that high amounts of FDMR at wheat planting may not negatively affect wheat seeding and early development; conversely, it may improve wheat crop growth conditions such as preserving soil water from evaporation from cover crop termination to wheat canopy closure. However, this finding was not consistent with the other years-locations. Thus, no significant interactions cover crops x simulated grazing regimes were found at Chickasha in 2017.

Neither cover crop nor simulated grazing regimes significantly effected the wheat grain yield were found at Perkins in 2018. The low FDMR observed after cover crop replanting at 7 WAP did not affect the following wheat crop yield in this site-year. At Chickasha, wheat grain yield was the highest after TTSS (1.73 Mg ha^{-1}); however TSS effects on next wheat yield crop was not significantly different from TSS+CW (1.59 Mg ha^{-1}), Fallow (1.38 Mg ha^{-1}), SS (1.37 Mg ha^{-1}), FS (1.31 Mg ha^{-1}), MB (1.30 Mg ha^{-1}), CW (1.22 Mg ha^{-1}). Thus, fields previously cropped with PM+MB (1.03 Mg ha^{-1}) and PM (0.89 Mg ha^{-1}) had the lowest following wheat grain yields; however, only PM was significantly different from all other cover crops. Finally, there were no differences among simulated grazing regimes.

Wheat Grain Protein

Wheat grain protein was higher in Chickasha (116.77 g kg^{-1}) than in Perkins (96.70 g kg^{-1}, P = 0.02) across years (Table 7). High soil N in Chickasha resulted in a higher grain protein concentration even though N fertilization was performed in both locations. Wheat grain protein in 2018 (106.74 g kg^{-1}) was higher than in 2017 (94.48 g kg^{-1}, $p < 0.01$). Lack of rainfall during grain filling in 2018 in both locations reduced the amount of starch deposited into kernels. Consequently protein concentration increased as starch concentration decreased (Gooding et al., 2003; Triboi et al., 2003).

Differences were found only for cover crops effects at Perkins ($P < 0.01$) and Chickasha ($P < 0.01$) in 2017. At Perkins, fields previously cropped with MB (92.92 g kg^{-1}) resulted in the highest wheat grain protein concentration. However MB was only different from PM (88.42 g kg^{-1}). The effect of TTSS+ CW (92.75), SS (91.75 g kg^{-1}),

TTSS (90.92 g kg^{-1}), Fallow (90.10 g kg^{-1}), SS (91.75 g kg^{-1}), FS (89.92 g kg^{-1}), CW (89.42 g kg^{-1}), and PM+MB (89.17 g kg^{-1}) on grain protein of the following wheat crop were not different from any cover crop. Similar findings were observed in Chickasha in the same year. Mung beans (111.17 g kg^{-1}) showed the highest effect on next wheat crop's grain protein, but MB was only different from PM (95.46 g kg^{-1}). Fallow (107 g kg^{-1}), and the other cover crops such as FS (104.33 g kg^{-1}), CW (103.00 g kg^{-1}), TTSS+CW (102.58 g kg^{-1}), SS (100.64 g kg^{-1}), TTSS (100.58 g kg^{-1}), and PM+MB (100.08 g kg^{-1}) were not different from any tested cover crop regarding their effects on the next wheat crop's grain protein.

Even though all cover crops had limited time to grow from re-planting at 7 WAP at Perkins in 2018, wheat grain protein in fields previously cropped with MB (111.17 g kg^{-1}) was the highest; however MB effect was not different from most cover crops such as TTSS (99.91 g kg^{-1}), PM+MB (99.50 g kg^{-1}), TTSS+CW (98.41 g kg^{-1}), Fallow (98.17 g kg^{-1}), FS (98.10 g kg^{-1}). Finally, CW (96.67 g kg^{-1}) and PM (96.40 g kg^{-1}) effects on the next wheat crop's grain protein was the lowest among all cover crops.

CHAPTER V

CONCLUSION

Under well-watered conditions as observed in 2016, TTSS produced the highest ADFM at 6 WAP. However, all grasses, legumes and mixes, except for PM, produced enough FDMR at 14 WAP. At Chickasha, 2016, great amount of FDMR was produced especially from grasses with minimal weed composition. However, in Perkins, 2016, grasses and legume cover crops FDMR were much lower than in Chickasha; and they were not significantly different from each other. Differently from Chickasha, evaluation of plant species composition data showed that about 50% of FDMR composition were weeds in Perkins, 2016. Under erratic rainfall patterns as observed in 2017, very low ADFM (less than 2 Mg ha^{-1}) or no ADFM was produced at 6 WAP, and low amounts of FDMR were also observed at 14 WAP in both locations. Furthermore, both PM+MB and TTSS+CW mixes were mostly dominated by grasses in both locations; however, this finding was more evident in Chickasha. Good soil fertility favored grasses development, which suppressed not only weeds but also legumes in cover crop mixes in Chickasha. However, combining mung beans with pearl millet increased total ADFM under N limiting soils as observed in Perkins, 2016.

Even though TTSS was considered the summer cover crop with the highest ADFM potential, other summer cover crops such as MB and PM+MB in Perkins and Chickasha, respectively allowed the highest DSG and TSGA. Their higher forage quality

compensated for the lower ADFM production. The effects of cover crop on wheat yields was inconsistent, two legume treatments; CW and MB resulted in wheat yields that were equal to or greater than the fallow treatment. In contrast, the grass species resulted in wheat yields equal to or lower than the fallow. Moreover, summer cover crop effect on wheat yield and quality varied among site-years and most of the variation is attributed to inconsistent weather and soil conditions. A long-term study might be appropriate to reveal validate and extend our fidings.

TABLES FOR CHAPTER IV

Table 1. Chemical and Physical soil properties at 0.15 m depth in both Perkins, OK and Chickasha, OK prior to cover crops establishment in early June of 2016.

		Soil Properties							
		Chemical					Physical		
Site	Replication	pH	TN (%)	P (mg/kg)	K (mg/kg)	OM (%)	Sand (%)	Silt (%)	Clay (%)
1	1	6.3	0.07	240	1255	1.06	47.5	37.5	15
	2	6.3	0.07	230	1270	1.05	50	32.5	17.5
	3	6.3	0.07	220	1140	0.95	50	32.5	17.5
	4	6.4	0.07	210	1310	0.99	50	37.5	12.5
	AVG	6.3	0.07	225	1244	1.01	49.4	35	15.6
2	1	5.9	0.1	260	1435	1.57	35	42.5	22.5
	2	6.1	0.1	245	1500	1.58	25	50	25
	3	6	0.1	245	1475	1.56	25	50	25
	4	6	0.1	290	1570	1.57	25	50	25
	AVG	6	0.1	260	1495	1.57	27.5	48	24.4

Table 2. Cover crop seeding rate planted mid-July in both Perkins, OK and Chickasha, OK in 2016 and 2017.

Scientific name	Common name	Variety	Seeding rate (kg/ha)
Pennisetum glaucum (L.) R. Br.)	Pearl millet (PM)	K-Graze (KZ)	16.8
Sorghum bicolor x S. bicolor var. sudanese	Sorghum Sudangrass (TTSS)	Triple Treat (TT)	28
Sorghum bicolor x S. bicolor var. sudanese	Sorghum Sudangrass (SS)	AS 6402	22.4
Glycine Max	Forage Soybean (FS)	KS 5004N	28
Vigna radiata	Mung bean (MB)	Berkens (BE)	22.4
Vigna unguiculata	Cowpea (CW)	Chinese Reds (CR)	22.4
	PM + MB	KZ+BE	13.5+11.2
	TTSS+CW	TT+CR	11.2+11.2

Table 3: Plant species composition at Site1: Perkins at 6 and 14 weeks after planting in 2016 and 2017. Summer cover crops were planted early June in both years. Only cropped cover crops were accounted in Grass and Legumes categories. All other spontaneous plants, i.e., weeds, were accounted in Others category. Asterisks denote no cover crop production.

Summer Cover Crops -- Perkins, OK	----------2016----------			----------2017----------		
	Grass (%)	Legumes (%)	Others (%)	Grass (%)	Legumes (%)	Others (%)
	----------6 weeks after planting----------					
Forage Soybeans	-	48.6b	51.2a	*	*	*
Cowpea (CW)	-	57.6ab	42.4ab	*	*	*
Mung Bean (MB)	-	71.0a	29.0ab	*	*	*
Pearl Millet (PM)	66.6ab	-	33.4ab	*	*	*
Sorghum Sudan (SS)	75.2ab	-	24.8 b	*	*	*
Triple treat SS (TTSS)	81.7a	-	18.3b	*	*	*
PM+MB	62.9b	13.0c	24.1b	*	*	*
TTSS+CW	76.17ab	1.7d	22.13b	*	*	*
	----------14 weeks after planting----------					
Forage Soybeans	-	39.0a	61ab	-	50.4b	49.6a
Cowpea (CW)	-	40.8a	59.2b	-	59.5a	40.5b
Mung Bean (MB)	-	40.6a	59.4b	-	63.0a	37.0bc
Pearl Millet	17.8b	-	82.2a	61.7b	-	38.3b
Sorghum Sudan (SS)	76.9a	-	33.1c	67.8a	-	32.2c
Triple treat SS (TTSS)	74.6a	-	24.4c	66.8a	-	33.2c
PM+MB	73.3a	<1.0b	25.9c	39.8c	33.1c	27.1d
TTSS+CW	74.0a	<1.0b	25.4c	42.6c	32.4c	25.0d

Table 4: Plant species composition at Site2: Chickasha at 6 and 14 weeks after planting in 2016 and 2017. Summer cover crops were planted early June in both years. Only cropped cover crops were accounted in Grass and Legumes categories. All other spontaneous plants, i.e., weeds, were accounted in Others category. Asterisks denote no cover crop production.

Summer Cover Crops --- Chickasha, OK	2016			2017		
	Grass (%)	Legumes (%)	Others (%)	Grass (%)	Legumes (%)	Others (%)
	6 weeks after planting					
Forage Soybeans	-	76.5b	23.5a	-	10.7b	89.3a
Cowpea (CW)	-	92.5a	7.5b	-	21.7ab	78.3ab
Mung Bean (MB)	-	91.6a	8.4b	-	41.9a	58.1bc
Pearl Millet (PM)	99.9	-	<1.0c	36.4b	-	53.6c
Sorghum Sudan (SS)	99.9	-	<1.0c	54.3a	-	45.7cd
Triple treat SS (TTSS)	99.9	-	<1.0c	47.2ab	-	52.8c
PM+MB	99.2	<1.0c	<1.0c	47.0ab	28.54ab	38.0d
TTSS+CW	99.2	<1.0c	<1.0c	46.8ab	27.0ab	39.0d
	14 weeks after planting					
Forage Soybeans	-	33.8c	66.2a	-	<1.0c	99.2a
Cowpea (CW)	-	62.2b	37.8b	-	26.7a	73.3b
Mung Bean (MB)	-	79.5a	20.5c	-	36.6a	63.4b
Pearl Millet (PM)	97.8	-	2.2d	39.2	-	60.8bc
Sorghum Sudan (SS)	99.6	-	<1.0d	48.3	-	51.7c
Triple treat SS (TTSS)	99.3	-	<1.0d	41.4	-	58.6c
PM+MB	99.0	<1.0d	<1.0d	39.3	25.4ab	35.3d
TTSS+CW	99.1	<1.0d	<1.0d	37.2	22.6b	40.2d

Table 5: Forage quality indicators: Crude Protein (CP), Neutral Detergent Fiber (NDF), Acid Detergent Fiber (ADF), Total Digestible Nutrients (TDN), and beef production indicators: Daily Steer Gain and Total Steer Gain per Area per Area of all evaluated summer cover crops at 6 weeks after planting, Perkins, OK, 2016.

Summer Cover Crops Perkins, OK	CP ($g\ kg^{-1}$)	NDF ($g\ kg^{-1}$)	ADF ($g\ kg^{-1}$)	TDN ($g\ kg^{-1}$)	IVDMD ($g\ kg^{-1}$)	DSG* ($kg\ steer^{-1}\ d^{-1}$)	TSGA* ** ($kg\ ha^{-1}$)
	----------Year: 2016----------						
Forage Soybeans	161.6b	518.7c	316.7de	631.6ab	760.0b	0.50ab	117.9b
Cowpea (CW)	188.7a	403.7d	308.0e	638.6a	822.7a	0.58a	181.8ab
Mung Bean (MB)	181.7a	416.1d	348.9cde	605.4ab	819.5a	0.46b	206.4a
Pearl Millet (PM)	96.7d	652.7ab	375.6bcd	586.4abc	784.4ab	0.24c	104.8b
Sorghum Sudan (SS)	108.9cd	632.0b	391.6abc	569.6bcd	814.7a	0.27c	197.0ab
Triple treat SS(TTSS)	105.5cd	654.0ab	420.8ab	539.0cd	706.0c	0.21c	201.8ab
PM+MB	116.1c	634.2ab	384.5bc	577.0abc	742.0bc	0.25c	170.7ab
TTSS+CW	106.5cd	659.9a	450.0a	508.4d	755.4d	0.21c	153.5ab

* DSG and TSGA results were calculated based on Angus steers with initial body weight of 226.7 kg.

**TSGA results did not account potential forage waste by steers during grazing, i.e., harvest efficiency =100%. Common grazing regimes and their respective harvest efficiencies: Continuous (50%), 2-4 paddocks rotation (60%), 5-6 paddocks rotation (70%), and strip grazing (80%, Ball et al., 2007).

Table 6: Forage quality indicators: Crude Protein (CP), Neutral Detergent Fiber (NDF), Acid Detergent Fiber (ADF), Total Digestible Nutrients (TDN), and beef production indicators: Daily Steer Gain and Total Animal Steers per Area of all evaluated summer cover crops at 6 weeks after planting, Chickasha, OK, 2016.

Summer Cover Crops Chickasha, OK	CP ($g\ kg^{-1}$)	NDF ($g\ kg^{-1}$)	ADF ($g\ kg^{-1}$)	TDN ($g\ kg^{-1}$)	IVDMD ($g\ kg^{-1}$)	DSG* ($kg\ steer^{-1}\ d^{-1}$)	TSGA* ** ($kg\ ha^{-1}$)
	----------Year: 2016----------						
Forage Soybeans	138.4a	530.2b	275.2d	675.3a	817.6ab	0.50a	101.2b
Cowpea (CW)	146.3a	516.4b	326.8bc	623.4bc	818.6ab	0.46a	119.9b
Mung Bean (MB)	148.0a	499.6b	308.7cd	648.9ab	836.4a	0.49a	148.9b
Pearl Millet (PM)	74.5b	672.3a	356.0abc	606.8cd	797.5bc	0.21b	242.0a
Sorghum Sudan (SS)	56.2c	690.4a	342.3abc	621.3bc	803.2bc	0.14bc	179.7ab
Triple treat SS(TTSS)	60.4bc	667.1a	386.5a	575.0d	780.9c	0.13c	179.6ab
PM+MB	73.4b	658.8a	356.1abc	606.0cd	787.3c	0.21b	251.7a
TTSS+CW	65.9bc	660.8a	377.5a	584.4cd	786.1c	0.15bc	155.2b
	----------Year:2017----------						
Forage Soybeans	82.52	609.2a	386.2a	575.2	740.00c	0.20	36.4c
Cowpea (CW)	98.39	527.8cd	357.9abc	598.1	750.7c	0.28	55.5bc
Mung Bean (MB)	94.36	489.6d	346.2bc	607.6	772.9bc	0.27	68.3b
Pearl Millet (PM)	85.23	591.6ab	360.0ab	602.8	785.4abc	0.24	59.8bc
Sorghum Sudan (SS)	89.48	552.7bc	326.9bc	637.4	822.7a	0.29	84.1ab
Triple treat SS(TTSS)	77.24	558.8bc	348.5bc	614.7	778.4abc	0.22	67.3bc
PM+MB	95.28	551.8bc	351.9abc	611.2	777.9abc	0.28	103.3a
TTSS+CW	88.1	523.3cd	323.5c	641.0	806.2ab	0.29	110.4a

* DSG and TSGA results were calculated based on Angus steers with initial body weight of 226.7 kg.

**TSGA results did not account potential forage waste by steers during grazing, i.e., harvest efficiency =100%. Common grazing regimes and their respective harvest efficiencies: Continuous (50%), 2-4 paddocks rotation (60%), 5-6 paddocks rotation (70%), and strip grazing (80%, Ball et al.,2007).

Table 7: Wheat grain yield and protein content for 2016-2017 and 2017-2018 growing seasons for site 1 and 2.

Summer Cover Crops	2017		2018	
	Grain Yield (Mg ha^{-1})	Grain Protein (g/Kg)	Grain Yield (Mg ha^{-1})	Grain Protein (g/Kg)
	Perkins, OK			
Forage Soybeans	1.26ab	89.92ab	0.90	98.10abc
Cowpea (CW)	1.42a	89.42ab	0.84	96.67bc
Mung Bean (MB)	1.43a	91.75ab	0.83	100.25a
Pearl Millet	0.99c	88.42b	0.80	96.40c
Sorghum Sudan (SS)	1.05bc	92.92a	0.82	97.78abc
Triple treat SS (TTSS)	1.01c	90.92ab	0.90	99.91abc
PM+MB	1.12bc	89.17ab	0.82	99.50abc
TTSS+CW	1.05bc	92.75ab	0.91	98.41abc
Fallow	1.28b	90.10ab	0.86	98.17abc
	Chickasha, OK			
Forage Soybeans	1.97	104.33ab	1.31abc	135.83
Cowpea (CW)	1.93	103.00ab	1.22abc	130.67
Mung Bean (MB)	1.76	111.17a	1.30abc	136.25
Pearl Millet	1.86	95.46b	0.89c	133.16
Sorghum Sudan (SS)	1.95	100.64ab	1.37abc	139.66
Triple treat SS (TTSS)	1.83	100.58ab	1.73a	137.08
PM+MB	1.80	100.08ab	1.03bc	138.00
TTSS+CW	1.84	102.58ab	1.59ab	133.42
Fallow	1.98	107.42a	1.38abc	132.58

FIGURES FOR CHAPTER IV

Figure 1: Monthly cumulative precipitation (mm), 30 year normal precipitation (mm), monthly mean air temperature (ºC), 30 year normal mean air temperature (ºC) from 2016 through 2018 for site 1 and 2.

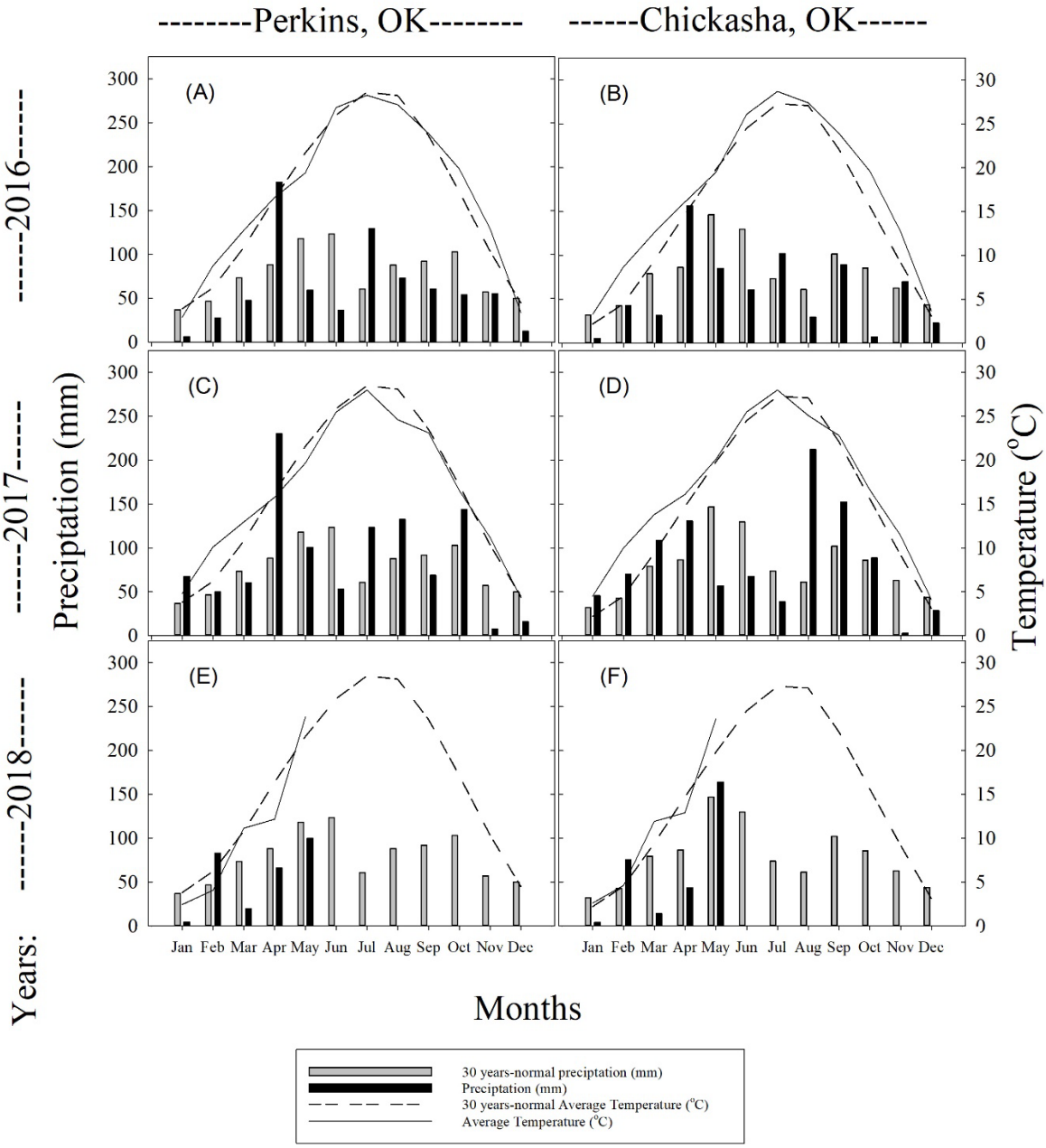
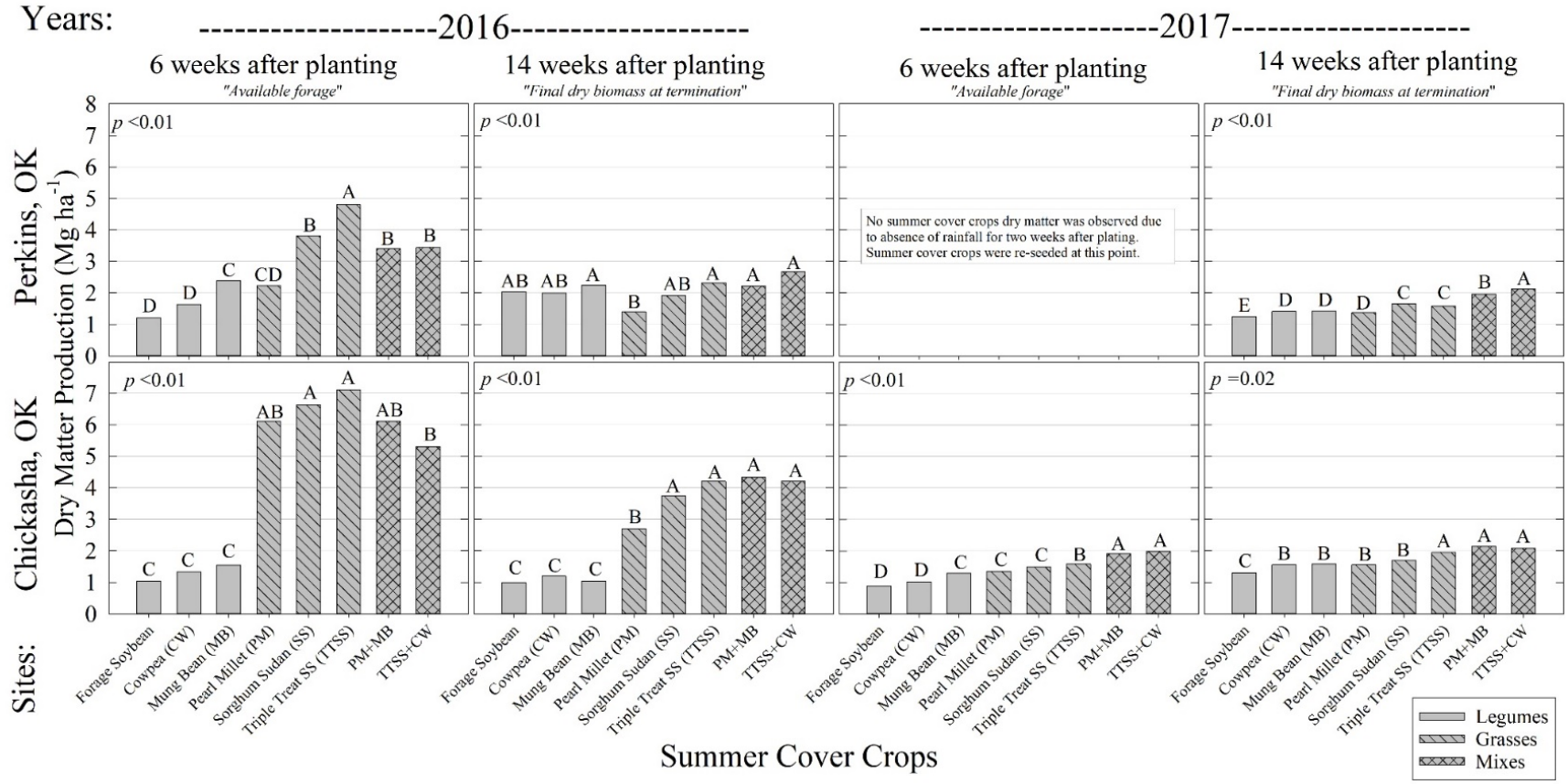


Figure 2: Dry matter production of cover crops (Mg ha^{-1}) at 6 and 14 weeks after planting in 2016 and 2017. 6WAP is the first simulated graze and 14WAP is amount of residue present before winter wheat planting.



REFERENCES

Ali, E. (2010). Grain yield and nitrogen use efficiency of pearl millet as affected by plant density, nitrogen rate and splitting in sandy soil. *American-Eurasian Journal of Agricultural* **7**, 327-335. doi:10.2134/agronj2010.0410

Allen, B. L., Pikul, J. L., Jr., Waddell, J. T., and Cochran, V. L. (2011). Long-Term Lentil Green-Manure Replacement for Fallow in the Semiarid Northern Great Plains. *Agronomy Journal* **103**, 1292-1298. doi:10.2134/agronj2010.0410

Alta Seeds (2018). Sorghum Sudangrass. Vol. 2018.

AOAC (1999). Official methods of analysis, 16th edn. Association of Official Analytical Chemists.

Asekova, S., Shannon, J. G., and Lee, J.-D. (2014). The current status of forage soybean. *Plant Breeding and Biotechnology* **2**, 334-341. doi:10.9787/PBB.2014.2.4.334

Ates, S., Keles, G., Demirci, U., Dogan, S., and Ben Salem, H. (2017). Biomass yield and feeding value of rye, triticale, and wheat straw produced under a dual-purpose management system1. *Journal of Animal Science* **95**, 4893-4903. doi:10.2527/jas2017.1888

Ball, D.M, C.S. Hoveland, and G.D. Lacefield. (2007). Southern Forages. Fourth Edition. IPNI.

Barnes, R. F., Nelson, C., Collins, M., and Moore, K. (2003). Forages: An introduction to grassland agriculture. Vol. 1. Iowa State Press, Ames.

Bean, B. W., Baumhardt, R. L., McCollum, F. T., and McCuistion, K. C. (2013). Comparison of sorghum classes for grain and forage yield and forage nutritive value. *Field Crops Research* **142**, 20-26. doi:10.1016/j.fcr.2012.11.014

Bhardwaj, H. L., and Hamama, A. A. (2016). Cultivar, planting date, and row spacing effects on mungbean seed composition. doi:10.5539/jas.v8n10p26

Biederbeck, V. O., Campbell, C. A., Rasiah, V., Zentner, R. P., and Wen, G. (1998). Soil quality attributes as influenced by annual legumes used as green manure. *Soil Biology and Biochemistry* **30**, 1177-1185. doi:10.1016/S0038-0717(97)00150-8

Blanco-Canqui, H., Claassen, M., and Presley, D. (2012). Summer cover crops fix nitrogen, increase crop yield, and improve soil–crop relationships. *Agronomy journal* **104**, 137-147. doi:10.2134/agronj2011.0240

Boe, A., Twidwell, E. K., and Rephart, K. D. (1991). Growth and forage yield of cowpea and mungbean in the northern Great Plains. *Canadian Journal of Plant Science* **71**, 709-715. doi:10.4141/cjps91-104

Caldwell, B. E., Howell, R. W., Judd, R., and Johnson, H. (1973). "Soybeans: Improvement, production, and uses," American Society of Agronomy Madison, WI.

Chimonyo, V. G. P., Modi, A. T., and Mabhaudhi, T. (2016). Water use and productivity of a sorghum–cowpea–bottle gourd intercrop system. *Agricultural Water Management* **165**, 82-96. doi:10.1016/j.agwat.2015.11.014

D. Meyer, L., M. Dabney, S., E. Murphree, C., C. Harmon, W., and H. Grissinger, E. (1999). CROP PRODUCTION SYSTEMS TO CONTROL EROSION AND REDUCE RUNOFF FROM UPLAND SILTY SOILS. *Transactions of the ASAE* **42**, 1645-1652. doi:10.13031/2013.13358

Edwards, J., Carver, B., Horn, G., and Payton, M. (2011). Impact of dual-purpose management on wheat grain yield. *Crop Science* **51**, 2181-2185. doi:10.2135/cropsci2011.01.0043

Franzluebbers, A. J. (2007). Integrated crop-livestock systems in the southeastern USA. *Agronomy Journal* **99**, 361-372. doi:10.2134/agronj2006.0076

Galyean, M., Beauchemin, K., Caton, J., Cole, N., Eisemann, J., Engle, T., Erickson, G., Krehbiel, C., Lemenager, R., and Tedeschi, L. (2016). Beef Cattle Nutrient Requirements Model 2016. Vol. 2016. The National Academies Press.

Gomez, K. A. (1976). "Statistical procedures for agricultural research with emphasis on rice," Los Baños, Philippines : International Rice Research Institute, Los Baños, Philippines.

Gonçalves, A., Goufo, P., Barros, A., Domínguez-Perles, R., Trindade, H., Rosa, E. A. S., Ferreira, L., and Rodrigues, M. (2016). Cowpea (Vigna unguiculata L. Walp),

a renewed multipurpose crop for a more sustainable agri-food system: nutritional advantages and constraints. Vol. 96, pp. 2941-2951, Chichester, UK.

Greb, B. W. (1979). "Reducing drought effects on croplands in the west-central Great Plains," Washington, D.C. : U.S. Dept. of Agriculture, Science and Education Administration, Washington, D.C.

Hossain, I., Epplin, F. M., Horn, G. W., and Krenzer Jr, E. G. (2004). Wheat production and management practices used by Oklahoma grain and livestock producers. *Oklahoma Agricultural Experimental Station*.

Janke, R. R., Claassen, M. M., Heer, W. F., Jost, J., Freyenberger, S., and Norman, D. (2002). The Use of Winter Annual Legume Cover Crops in a Wheat-Grain Sorghum Rotation in South Central Kansas. *Journal of Sustainable Agriculture* **20**, 69-88. doi:10.1300/J064v20n02_08

Johnston Seed Company (2018a). Chinese Red Cowpea. Vol. 2018. Johnston Seed Company.

Johnston Seed Company (2018b). Triple Treat Sorghum Sudangrass. Vol. 2018. Johnston Seed Company.

Kansas State University (2009). 2009 K-State Special Purpose Soybean Variety Descriptions. *In* "Conventional/Special Purpose Varieties" (G. Pierzynski, ed.). Kansas State University, Manhattan, KS 66506.

Lal, R., Follett, R. F., Stewart, B. A., and Kimble, J. M. (2007). Soil carbon sequestration to mitigate climate change and advance food security. *Soil Science* **172**, 943-956. doi:10.1097/ss.0b013e31815cc498

Littell, R. C., Milliken, G. A., Stroup, W. W., and Wolfinger, R. D. (1996). SAS system for mixed models. SAS Institute, Cary, NC.

Lollato, R., Marburger, D., Holman, J., Tomlinson, P., Presley, D., Edwards, J. (2017). Dual Purpose Wheat: Management for Forage and Grain Production. Oklahoma State University.

Lyles, L. (1977). Wind erosion: processes and effect on soil productivity. *Transactions of the ASAE* **20**, 880-0884. doi:10.13031/2013.35668

Lyles, L., and Tatarko, J. (1988). Soil Wind Erodibility Index in Seven North Central States. *Transactions of the ASAE* **31**, 1396-1399. doi:10.13031/2013.30875

MacKown, C. T., Heitholt, J. J., and Rao, S. C. (2007). Agronomic Feasibility of a Continuous Double Crop of Winter Wheat and Soybean Forage in the Southern Great Plains. *Crop Science* **47**, 1652-1660. doi:10.2135/cropsci2006.10.0683

Marburger, D., Calhoun, R., Carver, B., Hunger, B., Watson, B., and Gillespie, C. (2018). "2017-2018 Small Grains Variety Performance Tests."

McCuistion, K. C. P., McCollum, F. T., III, Greene, L. W., MacDonald, J. P., and Bean, B. (2011). Performance of stocker cattle grazing 2 sorghum-sudangrass hybrids

under various stocking rates. *Professional Animal Scientist* **27**, 92-100. doi:10.15232/s1080-7446(15)30454-x

McPherson, R. A., C. Fiebrich, K. C., Crawford, R. L. E., J. R. Kilby, D. L. G., J. E. Martinez, J. B. Basara, B. G. Illston, D. A. Morris, K. A. Kloesel, S. J. Stadler, A. D. Melvin, A.J. Sutherland, and and H. Shrivastava (2007). Statewide monitoring of the mesoscale environment: A technical update on the Oklahoma Mesonet. *J. Atmos. Oceanic Technol.* **24**, 301-321. doi:10.15763/dbs.mesonet.standard

Mendez, M. J., and Buschiazzo, D. E. (2015). Soil coverage evolution and wind erosion risk on summer crops under contrasting tillage systems. *Aeolian Research* **16**, 117-124. doi:10.1016/j.aeolia.2014.12.002

Mertens, D. R. (1994). Regulation of forage intake. *Forage quality, evaluation and utilization*, 450-493. doi:10.2134/1994.foragequality.c11

Nair, R. M., Yang, R. Y., Easdown, W. J., Thavarajah, D., Thavarajah, P., Hughes, J. d. A., and Keatinge, J. (2013). Biofortification of mungbean (Vigna radiata) as a whole food to enhance human health. *Journal of the Science of Food* **93**, 1805-1813. doi:10.1002/jsfa.6110

National Academies of Sciences, E., and Medicine (2016). "Nutrient Requirements of Beef Cattle: Eighth Revised Edition," The National Academies Press, Washington, DC.

Nielsen, D. C. (2011). Forage soybean yield and quality response to water use. *Field Crops Research* **124**, 400-407. doi:10.1016/j.fcr.2011.07.007

Nielsen, D. C., Lyon, D. J., and Miceli-Garcia, J. J. (2017). Replacing fallow with forage triticale in a dryland wheat-corn-fallow rotation may increase profitability. *Field Crops Research* **203**, 227-237. doi:10.1016/j.fcr.2016.12.005

Nielsen, D. C., and Vigil, M. F. (2005). Legume Green Fallow Effect on Soil Water Content at Wheat Planting and Wheat Yield. *Agronomy Journal* **97**, 684-689. doi:10.2134/agronj2004.0071

NRCS (2016). "Conservation Practice Standard Cover Crop."

Ogden, R. K., Coblentz, W. K., Coffey, K. P., Turner, J. E., Scarbrough, D. A., Jennings, J. A., and Richardson, M. D. (2005). Ruminal in situ disappearance kinetics of dry matter and fiber in growing steers for common crabgrass forages sampled on seven dates in northern Arkansas1. *Journal of Animal Science* **83**, 1142-1152. doi:10.2527/2005.8351142x

Ohler, T. A., and Mitchell, C. A. (1996). Identifying yield-optimizing environments for two cowpea breeding lines by manipulating photoperiod and harvest scenario. *Journal of the American Society for Horticultural Science. American Society for Horticultural Science* **121**, 576. doi:10.21273/jashs.121.3.576

Oklahoma Cooperative Extension Service (2016). Oklahoma Forage and Pasture Fertility Guide. (B. Arnall and A. Rocateli, eds.), Vol. E-1021. Oklahoma State University, Stillwater, Ok.

Oklahoma Department of Agriculture Food and Forestry (2016). Oklahoma Agriculture Statistics 2016. (N. A. S. Service, ed.). Printing Division, Office of Management and Enterprises Service, Oklahoma City, OK.

Oklahoma Foundation Seed Stocks (2018). Mungbean. Oklahoma State University,.

Pandey, A., Li, F., Askegaard, M., and Olesen, J. E. (2017). Biological nitrogen fixation in three long-term organic and conventional arable crop rotation experiments in Denmark. *European Journal of Agronomy* **90**, 87-95. doi:10.1016/j.eja.2017.07.009

Parish, J. A. P., Parish, J. R., and Best, T. F. (2013). Assessment of 3 sudangrass cultivars for summer stockering of beef steers. *Professional Animal Scientist* **29**, 395-402. doi:10.15232/s1080-7446(15)30252-7

Rai, K., Reddy, B., Saxena, K., and Gowda, C. (2004). Prospects of breeding sorghum, pearl millet and pigeonpea for high forage yield and quality.

Rao, S. C., and Northup, B. K. (2009a). Capabilities of Four Novel Warm-Season Legumes in the Southern Great Plains: Grain Production and Quality. *Crop Science* **49**, 1103-1108. doi:10.2135/cropsci2008.08.0469

Rao, S. C., and Northup, B. K. (2009b). Water Use by Five Warm-Season Legumes in the Southern Great Plains. *Crop Science* **49**, 2317-2323. doi:10.2135/cropsci2009.03.0134

Redmon, L. A., Horn, G. W., Krenzer, E. G., and Bernardo, D. J. J. A. J. (1995). A review of livestock grazing and wheat grain yield: Boom or bust? **87**, 137-147. doi:10.2134/agronj1995.00021962008700020001x

Roth, R. T., Ruffatti, M. D., Apos, Rourke, P. D., and Armstrong, S. D. (2018). A cost analysis approach to valuing cover crop environmental and nitrogen cycling benefits: A central Illinois on farm case study. *Agricultural Systems* **159**, 69-77. doi:10.1016/j.agsy.2017.10.007

Schillinger, W. F., Kennedy, A. C., and Young, D. L. (2007). Eight years of annual no-till cropping in Washington's winter wheat-summer fallow region. *Agriculture, Ecosystems & Environment* **120**, 345-358. doi:10.1016/j.agee.2006.10.017

Serba, D. D., and Yadav, R. S. (2016). Genomic Tools in Pearl Millet Breeding for Drought Tolerance: Status and Prospects. **7**. doi:10.3389/fpls.2016.01724

Sharpley, A., and Halvorson, A. (1994). The Management of Soil Phosphorus Availability and its Impact on Surface. *Soil processes and water quality* **7**.

Sharratt, B. S., and Feng, G. (2009). Windblown dust influenced by conventional and undercutter tillage within the Columbia Plateau, USA. *Earth Surface Processes and Landforms* **34**, 1323-1332. doi:10.1002/esp.1812

Singh, B., Raj, D. M., Dashiell, K., and Jackai, L. (1997). Advances in cowpea research. *Ibadan Nigeria*.

Singh, P., Boote, K. J., Kadiyala, M. D. M., Nedumaran, S., Gupta, S. K., Srinivas, K., and Bantilan, M. C. S. (2017). An assessment of yield gains under climate change due to genetic modification of pearl millet. *Science of the Total Environment* **601-602**, 1226-1237. doi:10.1016/j.scitotenv.2017.06.002

Snapp, S., Swinton, S., Labarta, R., and Mutch, D. (2005). Evaluating Cover Crops for Benefits, Costs and Performance within Cropping System Niches. *Agronomy Journal* **97**, 322-332. doi:10.2134/agronj2005.0322

Soil Survey Staff, Natural Resources Conservation Service, and United States Department of Agriculture Web Soil Survey.

Teasdale, J. R., and Daughtry, C. S. T. (1993). Weed Suppression by Live and Desiccated Hairy Vetch (Vicia villosa). *Weed Science* **41**, 207-212.

Tilman, D., Wedin, D., and Knops, J. (1996). Productivity and sustainability influenced by biodiversity in grassland ecosystems. *Nature* **379**, 718. doi:10.1038/379718a0

Towett, E. K., Alex, M., Shepherd, K. D., Polreich, S., Aynekulu, E., and Maass, B. L. (2013). Applicability of near-infrared reflectance spectroscopy (NIRS) for determination of crude protein content in cowpea (V igna unguiculata) leaves. *Food Science & Nutrition* **1**, 45-53. doi:10.1002/fsn3.7

United States (1978). "Sudangrass and sorghum-sudangrass hybrids for forage," Rev. Aug. 1978../Ed. Washington, D.C. : U.S. Dept. of Agriculture, Washington, D.C.

USDA (2011). National Agronomy Manual 90–V–NAM, 4th Ed. (USDA, ed.). NRCS.

USDA (2017). Quick Stats Ad-hoc Query Tool.

Van Soest, P. (1994). "Nutritional ecology of the ruminant," Cornell University Press, Eage House, 512 East State Street, Ithaca, NY 14850, USA.

Vaughn, S. E. (2012). Review of the third edition of the Guide for the Care and Use of Agricultural Animals in Research and Teaching. *Journal of the American Association for Laboratory Animal Science : JAALAS* **51**, 298-300. PMCID: PMC3358976

Watson, C. A., Atkinson, D., Gosling, P., Jackson, L. R., and Rayns, F. W. (2002). Managing soil fertility in organic farming systems. *Soil Use and Management* **18**, 239-247. doi:10.1079/SUM2002131

Wheeler, W. A. (1950). "Forage and pasture crops a handbook of information about the grasses and legumes grown for forage in the United States," New York : Van Nostrand, New York.

Zeleke, K. T. (2017). Fallow management increases soil water and nitrogen storage. *Agricultural Water Management* **186**, 12-20. doi:10.1016/j.agwat.2017.02.011

Zhang, X. C. (2012). Cropping and Tillage Systems Effects on Soil Erosion under Climate Change in Oklahoma. *Soil Science Society of America Journal* **76**, 1789-1797. doi:10.2136/sssaj2012.0085

APPENDIX

Perkins Soil Moisture

Event	Year	Rep	Crop	Cut	Depth (cm)	V_T (cm^3)	M_{bag} (g)	$M_{bag,wet}$ (g)	$M_{bag,dry}$ (g)	P_b (g cm^{-3})	Θ (cm^3 cm^3)
Planting	2016	1	PM		30.48	222.25	14.46	409.5	388.82	1.68436	0.0930467
Planting	2016	1	PM		60.96	222.25	14.46	447	389.6	1.68787	0.258263
Planting	2016	1	PM		91.44	222.25	14.46	463.4	410.6	1.78236	0.2375659
Planting	2016	1	PM		121.92	222.25	14.46	663.5	596.57	2.6191	0.3011418
Planting	2016	1	PMMB		30.48	222.25	14.46	374.8	343.8	1.4818	0.13948
Planting	2016	1	PMMB		60.96	222.25	14.46	435.5	377.44	1.63316	0.2612325
Planting	2016	1	PMMB		91.44	222.25	14.46	457.8	401.5	1.74141	0.2533137
Planting	2016	1	PMMB		121.92	222.25	14.46	403.6	362.54	1.56612	0.1847435
Planting	2016	1	FS		30.48	222.25	14.46	337.8	305.13	1.30781	0.1469939
Planting	2016	1	FS		60.96	222.25	14.46	415.6	360.87	1.5586	0.2462497
Planting	2016	1	FS		91.44	222.25	14.46	458.5	404.94	1.75689	0.2409854
Planting	2016	1	FS		121.92	222.25	14.46	368.4	331.8	1.42781	0.1646764
Planting	2016	1	TTSS		30.48	222.25	14.46	383.2	348.93	1.50488	0.1541929
Planting	2016	1	TTSS		60.96	222.25	14.46	417.4	362.6	1.56639	0.2465646

Planting	2016	1	TTSS		91.44	222.25	14.46	451.3	399.4	1.73196	0.2335165
Planting	2016	1	TTSS		121.92	222.25	14.46	564.3	509.29	2.2264	0.2475095
Planting	2016	1	FALLOW		30.48	222.25	14.46	383.7	347.43	1.49813	0.1631916
Planting	2016	1	FALLOW		60.96	222.25	14.46	411.5	356.99	1.54114	0.2452598
Planting	2016	1	FALLOW		91.44	222.25	14.46	428.5	379.09	1.64058	0.2223131
Planting	2016	1	FALLOW		121.92	222.25	14.46	399.6	358.3	1.54704	0.1858234
Planting	2016	1	SS		30.48	222.25	14.46	403.9	371.88	1.60814	0.1440693
Planting	2016	1	SS		60.96	222.25	14.46	447.8	390.5	1.69192	0.257813
Planting	2016	1	SS		91.44	222.25	14.46	415.7	369.8	1.59878	0.2065204
Planting	2016	1	SS		121.92	222.25	14.46	508.1	460.49	2.00683	0.2142143
Planting	2016	1	CP		30.48	222.25	14.46	427.9	392.94	1.7029	0.1572974
Planting	2016	1	CP		60.96	222.25	14.46	435.4	378.88	1.63964	0.2543035
Planting	2016	1	CP		91.44	222.25	14.46	453	399.15	1.73084	0.2422903
Planting	2016	1	CP		121.92	222.25	14.46	490.3	440.8	1.91824	0.2227181
Planting	2016	1	MB		30.48	222.25	14.46	404.1	371.48	1.60634	0.146769
Planting	2016	1	MB		60.96	222.25	14.46	433.1	377.1	1.63163	0.2519639
Planting	2016	1	MB		91.44	222.25	14.46	457.4	403.7	1.75131	0.2416154

Planting	2016	1	MB		121.92	222.25	14.46	542.5	490.9	2.14365	0.2321667
Planting	2016	1	TTSSCP		30.48	222.25	14.46	408.2	366.2	1.58258	0.1889729
Planting	2016	1	TTSSCP		60.96	222.25	14.46	388.2	335.3	1.44355	0.2380159
Planting	2016	1	TTSSCP		91.44	222.25	14.46	457.6	399.47	1.73228	0.2615475
Planting	2016	1	TTSSCP		121.92	222.25	14.46	604.2	542.8	2.37717	0.2762604
Planting	2016	2	PMMB		30.48	222.25	14.46	384.4	354.25	1.52882	0.1356555
Planting	2016	2	PMMB		60.96	222.25	14.46	504.2	438.5	1.90789	0.2956076
Planting	2016	2	PMMB		91.44	222.25	14.46	441.7	391.86	1.69804	0.2242478
Planting	2016	2	PMMB		121.92	222.25	14.46	483.8	435.9	1.89619	0.2155191
Planting	2016	2	TTSSCP		30.48	222.25	14.46	323.8	297.25	1.27235	0.1194579
Planting	2016	2	TTSSCP		60.96	222.25	14.46	484.3	419.95	1.82442	0.2895335
Planting	2016	2	TTSSCP		91.44	222.25	14.46	479.9	425.11	1.84764	0.2465197
Planting	2016	2	TTSSCP		121.92	222.25	14.46	551.6	496.86	2.17047	0.2462947
Planting	2016	2	FALLOW		30.48	222.25	14.46	418	376.49	1.62888	0.1867682
Planting	2016	2	FALLOW		60.96	222.25	14.46	450.9	390.8	1.69327	0.2704112
Planting	2016	2	FALLOW		91.44	222.25	14.46	413.2	363.9	1.57224	0.2218182
Planting	2016	2	FALLOW		121.92	222.25	14.46	529.3	477.3	2.08246	0.2339665

Planting	2016	2	PM		30.48	222.25	14.46	503.4	452.56	1.97115	0.2287472
Planting	2016	2	PM		60.96	222.25	14.46	440	380.65	1.6476	0.2670367
Planting	2016	2	PM		91.44	222.25	14.46	529.9	472.5	2.06087	0.258263
Planting	2016	2	PM		121.92	222.25	14.46	323	291.8	1.24783	0.1403799
Planting	2016	2	SS		30.48	222.25	14.46	389.7	357.8	1.54479	0.1435294
Planting	2016	2	SS		60.96	222.25	14.46	418.1	363.65	1.57111	0.2449899
Planting	2016	2	SS		91.44	222.25	14.46	482.4	427.23	1.85718	0.2482294
Planting	2016	2	SS		121.92	222.25	14.46	502.3		-0.06508	2.2600259
Planting	2016	2	CP		30.48	222.25	14.46	395	364.02	1.57278	0.13939
Planting	2016	2	CP		60.96	222.25	14.46	415.5	359.6	1.55289	0.2515139
Planting	2016	2	CP		91.44	222.25	14.46	417.3	362.85	1.56751	0.2449899
Planting	2016	2	CP		121.92	222.25	14.46	537.3	484.79	2.11616	0.2362611
Planting	2016	2	TTSS		30.48	222.25	14.46	425.2	384.8	1.66627	0.1817739
Planting	2016	2	TTSS		60.96	222.25	14.46	423	368.5	1.59293	0.2452148
Planting	2016	2	TTSS		91.44	222.25	14.46	470.6	418.35	1.81723	0.2350913
Planting	2016	2	TTSS		121.92	222.25	14.46	489.5	442.43	1.92557	0.2117846
Planting	2016	2	FS		30.48	222.25	14.46	373.1	341.5	1.47145	0.1421796

Planting	2016	2	FS		60.96	222.25	14.46	470.3	409.44	1.77714	0.2738307
Planting	2016	2	FS		91.44	222.25	14.46	435.3	386.1	1.67212	0.2213683
Planting	2016	2	FS		121.92	222.25	14.46	490.9	444.1	1.93308	0.2105698
Planting	2016	2	MB		30.48	222.25	14.46	328.4	303.52	1.30056	0.1119439
Planting	2016	2	MB		60.96	222.25	14.46	456.9	396.05	1.71689	0.2737857
Planting	2016	2	MB		91.44	222.25	14.46	390.2	344.26	1.48387	0.2067004
Planting	2016	2	MB		121.92	222.25	14.46	608.7	550.06	2.40984	0.2638422
Planting	2016	3	SS		30.48	222.25	14.46	367	339.03	1.46034	0.125847
Planting	2016	3	SS		60.96	222.25	14.46	337.6	292.67	1.25175	0.202156
Planting	2016	3	SS		91.44	222.25	14.46	436.7	384.94	1.6669	0.2328866
Planting	2016	3	SS		121.92	222.25	14.46	617.3	557.56	2.44358	0.2687915
Planting	2016	3	MB		30.48	222.25	14.46	542.8	489.14	2.13573	0.2414354
Planting	2016	3	MB		60.96	222.25	14.46	448.8	388.3	1.68202	0.272211
Planting	2016	3	MB		91.44	222.25	14.46	471.5	418.85	1.81947	0.236891
Planting	2016	3	MB		121.92	222.25	14.46	386.2	351.34	1.51572	0.1568475
Planting	2016	3	CP		30.48	222.25	14.46	406.2	373.53	1.61556	0.1469939
Planting	2016	3	CP		60.96	222.25	14.46	397.7	345.6	1.4899	0.2344164

Planting	2016	3	CP		91.44	222.25	14.46	450.1	398.43	1.7276	0.2324817
Planting	2016	3	CP		121.92	222.25	14.46	589.4	534.7	2.34073	0.2461147
Planting	2016	3	PMMB		30.48	222.25	14.46	409.8	377.1	1.63163	0.1471289
Planting	2016	3	PMMB		60.96	222.25	14.46	412.3	361.08	1.55955	0.230457
Planting	2016	3	PMMB		91.44	222.25	14.46	483.2	429.24	1.86622	0.2427852
Planting	2016	3	PMMB		121.92	222.25	14.46	517.6	469.23	2.04615	0.2176338
Planting	2016	3	FALLOW		30.48	222.25	14.46	420.7	384.23	1.66371	0.1640915
Planting	2016	3	FALLOW		60.96	222.25	14.46	402.4	350.47	1.51181	0.2336515
Planting	2016	3	FALLOW		91.44	222.25	14.46	450	398.16	1.72638	0.2332466
Planting	2016	3	FALLOW		121.92	222.25	14.46	538.6	488.69	2.13371	0.2245628
Planting	2016	3	TTSSCP		30.48	222.25	14.46	431.3	394.1	1.70812	0.167376
Planting	2016	3	TTSSCP		60.96	222.25	14.46	472.5	412.59	1.79131	0.2695564
Planting	2016	3	TTSSCP		91.44	222.25	14.46	437.1	391.98	1.69858	0.2030109
Planting	2016	3	TTSSCP		121.92	222.25	14.46	463.8	423.96	1.84247	0.1792543
Planting	2016	3	FS		30.48	222.25	14.46	406	371.55	1.60666	0.1550028
Planting	2016	3	FS		60.96	222.25	14.46	432.1	377.19	1.63203	0.2470596
Planting	2016	3	FS		91.44	222.25	14.46	447.6	399.03	1.7303	0.2185337

Planting	2016	3	FS		121.92	222.25	14.46	548.8	498.75	2.17897	0.2251927
Planting	2016	3	PM		30.48	222.25	14.46	332.6	313.24	1.3443	0.0871075
Planting	2016	3	PM		60.96	222.25	14.46	508.1	443.2	1.92903	0.2920081
Planting	2016	3	PM		91.44	222.25	14.46	445.3	396.38	1.71837	0.2201084
Planting	2016	3	PM		121.92	222.25	14.46	472.7	430.05	1.86987	0.1918975
Planting	2016	3	TTSS		30.48	222.25	14.46	355.1	326.68	1.40477	0.1278717
Planting	2016	3	TTSS		60.96	222.25	14.46	438.2	382.26	1.65484	0.2516939
Planting	2016	3	TTSS		91.44	222.25	14.46	444.7	394.67	1.71068	0.2251027
Planting	2016	3	TTSS		121.92	222.25	14.46	641.3	582.13	2.55413	0.2662268
Planting	2016	4	FS		30.48	222.25	14.46	435.9	399.75	1.73354	0.1626517
Planting	2016	4	FS		60.96	222.25	14.46	446	391.53	1.69655	0.2450799
Planting	2016	4	FS		91.44	222.25	14.46	444.4	397.42	1.72305	0.2113797
Planting	2016	4	FS		121.92	222.25	14.46	515.2	466.64	2.0345	0.2184887
Planting	2016	4	SS		30.48	222.25	14.46	377.1	347.05	1.49642	0.1352056
Planting	2016	4	SS		60.96	222.25	14.46	428	372.58	1.61129	0.2493542
Planting	2016	4	SS		91.44	222.25	14.46	441.3	391.1	1.69462	0.2258676
Planting	2016	4	SS		121.92	222.25	14.46	599.6	541	2.36907	0.2636622

Planting	2016	4	PMMB		30.48	222.25	14.46	366.8	341.92	1.47334	0.1119439
Planting	2016	4	PMMB		60.96	222.25	14.46	425.6	372.67	1.61169	0.2381509
Planting	2016	4	PMMB		91.44	222.25	14.46	412.8	365.45	1.57921	0.2130445
Planting	2016	4	PMMB		121.92	222.25	14.46	544.2	494.2	2.1585	0.2249677
Planting	2016	4	TTSS		30.48	222.25	14.46	378.7	348.8	1.5043	0.1345307
Planting	2016	4	TTSS		60.96	222.25	14.46	408.5	355.15	1.53287	0.2400406
Planting	2016	4	TTSS		91.44	222.25	14.46	425.7	377.46	1.63325	0.2170489
Planting	2016	4	TTSS		121.92	222.25	14.46	545.7	496.55	2.16907	0.2211433
Planting	2016	4	FALLOW		30.48	222.25	14.46	360.3	334.4	1.4395	0.1165333
Planting	2016	4	FALLOW		60.96	222.25	14.46	418.3	362.05	1.56391	0.2530887
Planting	2016	4	FALLOW		91.44	222.25	14.46	519.2	458.8	1.99922	0.271761
Planting	2016	4	FALLOW		121.92	222.25	14.46	432.2	391.86	1.69804	0.181504
Planting	2016	4	PM		30.48	222.25	14.46	418.9	383.5	1.66042	0.1592772
Planting	2016	4	PM		60.96	222.25	14.46	370	321.67	1.38223	0.2174538
Planting	2016	4	PM		91.44	222.25	14.46	463	406.68	1.76472	0.2534037
Planting	2016	4	PM		121.92	222.25	14.46	504.3	455.7	1.98528	0.2186686
Planting	2016	4	MB		30.48	222.25	14.46	392.1	367.6	1.58888	0.1102342

Planting	2016	4	MB		60.96	222.25	14.46	429.7	376	1.62668	0.2416154
Planting	2016	4	MB		91.44	222.25	14.46	451	401.35	1.74074	0.223393
Planting	2016	4	MB		121.92	222.25	14.46	414.8	376.18	1.62749	0.1737651
Planting	2016	4	TTSSCP		30.48	222.25	14.46	382.5	358.68	1.54875	0.1071746
Planting	2016	4	TTSSCP		60.96	222.25	14.46	405.8	354.4	1.52949	0.2312668
Planting	2016	4	TTSSCP		91.44	222.25	14.46	428.4	379.25	1.6413	0.2211433
Planting	2016	4	TTSSCP		121.92	222.25	14.46	556.8	505.05	2.20732	0.2328416
Planting	2016	4	CP		30.48	222.25	14.46	388.8	362.9	1.56774	0.1165333
Planting	2016	4	CP		60.96	222.25	14.46	418.7	365.85	1.58101	0.2377909
Planting	2016	4	CP		91.44	222.25	14.46	455.3	405.9	1.76121	0.2222681
Planting	2016	4	CP		121.92	222.25	14.46	531.6	483.16	2.10883	0.2179487
6WAP	2016	1	PM		30.48	222.25	14.46	410	376	1.62668	0.1529781
6WAP	2016	1	PM		60.96	222.25	14.46	369	338	1.4557	0.13948
6WAP	2016	1	PM		91.44	222.25	14.46	389	351	1.51419	0.1709755
6WAP	2016	1	PM		121.92	222.25	14.46	317	290	1.23973	0.1214826
6WAP	2016	1	PMMB		30.48	222.25	14.46	410	372	1.60868	0.1709755
6WAP	2016	1	PMMB		60.96	222.25	14.46	404	369	1.59518	0.1574774

6WAP	2016	1	PMMB		91.44	222.25	14.46	415	380	1.64468	0.1574774
6WAP	2016	1	PMMB		121.92	222.25	14.46	311	286	1.22174	0.1124839
6WAP	2016	1	FS		30.48	222.25	14.46	357	322	1.38371	0.1574774
6WAP	2016	1	FS		60.96	222.25	14.46	440	388	1.68067	0.2339665
6WAP	2016	1	FS		91.44	222.25	14.46	458	410	1.77966	0.215969
6WAP	2016	1	FS		121.92	222.25	14.46	372	340	1.4647	0.1439794
6WAP	2016	1	TTSS		30.48	222.25	14.46	394	354	1.52769	0.1799742
6WAP	2016	1	TTSS		60.96	222.25	14.46	443	390	1.68967	0.2384658
6WAP	2016	1	TTSS		91.44	222.25	14.46	424	386	1.67167	0.1709755
6WAP	2016	1	TTSS		121.92	222.25	14.46	443	409	1.77516	0.1529781
6WAP	2016	1	FALLOW		30.48	222.25	14.46	404	371	1.60418	0.1484787
6WAP	2016	1	FALLOW		60.96	222.25	14.46	406	370	1.59968	0.1619768
6WAP	2016	1	FALLOW		91.44	222.25	14.46	458	416	1.80665	0.1889729
6WAP	2016	1	FALLOW		121.92	222.25	14.46	370	340	1.4647	0.1349806
6WAP	2016	1	SS		30.48	222.25	14.46	426	379	1.64018	0.2114697
6WAP	2016	1	SS		60.96	222.25	14.46	427	379	1.64018	0.215969
6WAP	2016	1	SS		91.44	222.25	14.46	427	388	1.68067	0.1754748

6WAP	2016	1	SS		121.92	222.25	14.46	441	405	1.75716	0.1619768
6WAP	2016	1	CP		30.48	222.25	14.46	424	379	1.64018	0.202471
6WAP	2016	1	CP		60.96	222.25	14.46	421	372	1.60868	0.2204684
6WAP	2016	1	CP		91.44	222.25	14.46	471	427	1.85614	0.1979716
6WAP	2016	1	CP		121.92	222.25	14.46	436	401	1.73916	0.1574774
6WAP	2016	1	MB		30.48	222.25	14.46	442	402	1.74366	0.1799742
6WAP	2016	1	MB		60.96	222.25	14.46	459	410	1.77966	0.2204684
6WAP	2016	1	MB		91.44	222.25	14.46	386	352	1.51869	0.1529781
6WAP	2016	1	MB		121.92	222.25	14.46	450	415	1.80215	0.1574774
6WAP	2016	1	TTSSCP		30.48	222.25	14.46	422	372	1.60868	0.2249677
6WAP	2016	1	TTSSCP		60.96	222.25	14.46	435	380	1.64468	0.2474645
6WAP	2016	1	TTSSCP		91.44	222.25	14.46	444	398	1.72566	0.2069703
6WAP	2016	1	TTSSCP		121.92	222.25	14.46	451	413	1.79315	0.1709755
6WAP	2016	2	PMMB		30.48	222.25	14.46	420	389	1.68517	0.13948
6WAP	2016	2	PMMB		60.96	222.25	14.46	379	350	1.50969	0.1304813
6WAP	2016	2	PMMB		91.44	222.25	14.46	434	403	1.74816	0.13948
6WAP	2016	2	PMMB		121.92	222.25	14.46	448	415	1.80215	0.1484787

6WAP	2016	2	TTSSCP		30.48	222.25	14.46	403	380	1.64468	0.1034852
6WAP	2016	2	TTSSCP		60.96	222.25	14.46	429	394	1.70767	0.1574774
6WAP	2016	2	TTSSCP		91.44	222.25	14.46	420	385	1.66717	0.1574774
6WAP	2016	2	TTSSCP		121.92	222.25	14.46	457	421	1.82915	0.1619768
6WAP	2016	2	FALLOW		30.48	222.25	14.46	436	399	1.73016	0.1664761
6WAP	2016	2	FALLOW		60.96	222.25	14.46	413	372	1.60868	0.1844735
6WAP	2016	2	FALLOW		91.44	222.25	14.46	438	395	1.71217	0.1934723
6WAP	2016	2	FALLOW		121.92	222.25	14.46	453	416	1.80665	0.1664761
6WAP	2016	2	PM		30.48	222.25	14.46	449	403	1.74816	0.2069703
6WAP	2016	2	PM		60.96	222.25	14.46	407	375	1.62218	0.1439794
6WAP	2016	2	PM		91.44	222.25	14.46	408	376	1.62668	0.1439794
6WAP	2016	2	PM		121.92	222.25	14.46	405	374	1.61768	0.13948
6WAP	2016	2	SS		30.48	222.25	14.46	409	372	1.60868	0.1664761
6WAP	2016	2	SS		60.96	222.25	14.46	398	362	1.56369	0.1619768
6WAP	2016	2	SS		91.44	222.25	14.46	419	384	1.66267	0.1574774
6WAP	2016	2	SS		121.92	222.25	14.46	432	399	1.73016	0.1484787
6WAP	2016	2	CP		30.48	222.25	14.46	475	436	1.89664	0.1754748

6WAP	2016	2	CP		60.96	222.25	14.46	424	390	1.68967	0.1529781
6WAP	2016	2	CP		91.44	222.25	14.46	442	409	1.77516	0.1484787
6WAP	2016	2	CP		121.92	222.25	14.46	367	337	1.4512	0.1349806
6WAP	2016	2	TTSS		30.48	222.25	14.46	436	395	1.71217	0.1844735
6WAP	2016	2	TTSS		60.96	222.25	14.46	402	373	1.61318	0.1304813
6WAP	2016	2	TTSS		91.44	222.25	14.46	417	388	1.68067	0.1304813
6WAP	2016	2	TTSS		121.92	222.25	14.46	414	382	1.65367	0.1439794
6WAP	2016	2	FS		30.48	222.25	14.46	410	378	1.63568	0.1439794
6WAP	2016	2	FS		60.96	222.25	14.46	427	384	1.66267	0.1934723
6WAP	2016	2	FS		91.44	222.25	14.46	426	385	1.66717	0.1844735
6WAP	2016	2	FS		121.92	222.25	14.46	528	485	2.11711	0.1934723
6WAP	2016	2	MB		30.48	222.25	14.46	425	393	1.70317	0.1439794
6WAP	2016	2	MB		60.96	222.25	14.46	411	374	1.61768	0.1664761
6WAP	2016	2	MB		91.44	222.25	14.46	428	390	1.68967	0.1709755
6WAP	2016	2	MB		121.92	222.25	14.46	447	411	1.78416	0.1619768
6WAP	2016	3	SS		30.48	222.25	14.46	416	396	1.71666	0.0899871
6WAP	2016	3	SS		60.96	222.25	14.46	390	358	1.54569	0.1439794

6WAP	2016	3	SS		91.44	222.25	14.46	434	396	1.71666	0.1709755
6WAP	2016	3	SS		121.92	222.25	14.46	416	385	1.66717	0.13948
6WAP	2016	3	MB		30.48	222.25	14.46	405	386	1.67167	0.0854877
6WAP	2016	3	MB		60.96	222.25	14.46	388	357	1.54119	0.13948
6WAP	2016	3	MB		91.44	222.25	14.46	424	385	1.66717	0.1754748
6WAP	2016	3	MB		121.92	222.25	14.46	422	388	1.68067	0.1529781
6WAP	2016	3	CP		30.48	222.25	14.46	408	384	1.66267	0.1079845
6WAP	2016	3	CP		60.96	222.25	14.46	415	374	1.61768	0.1844735
6WAP	2016	3	CP		91.44	222.25	14.46	434	391	1.69417	0.1934723
6WAP	2016	3	CP		121.92	222.25	14.46	449	409	1.77516	0.1799742
6WAP	2016	3	PMMB		30.48	222.25	14.46	404	379	1.64018	0.1124839
6WAP	2016	3	PMMB		60.96	222.25	14.46	391	356	1.53669	0.1574774
6WAP	2016	3	PMMB		91.44	222.25	14.46	428	386	1.67167	0.1889729
6WAP	2016	3	PMMB		121.92	222.25	14.46	476	424	1.84265	0.2339665
6WAP	2016	3	FALLOW		30.48	222.25	14.46	404	380	1.64468	0.1079845
6WAP	2016	3	FALLOW		60.96	222.25	14.46	414	377	1.63118	0.1664761
6WAP	2016	3	FALLOW		91.44	222.25	14.46	438	400	1.73466	0.1709755

6WAP	2016	3	FALLOW		121.92	222.25	14.46	468	427	1.85614	0.1844735
6WAP	2016	3	TTSSCP		30.48	222.25	14.46	376	345	1.4872	0.13948
6WAP	2016	3	TTSSCP		60.96	222.25	14.46	384	348	1.5007	0.1619768
6WAP	2016	3	TTSSCP		91.44	222.25	14.46	434	395	1.71217	0.1754748
6WAP	2016	3	TTSSCP		121.92	222.25	14.46	500	457	1.99113	0.1934723
6WAP	2016	3	FS		30.48	222.25	14.46	415	381	1.64917	0.1529781
6WAP	2016	3	FS		60.96	222.25	14.46	426	377	1.63118	0.2204684
6WAP	2016	3	FS		91.44	222.25	14.46	440	395	1.71217	0.202471
6WAP	2016	3	FS		121.92	222.25	14.46	433	394	1.70767	0.1754748
6WAP	2016	3	PM		30.48	222.25	14.46	411	374	1.61768	0.1664761
6WAP	2016	3	PM		60.96	222.25	14.46	409	368	1.59068	0.1844735
6WAP	2016	3	PM		91.44	222.25	14.46	459	412	1.78865	0.2114697
6WAP	2016	3	PM		121.92	222.25	14.46	493	451	1.96413	0.1889729
6WAP	2016	3	TTSS		30.48	222.25	14.46	416	382	1.65367	0.1529781
6WAP	2016	3	TTSS		60.96	222.25	14.46	397	359	1.55019	0.1709755
6WAP	2016	3	TTSS		91.44	222.25	14.46	423	381	1.64917	0.1889729
6WAP	2016	3	TTSS		121.92	222.25	14.46	464	423	1.83815	0.1844735

6WAP	2016	4	FS		30.48	222.25	14.46	393	366	1.58168	0.1214826
6WAP	2016	4	FS		60.96	222.25	14.46	382	348	1.5007	0.1529781
6WAP	2016	4	FS		91.44	222.25	14.46	393	360	1.55469	0.1484787
6WAP	2016	4	FS		121.92	222.25	14.46	511	468	2.04062	0.1934723
6WAP	2016	4	SS		30.48	222.25	14.46	409	381	1.64917	0.1259819
6WAP	2016	4	SS		60.96	222.25	14.46	409	374	1.61768	0.1574774
6WAP	2016	4	SS		91.44	222.25	14.46	424	388	1.68067	0.1619768
6WAP	2016	4	SS		121.92	222.25	14.46	445	410	1.77966	0.1574774
6WAP	2016	4	PMMB		30.48	222.25	14.46	434	400	1.73466	0.1529781
6WAP	2016	4	PMMB		60.96	222.25	14.46	372	345	1.4872	0.1214826
6WAP	2016	4	PMMB		91.44	222.25	14.46	427	389	1.68517	0.1709755
6WAP	2016	4	PMMB		121.92	222.25	14.46	562	515	2.25209	0.2114697
6WAP	2016	4	TTSS		30.48	222.25	14.46	406	378	1.63568	0.1259819
6WAP	2016	4	TTSS		60.96	222.25	14.46	377	347	1.4962	0.1349806
6WAP	2016	4	TTSS		91.44	222.25	14.46	447	406	1.76166	0.1844735
6WAP	2016	4	TTSS		121.92	222.25	14.46	477	435	1.89214	0.1889729
6WAP	2016	4	FALLOW		30.48	222.25	14.46	418	390	1.68967	0.1259819

6WAP	2016	4	FALLOW		60.96	222.25	14.46	413	372	1.60868	0.1844735
6WAP	2016	4	FALLOW		91.44	222.25	14.46	416	375	1.62218	0.1844735
6WAP	2016	4	FALLOW		121.92	222.25	14.46	465	424	1.84265	0.1844735
6WAP	2016	4	PM		30.48	222.25	14.46	407	384	1.66267	0.1034852
6WAP	2016	4	PM		60.96	222.25	14.46	415	375	1.62218	0.1799742
6WAP	2016	4	PM		91.44	222.25	14.46	401	358	1.54569	0.1934723
6WAP	2016	4	PM		121.92	222.25	14.46	489	444	1.93263	0.202471
6WAP	2016	4	MB		30.48	222.25	14.46	431	405	1.75716	0.1169832
6WAP	2016	4	MB		60.96	222.25	14.46	368	336	1.4467	0.1439794
6WAP	2016	4	MB		91.44	222.25	14.46	460	415	1.80215	0.202471
6WAP	2016	4	MB		121.92	222.25	14.46	455	412	1.78865	0.1934723
6WAP	2016	4	TTSSCP		30.48	222.25	14.46	397	374	1.61768	0.1034852
6WAP	2016	4	TTSSCP		60.96	222.25	14.46	402	364	1.57269	0.1709755
6WAP	2016	4	TTSSCP		91.44	222.25	14.46	419	381	1.64917	0.1709755
6WAP	2016	4	TTSSCP		121.92	222.25	14.46	525	480	2.09461	0.202471
6WAP	2016	4	CP		30.48	222.25	14.46	421	387	1.67617	0.1529781
6WAP	2016	4	CP		60.96	222.25	14.46	421	378	1.63568	0.1934723

6WAP	2016	4	CP		91.44	222.25	14.46	448	403	1.74816	0.202471
6WAP	2016	4	CP		121.92	222.25	14.46	478	434	1.88764	0.1979716
14WAP	2016	1	PM	Check	30.48	383.02	14.46	718	642	1.63838	0.1984215
14WAP	2016	1	PM	Check	60.96	383.02	14.46	716	634	1.61749	0.2140864
14WAP	2016	1	PM	Check	91.44	383.02	14.46	751	675	1.72453	0.1984215
14WAP	2016	1	PM	Check	121.92	383.02	14.46	916	844	2.16576	0.1879783
14WAP	2016	1	PM	Severe	30.48	383.02	14.46	565	510	1.29375	0.1435945
14WAP	2016	1	PM	Severe	60.96	383.02	14.46	667	586	1.49217	0.2114756
14WAP	2016	1	PM	Severe	91.44	383.02	14.46	670	602	1.53394	0.177535
14WAP	2016	1	PM	Severe	121.92	383.02	14.46	750	689	1.76108	0.1592594
14WAP	2016	1	PM	Proper	30.48	383.02	14.46	687	612	1.56005	0.1958107
14WAP	2016	1	PM	Proper	60.96	383.02	14.46	723	631	1.60966	0.2401945
14WAP	2016	1	PM	Proper	91.44	383.02	14.46	754	672	1.7167	0.2140864
14WAP	2016	1	PM	Proper	121.92	383.02	14.46	913	837	2.14748	0.1984215
14WAP	2016	1	PMMB	Severe	30.48	383.02	14.46	699	629	1.60444	0.1827567
14WAP	2016	1	PMMB	Severe	60.96	383.02	14.46	689	625	1.59399	0.1670918
14WAP	2016	1	PMMB	Severe	91.44	383.02	14.46	706	648	1.65404	0.1514269

14WAP	2016	1	PMMB	Severe	121.92	383.02	14.46	857	790	2.02478	0.1749242
14WAP	2016	1	PMMB	Check	30.48	383.02	14.46	726	652	1.66448	0.1931999
14WAP	2016	1	PMMB	Check	60.96	383.02	14.46	694	614	1.56527	0.2088648
14WAP	2016	1	PMMB	Check	91.44	383.02	14.46	732	656	1.67493	0.1984215
14WAP	2016	1	PMMB	Check	121.92	383.02	14.46	819	754	1.93079	0.1697026
14WAP	2016	1	PMMB	Proper	30.48	383.02	14.46	715	649	1.65665	0.1723134
14WAP	2016	1	PMMB	Proper	60.96	383.02	14.46	709	646	1.64882	0.164481
14WAP	2016	1	PMMB	Proper	91.44	383.02	14.46	744	679	1.73498	0.1697026
14WAP	2016	1	PMMB	Proper	121.92	383.02	14.46	879	815	2.09005	0.1670918
14WAP	2016	1	FS	Proper	30.48	383.02	14.46	712	638	1.62793	0.1931999
14WAP	2016	1	FS	Proper	60.96	383.02	14.46	720	637	1.62532	0.2166972
14WAP	2016	1	FS	Proper	91.44	383.02	14.46	731	662	1.69059	0.1801459
14WAP	2016	1	FS	Proper	121.92	383.02	14.46	900	830	2.12921	0.1827567
14WAP	2016	1	FS	Check	30.48	383.02	14.46	726	658	1.68015	0.177535
14WAP	2016	1	FS	Check	60.96	383.02	14.46	669	613	1.56266	0.1462053
14WAP	2016	1	FS	Check	91.44	383.02	14.46	719	662	1.69059	0.1488161
14WAP	2016	1	FS	Check	121.92	383.02	14.46	882	814	2.08744	0.177535

14WAP	2016	1	FS	Severe	30.48	383.02	14.46	708	637	1.62532	0.1853675
14WAP	2016	1	FS	Severe	60.96	383.02	14.46	682	615	1.56788	0.1749242
14WAP	2016	1	FS	Severe	91.44	383.02	14.46	707	644	1.6436	0.164481
14WAP	2016	1	FS	Severe	121.92	383.02	14.46	897	825	2.11615	0.1879783
14WAP	2016	1	TTSS	Check	30.48	383.02	14.46	713	631	1.60966	0.2140864
14WAP	2016	1	TTSS	Check	60.96	383.02	14.46	732	636	1.62271	0.2506377
14WAP	2016	1	TTSS	Check	91.44	383.02	14.46	756	679	1.73498	0.2010323
14WAP	2016	1	TTSS	Check	121.92	383.02	14.46	863	802	2.05611	0.1592594
14WAP	2016	1	TTSS	Severe	30.48	383.02	14.46	710	641	1.63577	0.1801459
14WAP	2016	1	TTSS	Severe	60.96	383.02	14.46	716	644	1.6436	0.1879783
14WAP	2016	1	TTSS	Severe	91.44	383.02	14.46	703	647	1.65143	0.1462053
14WAP	2016	1	TTSS	Severe	121.92	383.02	14.46	931	868	2.22842	0.164481
14WAP	2016	1	TTSS	Proper	30.48	383.02	14.46	721	638	1.62793	0.2166972
14WAP	2016	1	TTSS	Proper	60.96	383.02	14.46	725	633	1.61488	0.2401945
14WAP	2016	1	TTSS	Proper	91.44	383.02	14.46	763	680	1.73759	0.2166972
14WAP	2016	1	TTSS	Proper	121.92	383.02	14.46	885	812	2.08221	0.1905891
14WAP	2016	1	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0

14WAP	2016	1	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
14WAP	2016	1	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
14WAP	2016	1	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
14WAP	2016	1	FALLOW	Fallow	30.48	383.02	14.46	645	566	1.43995	0.2062539
14WAP	2016	1	FALLOW	Fallow	60.96	383.02	14.46	704	612	1.56005	0.2401945
14WAP	2016	1	FALLOW	Fallow	91.44	383.02	14.46	724	647	1.65143	0.2010323
14WAP	2016	1	FALLOW	Fallow	121.92	383.02	14.46	637	583	1.48434	0.1409837
14WAP	2016	1	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
14WAP	2016	1	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
14WAP	2016	1	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
14WAP	2016	1	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
14WAP	2016	1	SS	Check	30.48	383.02	14.46	685	611	1.55744	0.1931999
14WAP	2016	1	SS	Check	60.96	383.02	14.46	655	590	1.50261	0.1697026
14WAP	2016	1	SS	Check	91.44	383.02	14.46	658	608	1.54961	0.1305405
14WAP	2016	1	SS	Check	121.92	383.02	14.46	814	753	1.92818	0.1592594
14WAP	2016	1	SS	Severe	30.48	383.02	14.46	720	648	1.65404	0.1879783
14WAP	2016	1	SS	Severe	60.96	383.02	14.46	702	640	1.63315	0.1618702

14WAP	2016	1	SS	Severe	91.44	383.02	14.46	717	657	1.67754	0.1566486
14WAP	2016	1	SS	Severe	121.92	383.02	14.46	835	775	1.98561	0.1566486
14WAP	2016	1	SS	Proper	30.48	383.02	14.46	634	656	1.67493	-0.057438
14WAP	2016	1	SS	Proper	60.96	383.02	14.46	707	615	1.56788	0.2401945
14WAP	2016	1	SS	Proper	91.44	383.02	14.46	733	651	1.66187	0.2140864
14WAP	2016	1	SS	Proper	121.92	383.02	14.46	689	324	0.80814	0.9529455
14WAP	2016	1	CP	Proper	30.48	383.02	14.46	678	605	1.54178	0.1905891
14WAP	2016	1	CP	Proper	60.96	383.02	14.46	695	610	1.55483	0.2219188
14WAP	2016	1	CP	Proper	91.44	383.02	14.46	731	650	1.65926	0.2114756
14WAP	2016	1	CP	Proper	121.92	383.02	14.46	1020	931	2.3929	0.232362
14WAP	2016	1	CP	Severe	30.48	383.02	14.46	658	588	1.49739	0.1827567
14WAP	2016	1	CP	Severe	60.96	383.02	14.46	649	573	1.45823	0.1984215
14WAP	2016	1	CP	Severe	91.44	383.02	14.46	650	593	1.51045	0.1488161
14WAP	2016	1	CP	Severe	121.92	383.02	14.46	826	762	1.95167	0.1670918
14WAP	2016	1	CP	Check	30.48	383.02	14.46	656	590	1.50261	0.1723134
14WAP	2016	1	CP	Check	60.96	383.02	14.46	769	677	1.72975	0.2401945
14WAP	2016	1	CP	Check	91.44	383.02	14.46	734	673	1.71931	0.1592594

14WAP	2016	1	CP	Check	121.92	383.02	14.46	1007	937	2.40857	0.1827567
14WAP	2016	1	MB	Proper	30.48	383.02	14.46	637	565	1.43734	0.1879783
14WAP	2016	1	MB	Proper	60.96	383.02	14.46	719	625	1.59399	0.2454161
14WAP	2016	1	MB	Proper	91.44	383.02	14.46	696	617	1.57311	0.2062539
14WAP	2016	1	MB	Proper	121.92	383.02	14.46	774	703	1.79764	0.1853675
14WAP	2016	1	MB	Check	30.48	383.02	14.46	722	639	1.63054	0.2166972
14WAP	2016	1	MB	Check	60.96	383.02	14.46	767	669	1.70887	0.2558593
14WAP	2016	1	MB	Check	91.44	383.02	14.46	720	645	1.64621	0.1958107
14WAP	2016	1	MB	Check	121.92	383.02	14.46	944	867	2.22581	0.2010323
14WAP	2016	1	MB	Severe	30.48	383.02	14.46	660	592	1.50784	0.177535
14WAP	2016	1	MB	Severe	60.96	383.02	14.46	668	603	1.53655	0.1697026
14WAP	2016	1	MB	Severe	91.44	383.02	14.46	667	613	1.56266	0.1409837
14WAP	2016	1	MB	Severe	121.92	383.02	14.46	779	719	1.83941	0.1566486
14WAP	2016	1	TTSSCP	Severe	30.48	383.02	14.46	686	624	1.59138	0.1618702
14WAP	2016	1	TTSSCP	Severe	60.96	383.02	14.46	711	653	1.6671	0.1514269
14WAP	2016	1	TTSSCP	Severe	91.44	383.02	14.46	735	676	1.72714	0.1540378
14WAP	2016	1	TTSSCP	Severe	121.92	383.02	14.46	911	848	2.1762	0.164481

14WAP	2016	1	TTSSCP	Check	30.48	383.02	14.46	653	573	1.45823	0.2088648
14WAP	2016	1	TTSSCP	Check	60.96	383.02	14.46	715	629	1.60444	0.2245296
14WAP	2016	1	TTSSCP	Check	91.44	383.02	14.46	709	637	1.62532	0.1879783
14WAP	2016	1	TTSSCP	Check	121.92	383.02	14.46	744	682	1.74281	0.1618702
14WAP	2016	1	TTSSCP	Proper	30.48	383.02	14.46	723	641	1.63577	0.2140864
14WAP	2016	1	TTSSCP	Proper	60.96	383.02	14.46	729	651	1.66187	0.2036431
14WAP	2016	1	TTSSCP	Proper	91.44	383.02	14.46	706	645	1.64621	0.1592594
14WAP	2016	1	TTSSCP	Proper	121.92	383.02	14.46	924	852	2.18665	0.1879783
14WAP	2016	2	PMMB	Check	30.48	383.02	14.46	640	589	1.5	0.1331513
14WAP	2016	2	PMMB	Check	60.96	383.02	14.46	659	608	1.54961	0.1331513
14WAP	2016	2	PMMB	Check	91.44	383.02	14.46	660	612	1.56005	0.1253189
14WAP	2016	2	PMMB	Check	121.92	383.02	14.46	759	708	1.81069	0.1331513
14WAP	2016	2	PMMB	Proper	30.48	383.02	14.46	729	666	1.70104	0.164481
14WAP	2016	2	PMMB	Proper	60.96	383.02	14.46	681	628	1.60182	0.1383729
14WAP	2016	2	PMMB	Proper	91.44	383.02	14.46	725	672	1.7167	0.1383729
14WAP	2016	2	PMMB	Proper	121.92	383.02	14.46	857	802	2.05611	0.1435945
14WAP	2016	2	PMMB	Severe	30.48	383.02	14.46	659	595	1.51567	0.1670918

14WAP	2016	2	PMMB	Severe	60.96	383.02	14.46	646	593	1.51045	0.1383729
14WAP	2016	2	PMMB	Severe	91.44	383.02	14.46	631	582	1.48173	0.1279297
14WAP	2016	2	PMMB	Severe	121.92	383.02	14.46	752	697	1.78197	0.1435945
14WAP	2016	2	TTSSCP	Proper	30.48	383.02	14.46	747	669	1.70887	0.2036431
14WAP	2016	2	TTSSCP	Proper	60.96	383.02	14.46	757	683	1.74542	0.1931999
14WAP	2016	2	TTSSCP	Proper	91.44	383.02	14.46	683	627	1.59921	0.1462053
14WAP	2016	2	TTSSCP	Proper	121.92	383.02	14.46	916	846	2.17098	0.1827567
14WAP	2016	2	TTSSCP	Severe	30.48	383.02	14.46	671	605	1.54178	0.1723134
14WAP	2016	2	TTSSCP	Severe	60.96	383.02	14.46	647	577	1.46867	0.1827567
14WAP	2016	2	TTSSCP	Severe	91.44	383.02	14.46	685	622	1.58616	0.164481
14WAP	2016	2	TTSSCP	Severe	121.92	383.02	14.46	780	724	1.85246	0.1462053
14WAP	2016	2	TTSSCP	Check	30.48	383.02	14.46	717	643	1.64099	0.1931999
14WAP	2016	2	TTSSCP	Check	60.96	383.02	14.46	705	637	1.62532	0.177535
14WAP	2016	2	TTSSCP	Check	91.44	383.02	14.46	717	657	1.67754	0.1566486
14WAP	2016	2	TTSSCP	Check	121.92	383.02	14.46	827	764	1.9569	0.164481
14WAP	2016	2	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
14WAP	2016	2	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0

14WAP	2016	2	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
14WAP	2016	2	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
14WAP	2016	2	FALLOW	Fallow	30.48	383.02	14.46	605	543	1.37991	0.1618702
14WAP	2016	2	FALLOW	Fallow	60.96	383.02	14.46	683	619	1.57833	0.1670918
14WAP	2016	2	FALLOW	Fallow	91.44	383.02	14.46	666	614	1.56527	0.1357621
14WAP	2016	2	FALLOW	Fallow	121.92	383.02	14.46	788	727	1.8603	0.1592594
14WAP	2016	2	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
14WAP	2016	2	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
14WAP	2016	2	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
14WAP	2016	2	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
14WAP	2016	2	PM	Check	30.48	383.02	14.46	669	596	1.51828	0.1905891
14WAP	2016	2	PM	Check	60.96	383.02	14.46	692	615	1.56788	0.2010323
14WAP	2016	2	PM	Check	91.44	383.02	14.46	713	646	1.64882	0.1749242
14WAP	2016	2	PM	Check	121.92	383.02	14.46	666	612	1.56005	0.1409837
14WAP	2016	2	PM	Proper	30.48	383.02	14.46	702	633	1.61488	0.1801459
14WAP	2016	2	PM	Proper	60.96	383.02	14.46	698	631	1.60966	0.1749242
14WAP	2016	2	PM	Proper	91.44	383.02	14.46	722	660	1.68537	0.1618702

14WAP	2016	2	PM	Proper	121.92	383.02	14.46	854	784	2.00911	0.1827567
14WAP	2016	2	PM	Severe	30.48	383.02	14.46	669	605	1.54178	0.1670918
14WAP	2016	2	PM	Severe	60.96	383.02	14.46	643	583	1.48434	0.1566486
14WAP	2016	2	PM	Severe	91.44	383.02	14.46	665	608	1.54961	0.1488161
14WAP	2016	2	PM	Severe	121.92	383.02	14.46	835	772	1.97778	0.164481
14WAP	2016	2	SS	Check	30.48	383.02	14.46	639	589	1.5	0.1305405
14WAP	2016	2	SS	Check	60.96	383.02	14.46	616	568	1.44518	0.1253189
14WAP	2016	2	SS	Check	91.44	383.02	14.46	641	593	1.51045	0.1253189
14WAP	2016	2	SS	Check	121.92	383.02	14.46	851	795	2.03783	0.1462053
14WAP	2016	2	SS	Proper	30.48	383.02	14.46	726	659	1.68276	0.1749242
14WAP	2016	2	SS	Proper	60.96	383.02	14.46	696	634	1.61749	0.1618702
14WAP	2016	2	SS	Proper	91.44	383.02	14.46	701	646	1.64882	0.1435945
14WAP	2016	2	SS	Proper	121.92	383.02	14.46	851	791	2.02739	0.1566486
14WAP	2016	2	SS	Severe	30.48	383.02	14.46	683	620	1.58094	0.164481
14WAP	2016	2	SS	Severe	60.96	383.02	14.46	672	615	1.56788	0.1488161
14WAP	2016	2	SS	Severe	91.44	383.02	14.46	708	652	1.66448	0.1462053
14WAP	2016	2	SS	Severe	121.92	383.02	14.46	731	680	1.73759	0.1331513

14WAP	2016	2	CP	Severe	30.48	383.02	14.46	609	559	1.42168	0.1305405
14WAP	2016	2	CP	Severe	60.96	383.02	14.46	660	600	1.52872	0.1566486
14WAP	2016	2	CP	Severe	91.44	383.02	14.46	686	628	1.60182	0.1514269
14WAP	2016	2	CP	Severe	121.92	383.02	14.46	781	721	1.84463	0.1566486
14WAP	2016	2	CP	Proper	30.48	383.02	14.46	776	669	1.70887	0.2793566
14WAP	2016	2	CP	Proper	60.96	383.02	14.46	702	648	1.65404	0.1409837
14WAP	2016	2	CP	Proper	91.44	383.02	14.46	717	667	1.70365	0.1305405
14WAP	2016	2	CP	Proper	121.92	383.02	14.46	890	831	2.13182	0.1540378
14WAP	2016	2	CP	Check	30.48	383.02	14.46	719	647	1.65143	0.1879783
14WAP	2016	2	CP	Check	60.96	383.02	14.46	651	598	1.5235	0.1383729
14WAP	2016	2	CP	Check	91.44	383.02	14.46	652	605	1.54178	0.122708
14WAP	2016	2	CP	Check	121.92	383.02	14.46	869	807	2.06916	0.1618702
14WAP	2016	2	TTSS	Severe	30.48	383.02	14.46	701	631	1.60966	0.1827567
14WAP	2016	2	TTSS	Severe	60.96	383.02	14.46	692	630	1.60705	0.1618702
14WAP	2016	2	TTSS	Severe	91.44	383.02	14.46	719	660	1.68537	0.1540378
14WAP	2016	2	TTSS	Severe	121.92	383.02	14.46	859	796	2.04044	0.164481
14WAP	2016	2	TTSS	Check	30.48	383.02	14.46	659	585	1.48956	0.1931999

14WAP	2016	2	TTSS	Check	60.96	383.02	14.46	620	544	1.38252	0.1984215
14WAP	2016	2	TTSS	Check	91.44	383.02	14.46	678	622	1.58616	0.1462053
14WAP	2016	2	TTSS	Check	121.92	383.02	14.46	805	743	1.90207	0.1618702
14WAP	2016	2	TTSS	Proper	30.48	383.02	14.46	690	617	1.57311	0.1905891
14WAP	2016	2	TTSS	Proper	60.96	383.02	14.46	704	646	1.64882	0.1514269
14WAP	2016	2	TTSS	Proper	91.44	383.02	14.46	753	697	1.78197	0.1462053
14WAP	2016	2	TTSS	Proper	121.92	383.02	14.46	773	717	1.83419	0.1462053
14WAP	2016	2	FS	Check	30.48	383.02	14.46	646	592	1.50784	0.1409837
14WAP	2016	2	FS	Check	60.96	383.02	14.46	677	603	1.53655	0.1931999
14WAP	2016	2	FS	Check	91.44	383.02	14.46	684	616	1.5705	0.177535
14WAP	2016	2	FS	Check	121.92	383.02	14.46	481	444	1.12144	0.0965999
14WAP	2016	2	FS	Severe	30.48	383.02	14.46	746	675	1.72453	0.1853675
14WAP	2016	2	FS	Severe	60.96	383.02	14.46	755	665	1.69842	0.2349729
14WAP	2016	2	FS	Severe	91.44	383.02	14.46	781	703	1.79764	0.2036431
14WAP	2016	2	FS	Severe	121.92	383.02	14.46	851	781	2.00128	0.1827567
14WAP	2016	2	FS	Proper	30.48	383.02	14.46	684	615	1.56788	0.1801459
14WAP	2016	2	FS	Proper	60.96	383.02	14.46	699	614	1.56527	0.2219188

14WAP	2016	2	FS	Proper	91.44	383.02	14.46	736	661	1.68798	0.1958107
14WAP	2016	2	FS	Proper	121.92	383.02	14.46	802	135	0.3147	1.7414099
14WAP	2016	2	MB	Proper	30.48	383.02	14.46	689	633	1.61488	0.1462053
14WAP	2016	2	MB	Proper	60.96	383.02	14.46	602	548	1.39296	0.1409837
14WAP	2016	2	MB	Proper	91.44	383.02	14.46	734	666	1.70104	0.177535
14WAP	2016	2	MB	Proper	121.92	383.02	14.46	954	875	2.24669	0.2062539
14WAP	2016	2	MB	Check	30.48	383.02	14.46	685	622	1.58616	0.164481
14WAP	2016	2	MB	Check	60.96	383.02	14.46	658	588	1.49739	0.1827567
14WAP	2016	2	MB	Check	91.44	383.02	14.46	648	595	1.51567	0.1383729
14WAP	2016	2	MB	Check	121.92	383.02	14.46	752	692	1.76892	0.1566486
14WAP	2016	2	MB	Severe	30.48	383.02	14.46	711	653	1.6671	0.1514269
14WAP	2016	2	MB	Severe	60.96	383.02	14.46	699	643	1.64099	0.1462053
14WAP	2016	2	MB	Severe	91.44	383.02	14.46	703	651	1.66187	0.1357621
14WAP	2016	2	MB	Severe	121.92	383.02	14.46	880	817	2.09527	0.164481
14WAP	2016	3	SS	Severe	30.48	383.02	14.46	638	572	1.45562	0.1723134
14WAP	2016	3	SS	Severe	60.96	383.02	14.46	668	601	1.53133	0.1749242
14WAP	2016	3	SS	Severe	91.44	383.02	14.46	635	583	1.48434	0.1357621

14WAP	2016	3	SS	Severe	121.92	383.02	14.46	765	706	1.80547	0.1540378
14WAP	2016	3	SS	Proper	30.48	383.02	14.46	719	667	1.70365	0.1357621
14WAP	2016	3	SS	Proper	60.96	383.02	14.46	689	635	1.6201	0.1409837
14WAP	2016	3	SS	Proper	91.44	383.02	14.46	758	702	1.79502	0.1462053
14WAP	2016	3	SS	Proper	121.92	383.02	14.46	701	656	1.67493	0.1174864
14WAP	2016	3	SS	Check	30.48	383.02	14.46	698	637	1.62532	0.1592594
14WAP	2016	3	SS	Check	60.96	383.02	14.46	604	556	1.41385	0.1253189
14WAP	2016	3	SS	Check	91.44	383.02	14.46	605	560	1.42429	0.1174864
14WAP	2016	3	SS	Check	121.92	383.02	14.46	715	667	1.70365	0.1253189
14WAP	2016	3	MB	Check	30.48	383.02	14.46	610	562	1.42951	0.1253189
14WAP	2016	3	MB	Check	60.96	383.02	14.46	628	584	1.48695	0.1148756
14WAP	2016	3	MB	Check	91.44	383.02	14.46	678	629	1.60444	0.1279297
14WAP	2016	3	MB	Check	121.92	383.02	14.46	637	594	1.51306	0.1122648
14WAP	2016	3	MB	Severe	30.48	383.02	14.46	694	651	1.66187	0.1122648
14WAP	2016	3	MB	Severe	60.96	383.02	14.46	661	612	1.56005	0.1279297
14WAP	2016	3	MB	Severe	91.44	383.02	14.46	746	692	1.76892	0.1409837
14WAP	2016	3	MB	Severe	121.92	383.02	14.46	846	788	2.01955	0.1514269

14WAP	2016	3	MB	Proper	30.48	383.02	14.46	676	612	1.56005	0.1670918
14WAP	2016	3	MB	Proper	60.96	383.02	14.46	711	659	1.68276	0.1357621
14WAP	2016	3	MB	Proper	91.44	383.02	14.46	746	688	1.75847	0.1514269
14WAP	2016	3	MB	Proper	121.92	383.02	14.46	784	725	1.85507	0.1540378
14WAP	2016	3	CP	Check	30.48	383.02	14.46	690	633	1.61488	0.1488161
14WAP	2016	3	CP	Check	60.96	383.02	14.46	709	654	1.66971	0.1435945
14WAP	2016	3	CP	Check	91.44	383.02	14.46	695	646	1.64882	0.1279297
14WAP	2016	3	CP	Check	121.92	383.02	14.46	918	860	2.20753	0.1514269
14WAP	2016	3	CP	Proper	30.48	383.02	14.46	651	589	1.5	0.1618702
14WAP	2016	3	CP	Proper	60.96	383.02	14.46	630	579	1.4739	0.1331513
14WAP	2016	3	CP	Proper	91.44	383.02	14.46	665	612	1.56005	0.1383729
14WAP	2016	3	CP	Proper	121.92	383.02	14.46	423	392	0.98567	0.0809351
14WAP	2016	3	CP	Severe	30.48	383.02	14.46	695	634	1.61749	0.1592594
14WAP	2016	3	CP	Severe	60.96	383.02	14.46	625	581	1.47912	0.1148756
14WAP	2016	3	CP	Severe	91.44	383.02	14.46	745	685	1.75064	0.1566486
14WAP	2016	3	CP	Severe	121.92	383.02	14.46	978	907	2.33024	0.1853675
14WAP	2016	3	PMMB	Proper	30.48	383.02	14.46	614	558	1.41907	0.1462053

14WAP	2016	3	PMMB	Proper	60.96	383.02	14.46	645	593	1.51045	0.1357621
14WAP	2016	3	PMMB	Proper	91.44	383.02	14.46	648	599	1.52611	0.1279297
14WAP	2016	3	PMMB	Proper	121.92	383.02	14.46	769	717	1.83419	0.1357621
14WAP	2016	3	PMMB	Check	30.48	383.02	14.46	754	666	1.70104	0.2297512
14WAP	2016	3	PMMB	Check	60.96	383.02	14.46	737	645	1.64621	0.2401945
14WAP	2016	3	PMMB	Check	91.44	383.02	14.46	720	660	1.68537	0.1566486
14WAP	2016	3	PMMB	Check	121.92	383.02	14.46	851	796	2.04044	0.1435945
14WAP	2016	3	PMMB	Severe	30.48	383.02	14.46	675	605	1.54178	0.1827567
14WAP	2016	3	PMMB	Severe	60.96	383.02	14.46	633	584	1.48695	0.1279297
14WAP	2016	3	PMMB	Severe	91.44	383.02	14.46	672	622	1.58616	0.1305405
14WAP	2016	3	PMMB	Severe	121.92	383.02	14.46	777	723	1.84985	0.1409837
14WAP	2016	3	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
14WAP	2016	3	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
14WAP	2016	3	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
14WAP	2016	3	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
14WAP	2016	3	FALLOW	Fallow	30.48	383.02	14.46	693	619	1.57833	0.1931999
14WAP	2016	3	FALLOW	Fallow	60.96	383.02	14.46	708	634	1.61749	0.1931999

14WAP	2016	3	FALLOW	Fallow	91.44	383.02	14.46	665	618	1.57572	0.122708
14WAP	2016	3	FALLOW	Fallow	121.92	383.02	14.46	957	890	2.28586	0.1749242
14WAP	2016	3	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
14WAP	2016	3	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
14WAP	2016	3	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
14WAP	2016	3	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
14WAP	2016	3	TTSSCP	Check	30.48	383.02	14.46	672	618	1.57572	0.1409837
14WAP	2016	3	TTSSCP	Check	60.96	383.02	14.46	628	578	1.47128	0.1305405
14WAP	2016	3	TTSSCP	Check	91.44	383.02	14.46	667	614	1.56527	0.1383729
14WAP	2016	3	TTSSCP	Check	121.92	383.02	14.46	832	776	1.98822	0.1462053
14WAP	2016	3	TTSSCP	Proper	30.48	383.02	14.46	749	677	1.72975	0.1879783
14WAP	2016	3	TTSSCP	Proper	60.96	383.02	14.46	698	643	1.64099	0.1435945
14WAP	2016	3	TTSSCP	Proper	91.44	383.02	14.46	716	662	1.69059	0.1409837
14WAP	2016	3	TTSSCP	Proper	121.92	383.02	14.46	942	873	2.24147	0.1801459
14WAP	2016	3	TTSSCP	Severe	30.48	383.02	14.46	633	564	1.43473	0.1801459
14WAP	2016	3	TTSSCP	Severe	60.96	383.02	14.46	661	595	1.51567	0.1723134
14WAP	2016	3	TTSSCP	Severe	91.44	383.02	14.46	684	623	1.58877	0.1592594

14WAP	2016	3	TTSSCP	Severe	121.92	383.02	14.46	810	744	1.90468	0.1723134
14WAP	2016	3	FS	Proper	30.48	383.02	14.46	654	605	1.54178	0.1279297
14WAP	2016	3	FS	Proper	60.96	383.02	14.46	644	592	1.50784	0.1357621
14WAP	2016	3	FS	Proper	91.44	383.02	14.46	700	641	1.63577	0.1540378
14WAP	2016	3	FS	Proper	121.92	383.02	14.46	340	314	0.78203	0.067881
14WAP	2016	3	FS	Check	30.48	383.02	14.46	651	602	1.53394	0.1279297
14WAP	2016	3	FS	Check	60.96	383.02	14.46	719	662	1.69059	0.1488161
14WAP	2016	3	FS	Check	91.44	383.02	14.46	739	686	1.75325	0.1383729
14WAP	2016	3	FS	Check	121.92	383.02	14.46	823	770	1.97256	0.1383729
14WAP	2016	3	FS	Severe	30.48	383.02	14.46	754	696	1.77936	0.1514269
14WAP	2016	3	FS	Severe	60.96	383.02	14.46	665	615	1.56788	0.1305405
14WAP	2016	3	FS	Severe	91.44	383.02	14.46	705	654	1.66971	0.1331513
14WAP	2016	3	FS	Severe	121.92	383.02	14.46	885	823	2.11093	0.1618702
14WAP	2016	3	PM	Proper	30.48	383.02	14.46	704	625	1.59399	0.2062539
14WAP	2016	3	PM	Proper	60.96	383.02	14.46	738	638	1.62793	0.2610809
14WAP	2016	3	PM	Proper	91.44	383.02	14.46	747	659	1.68276	0.2297512
14WAP	2016	3	PM	Proper	121.92	383.02	14.46	863	781	2.00128	0.2140864

14WAP	2016	3	PM	Severe	30.48	383.02	14.46	684	606	1.54439	0.2036431
14WAP	2016	3	PM	Severe	60.96	383.02	14.46	725	630	1.60705	0.2480269
14WAP	2016	3	PM	Severe	91.44	383.02	14.46	699	624	1.59138	0.1958107
14WAP	2016	3	PM	Severe	121.92	383.02	14.46	640	583	1.48434	0.1488161
14WAP	2016	3	PM	Check	30.48	383.02	14.46	734	659	1.68276	0.1958107
14WAP	2016	3	PM	Check	60.96	383.02	14.46	736	650	1.65926	0.2245296
14WAP	2016	3	PM	Check	91.44	383.02	14.46	733	660	1.68537	0.1905891
14WAP	2016	3	PM	Check	121.92	383.02	14.46	898	825	2.11615	0.1905891
14WAP	2016	3	TTSS	Severe	30.48	383.02	14.46	664	593	1.51045	0.1853675
14WAP	2016	3	TTSS	Severe	60.96	383.02	14.46	717	628	1.60182	0.232362
14WAP	2016	3	TTSS	Severe	91.44	383.02	14.46	709	639	1.63054	0.1827567
14WAP	2016	3	TTSS	Severe	121.92	383.02	14.46	723	663	1.6932	0.1566486
14WAP	2016	3	TTSS	Proper	30.48	383.02	14.46	683	610	1.55483	0.1905891
14WAP	2016	3	TTSS	Proper	60.96	383.02	14.46	680	594	1.51306	0.2245296
14WAP	2016	3	TTSS	Proper	91.44	383.02	14.46	663	588	1.49739	0.1958107
14WAP	2016	3	TTSS	Proper	121.92	383.02	14.46	753	691	1.76631	0.1618702
14WAP	2016	3	TTSS	Check	30.48	383.02	14.46	659	590	1.50261	0.1801459

14WAP	2016	3	TTSS	Check	60.96	383.02	14.46	689	602	1.53394	0.2271404
14WAP	2016	3	TTSS	Check	91.44	383.02	14.46	735	658	1.68015	0.2010323
14WAP	2016	3	TTSS	Check	121.92	383.02	14.46	554	505	1.2807	0.1279297
14WAP	2016	4	FS	Proper	30.48	383.02	14.46	738	682	1.74281	0.1462053
14WAP	2016	4	FS	Proper	60.96	383.02	14.46	703	655	1.67232	0.1253189
14WAP	2016	4	FS	Proper	91.44	383.02	14.46	657	611	1.55744	0.1200972
14WAP	2016	4	FS	Proper	121.92	383.02	14.46	893	832	2.13443	0.1592594
14WAP	2016	4	FS	Check	30.48	383.02	14.46	662	618	1.57572	0.1148756
14WAP	2016	4	FS	Check	60.96	383.02	14.46	668	617	1.57311	0.1331513
14WAP	2016	4	FS	Check	91.44	383.02	14.46	748	678	1.73237	0.1827567
14WAP	2016	4	FS	Check	121.92	383.02	14.46	874	802	2.05611	0.1879783
14WAP	2016	4	FS	Severe	30.48	383.02	14.46	698	645	1.64621	0.1383729
14WAP	2016	4	FS	Severe	60.96	383.02	14.46	662	618	1.57572	0.1148756
14WAP	2016	4	FS	Severe	91.44	383.02	14.46	775	723	1.84985	0.1357621
14WAP	2016	4	FS	Severe	121.92	383.02	14.46	666	624	1.59138	0.109654
14WAP	2016	4	SS	Severe	30.48	383.02	14.46	709	634	1.61749	0.1958107
14WAP	2016	4	SS	Severe	60.96	383.02	14.46	708	635	1.6201	0.1905891

14WAP	2016	4	SS	Severe	91.44	383.02	14.46	712	653	1.6671	0.1540378
14WAP	2016	4	SS	Severe	121.92	383.02	14.46	836	771	1.97517	0.1697026
14WAP	2016	4	SS	Proper	30.48	383.02	14.46	658	612	1.56005	0.1200972
14WAP	2016	4	SS	Proper	60.96	383.02	14.46	672	626	1.5966	0.1200972
14WAP	2016	4	SS	Proper	91.44	383.02	14.46	729	676	1.72714	0.1383729
14WAP	2016	4	SS	Proper	121.92	383.02	14.46	824	774	1.983	0.1305405
14WAP	2016	4	SS	Check	30.48	383.02	14.46	695	638	1.62793	0.1488161
14WAP	2016	4	SS	Check	60.96	383.02	14.46	646	599	1.52611	0.122708
14WAP	2016	4	SS	Check	91.44	383.02	14.46	744	689	1.76108	0.1435945
14WAP	2016	4	SS	Check	121.92	383.02	14.46	847	793	2.03261	0.1409837
14WAP	2016	4	PMMB	Check	30.48	383.02	14.46	746	675	1.72453	0.1853675
14WAP	2016	4	PMMB	Check	60.96	383.02	14.46	687	632	1.61227	0.1435945
14WAP	2016	4	PMMB	Check	91.44	383.02	14.46	713	658	1.68015	0.1435945
14WAP	2016	4	PMMB	Check	121.92	383.02	14.46	840	778	1.99345	0.1618702
14WAP	2016	4	PMMB	Proper	30.48	383.02	14.46	745	684	1.74803	0.1592594
14WAP	2016	4	PMMB	Proper	60.96	383.02	14.46	672	623	1.58877	0.1279297
14WAP	2016	4	PMMB	Proper	91.44	383.02	14.46	703	649	1.65665	0.1409837

14WAP	2016	4	PMMB	Proper	121.92	383.02	14.46	815	751	1.92295	0.1670918
14WAP	2016	4	PMMB	Severe	30.48	383.02	14.46	682	608	1.54961	0.1931999
14WAP	2016	4	PMMB	Severe	60.96	383.02	14.46	700	621	1.58355	0.2062539
14WAP	2016	4	PMMB	Severe	91.44	383.02	14.46	732	667	1.70365	0.1697026
14WAP	2016	4	PMMB	Severe	121.92	383.02	14.46	770	707	1.80808	0.164481
14WAP	2016	4	TTSS	Proper	30.48	383.02	14.46	684	638	1.62793	0.1200972
14WAP	2016	4	TTSS	Proper	60.96	383.02	14.46	718	667	1.70365	0.1331513
14WAP	2016	4	TTSS	Proper	91.44	383.02	14.46	675	625	1.59399	0.1305405
14WAP	2016	4	TTSS	Proper	121.92	383.02	14.46	762	713	1.82374	0.1279297
14WAP	2016	4	TTSS	Check	30.48	383.02	14.46	644	581	1.47912	0.164481
14WAP	2016	4	TTSS	Check	60.96	383.02	14.46	715	660	1.68537	0.1435945
14WAP	2016	4	TTSS	Check	91.44	383.02	14.46	638	592	1.50784	0.1200972
14WAP	2016	4	TTSS	Check	121.92	383.02	14.46	945	883	2.26758	0.1618702
14WAP	2016	4	TTSS	Severe	30.48	383.02	14.46	745	689	1.76108	0.1462053
14WAP	2016	4	TTSS	Severe	60.96	383.02	14.46	727	676	1.72714	0.1331513
14WAP	2016	4	TTSS	Severe	91.44	383.02	14.46	705	658	1.68015	0.122708
14WAP	2016	4	TTSS	Severe	121.92	383.02	14.46	821	774	1.983	0.122708

14WAP	2016	4	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
14WAP	2016	4	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
14WAP	2016	4	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
14WAP	2016	4	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
14WAP	2016	4	FALLOW	Fallow	30.48	383.02	14.46	706	639	1.63054	0.1749242
14WAP	2016	4	FALLOW	Fallow	60.96	383.02	14.46	657	612	1.56005	0.1174864
14WAP	2016	4	FALLOW	Fallow	91.44	383.02	14.46	687	640	1.63315	0.122708
14WAP	2016	4	FALLOW	Fallow	121.92	383.02	14.46	896	832	2.13443	0.1670918
14WAP	2016	4	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
14WAP	2016	4	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
14WAP	2016	4	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
14WAP	2016	4	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
14WAP	2016	4	PM	Check	30.48	383.02	14.46	705	651	1.66187	0.1409837
14WAP	2016	4	PM	Check	60.96	383.02	14.46	633	591	1.50522	0.109654
14WAP	2016	4	PM	Check	91.44	383.02	14.46	747	688	1.75847	0.1540378
14WAP	2016	4	PM	Check	121.92	383.02	14.46	760	704	1.80025	0.1462053
14WAP	2016	4	PM	Severe	30.48	383.02	14.46	682	632	1.61227	0.1305405

14WAP	2016	4	PM	Severe	60.96	383.02	14.46	653	605	1.54178	0.1253189
14WAP	2016	4	PM	Severe	91.44	383.02	14.46	740	681	1.7402	0.1540378
14WAP	2016	4	PM	Severe	121.92	383.02	14.46	934	867	2.22581	0.1749242
14WAP	2016	4	PM	Proper	30.48	383.02	14.46	742	668	1.70626	0.1931999
14WAP	2016	4	PM	Proper	60.96	383.02	14.46	690	631	1.60966	0.1540378
14WAP	2016	4	PM	Proper	91.44	383.02	14.46	705	649	1.65665	0.1462053
14WAP	2016	4	PM	Proper	121.92	383.02	14.46	836	769	1.96995	0.1749242
14WAP	2016	4	MB	Proper	30.48	383.02	14.46	705	652	1.66448	0.1383729
14WAP	2016	4	MB	Proper	60.96	383.02	14.46	689	641	1.63577	0.1253189
14WAP	2016	4	MB	Proper	91.44	383.02	14.46	736	688	1.75847	0.1253189
14WAP	2016	4	MB	Proper	121.92	383.02	14.46	876	816	2.09266	0.1566486
14WAP	2016	4	MB	Check	30.48	383.02	14.46	654	589	1.5	0.1697026
14WAP	2016	4	MB	Check	60.96	383.02	14.46	706	645	1.64621	0.1592594
14WAP	2016	4	MB	Check	91.44	383.02	14.46	654	600	1.52872	0.1409837
14WAP	2016	4	MB	Check	121.92	383.02	14.46	853	789	2.02217	0.1670918
14WAP	2016	4	MB	Severe	30.48	383.02	14.46	712	656	1.67493	0.1462053
14WAP	2016	4	MB	Severe	60.96	383.02	14.46	698	650	1.65926	0.1253189

14WAP	2016	4	MB	Severe	91.44	383.02	14.46	704	653	1.6671	0.1331513
14WAP	2016	4	MB	Severe	121.92	383.02	14.46	888	830	2.12921	0.1514269
14WAP	2016	4	TTSSCP	Severe	30.48	383.02	14.46	669	597	1.52089	0.1879783
14WAP	2016	4	TTSSCP	Severe	60.96	383.02	14.46	683	615	1.56788	0.177535
14WAP	2016	4	TTSSCP	Severe	91.44	383.02	14.46	672	620	1.58094	0.1357621
14WAP	2016	4	TTSSCP	Severe	121.92	383.02	14.46	921	850	2.18142	0.1853675
14WAP	2016	4	TTSSCP	Proper	30.48	383.02	14.46	712	663	1.6932	0.1279297
14WAP	2016	4	TTSSCP	Proper	60.96	383.02	14.46	655	605	1.54178	0.1305405
14WAP	2016	4	TTSSCP	Proper	91.44	383.02	14.46	715	666	1.70104	0.1279297
14WAP	2016	4	TTSSCP	Proper	121.92	383.02	14.46	738	695	1.77675	0.1122648
14WAP	2016	4	TTSSCP	Check	30.48	383.02	14.46	711	954	2.45295	-0.634427
14WAP	2016	4	TTSSCP	Check	60.96	383.02	14.46	718	665	1.69842	0.1383729
14WAP	2016	4	TTSSCP	Check	91.44	383.02	14.46	744	694	1.77414	0.1305405
14WAP	2016	4	TTSSCP	Check	121.92	383.02	14.46	841	787	2.01694	0.1409837
14WAP	2016	4	CP	Proper	30.48	383.02	14.46	740	673	1.71931	0.1749242
14WAP	2016	4	CP	Proper	60.96	383.02	14.46	672	618	1.57572	0.1409837
14WAP	2016	4	CP	Proper	91.44	383.02	14.46	707	649	1.65665	0.1514269

14WAP	2016	4	CP	Proper	121.92	383.02	14.46	848	780	1.99867	0.177535
14WAP	2016	4	CP	Severe	30.48	383.02	14.46	721	652	1.66448	0.1801459
14WAP	2016	4	CP	Severe	60.96	383.02	14.46	666	614	1.56527	0.1357621
14WAP	2016	4	CP	Severe	91.44	383.02	14.46	720	664	1.69581	0.1462053
14WAP	2016	4	CP	Severe	121.92	383.02	14.46	805	746	1.9099	0.1540378
14WAP	2016	4	CP	Check	30.48	383.02	14.46	692	627	1.59921	0.1697026
14WAP	2016	4	CP	Check	60.96	383.02	14.46	685	631	1.60966	0.1409837
14WAP	2016	4	CP	Check	91.44	383.02	14.46	734	677	1.72975	0.1488161
14WAP	2016	4	CP	Check	121.92	383.02	14.46	831	769	1.96995	0.1618702
Planting	2017	1	PM	Check	30.48	383.02	14.46	563.17	512.37	1.29994	0.1326291
Planting	2017	1	PM	Check	60.96	383.02	14.46	639.99	575.8	1.46554	0.1675879
Planting	2017	1	PM	Check	91.44	383.02	14.46	652.07	588.42	1.49849	0.166178
Planting	2017	1	PM	Check	121.92	383.02	14.46	608.65	553.58	1.40753	0.1437773
Planting	2017	1	PM	Severe	30.48	383.02	14.46	557.47	516.38	1.31041	0.1072782
Planting	2017	1	PM	Severe	60.96	383.02	14.46	620.51	545.24	1.38575	0.1965156
Planting	2017	1	PM	Severe	91.44	383.02	14.46	649.39	581.61	1.48071	0.1769607
Planting	2017	1	PM	Severe	121.92	383.02	14.46	576.24	521.79	1.32453	0.1421586

Planting	2017	1	PM	Proper	30.48	383.02	14.46	557.06	510.06	1.29391	0.122708
Planting	2017	1	PM	Proper	60.96	383.02	14.46	615.3	538.03	1.36693	0.2017372
Planting	2017	1	PM	Proper	91.44	383.02	14.46	679.41	602.97	1.53648	0.1995703
Planting	2017	1	PM	Proper	121.92	383.02	14.46	648.03	588.8	1.49948	0.1546382
Planting	2017	1	PMMB	Severe	30.48	383.02	14.46	567.5	523.34	1.32858	0.1152933
Planting	2017	1	PMMB	Severe	60.96	383.02	14.46	622.09	543.76	1.38189	0.2045047
Planting	2017	1	PMMB	Severe	91.44	383.02	14.46	678.37	604.74	1.5411	0.1922339
Planting	2017	1	PMMB	Severe	121.92	383.02	14.46	632.31	575.96	1.46596	0.1471191
Planting	2017	1	PMMB	Check	30.48	383.02	14.46	550.35	506.6	1.28487	0.1142229
Planting	2017	1	PMMB	Check	60.96	383.02	14.46	637.52	559.88	1.42398	0.2027032
Planting	2017	1	PMMB	Check	91.44	383.02	14.46	679.9	608.11	1.5499	0.18743
Planting	2017	1	PMMB	Check	121.92	383.02	14.46	645.94	586.78	1.49421	0.1544555
Planting	2017	1	PMMB	Proper	30.48	383.02	14.46	621.02	569.78	1.44982	0.1337779
Planting	2017	1	PMMB	Proper	60.96	383.02	14.46	607.75	530.3	1.34675	0.2022072
Planting	2017	1	PMMB	Proper	91.44	383.02	14.46	670.96	594.19	1.51355	0.2004318
Planting	2017	1	PMMB	Proper	121.92	383.02	14.46	643.66	582.21	1.48228	0.1604342
Planting	2017	1	FS	Proper	30.48	383.02	14.46	532.03	491.45	1.24532	0.1059466

Planting	2017	1	FS	Proper	60.96	383.02	14.46	613.31	539.14	1.36983	0.1936437
Planting	2017	1	FS	Proper	91.44	383.02	14.46	687.63	613.78	1.5647	0.1928083
Planting	2017	1	FS	Proper	121.92	383.02	14.46	595.85	543.33	1.38077	0.1371197
Planting	2017	1	FS	Check	30.48	383.02	14.46	569.75	529.77	1.34537	0.1043802
Planting	2017	1	FS	Check	60.96	383.02	14.46	638.31	561.9	1.42925	0.199492
Planting	2017	1	FS	Check	91.44	383.02	14.46	705.23	631.01	1.60968	0.1937743
Planting	2017	1	FS	Check	121.92	383.02	14.46	636.89	577.11	1.46896	0.1560742
Planting	2017	1	FS	Severe	30.48	383.02	14.46	575.1	537	1.36424	0.0994718
Planting	2017	1	FS	Severe	60.96	383.02	14.46	621.58	548.62	1.39458	0.1904847
Planting	2017	1	FS	Severe	91.44	383.02	14.46	639.13	573.82	1.46037	0.170512
Planting	2017	1	FS	Severe	121.92	383.02	14.46	596.17	546.84	1.38993	0.1287912
Planting	2017	1	TTSS	Check	30.48	383.02	14.46	516.25	478.76	1.21219	0.0978792
Planting	2017	1	TTSS	Check	60.96	383.02	14.46	624.3	549.32	1.39641	0.1957585
Planting	2017	1	TTSS	Check	91.44	383.02	14.46	661.56	593.24	1.51107	0.1783705
Planting	2017	1	TTSS	Check	121.92	383.02	14.46	665.15	607.47	1.54823	0.1505915
Planting	2017	1	TTSS	Severe	30.48	383.02	14.46	565.66	520.81	1.32197	0.1170948
Planting	2017	1	TTSS	Severe	60.96	383.02	14.46	575.85	503.31	1.27628	0.1893881

Planting	2017	1	TTSS	Severe	91.44	383.02	14.46	687.32	614.15	1.56567	0.1910329
Planting	2017	1	TTSS	Severe	121.92	383.02	14.46	653.81	596.08	1.51849	0.150722
Planting	2017	1	TTSS	Proper	30.48	383.02	14.46	565.19	521	1.32247	0.1153717
Planting	2017	1	TTSS	Proper	60.96	383.02	14.46	572.6	501.72	1.27213	0.1850542
Planting	2017	1	TTSS	Proper	91.44	383.02	14.46	699.33	620.03	1.58102	0.2070372
Planting	2017	1	TTSS	Proper	121.92	383.02	14.46	625.94	568.66	1.4469	0.1495472
Planting	2017	1	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
Planting	2017	1	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
Planting	2017	1	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
Planting	2017	1	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
Planting	2017	1	FALLOW	Fallow	30.48	383.02	14.46	572.07	525.76	1.3349	0.1209066
Planting	2017	1	FALLOW	Fallow	60.96	383.02	14.46	620.48	542.23	1.3779	0.2042958
Planting	2017	1	FALLOW	Fallow	91.44	383.02	14.46	661	587.48	1.49603	0.1919467
Planting	2017	1	FALLOW	Fallow	121.92	383.02	14.46	669.06	608.34	1.5505	0.1585284
Planting	2017	1	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
Planting	2017	1	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
Planting	2017	1	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0

Planting	2017	1	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
Planting	2017	1	SS	Check	30.48	383.02	14.46	560.29	518.83	1.3168	0.1082442
Planting	2017	1	SS	Check	60.96	383.02	14.46	590.02	516.95	1.31189	0.1907718
Planting	2017	1	SS	Check	91.44	383.02	14.46	669.84	618.96	1.57822	0.132838
Planting	2017	1	SS	Check	121.92	383.02	14.46	622	564.65	1.43643	0.1497299
Planting	2017	1	SS	Severe	30.48	383.02	14.46	565.96	519.38	1.31824	0.1216115
Planting	2017	1	SS	Severe	60.96	383.02	14.46	605.77	527.96	1.34064	0.2031471
Planting	2017	1	SS	Severe	91.44	383.02	14.46	670.94	595.9	1.51802	0.1959151
Planting	2017	1	SS	Severe	121.92	383.02	14.46	622.24	564.63	1.43638	0.1504087
Planting	2017	1	SS	Proper	30.48	383.02	14.46	569.87	526.39	1.33654	0.113518
Planting	2017	1	SS	Proper	60.96	383.02	14.46	539.37	486.09	1.23132	0.1391039
Planting	2017	1	SS	Proper	91.44	383.02	14.46	661.48	603.77	1.53857	0.1506698
Planting	2017	1	SS	Proper	121.92	383.02	14.46	599.76	554.97	1.41116	0.1169382
Planting	2017	1	CP	Proper	30.48	383.02	14.46	574.19	529.86	1.3456	0.1157372
Planting	2017	1	CP	Proper	60.96	383.02	14.46	614.57	541.46	1.37589	0.1908763
Planting	2017	1	CP	Proper	91.44	383.02	14.46	628.5	556.47	1.41507	0.1880566
Planting	2017	1	CP	Proper	121.92	383.02	14.46	656.32	587.05	1.49491	0.1808508

Planting	2017	1	CP	Severe	30.48	383.02	14.46	566.7	527.61	1.33973	0.1020565
Planting	2017	1	CP	Severe	60.96	383.02	14.46	581.18	512	1.29897	0.1806158
Planting	2017	1	CP	Severe	91.44	383.02	14.46	676.7	600.32	1.52956	0.1994136
Planting	2017	1	CP	Severe	121.92	383.02	14.46	664.66	600.03	1.5288	0.1687366
Planting	2017	1	CP	Check	30.48	383.02	14.46	533.37	501.48	1.27151	0.0832587
Planting	2017	1	CP	Check	60.96	383.02	14.46	637.64	561.69	1.4287	0.198291
Planting	2017	1	CP	Check	91.44	383.02	14.46	597.23	530.1	1.34623	0.1752636
Planting	2017	1	CP	Check	121.92	383.02	14.46	596.08	539.33	1.37032	0.1481634
Planting	2017	1	MB	Proper	30.48	383.02	14.46	564.98	531.52	1.34993	0.0873577
Planting	2017	1	MB	Proper	60.96	383.02	14.46	603.6	533.13	1.35414	0.1839837
Planting	2017	1	MB	Proper	91.44	383.02	14.46	656.76	584.69	1.48875	0.188161
Planting	2017	1	MB	Proper	121.92	383.02	14.46	622.07	567.63	1.44421	0.1421325
Planting	2017	1	MB	Check	30.48	383.02	14.46	572.21	533.84	1.35599	0.1001768
Planting	2017	1	MB	Check	60.96	383.02	14.46	614.94	544	1.38252	0.1852108
Planting	2017	1	MB	Check	91.44	383.02	14.46	673.24	605.85	1.544	0.1759424
Planting	2017	1	MB	Check	121.92	383.02	14.46	616.23	562.9	1.43186	0.1392345
Planting	2017	1	MB	Severe	30.48	383.02	14.46	568.21	528.12	1.34106	0.1046674

Planting	2017	1	MB	Severe	60.96	383.02	14.46	595.39	522.66	1.3268	0.1898842
Planting	2017	1	MB	Severe	91.44	383.02	14.46	685.09	607.3	1.54778	0.2030949
Planting	2017	1	MB	Severe	121.92	383.02	14.46	633.33	574.74	1.46277	0.1529673
Planting	2017	1	TTSSCP	Severe	30.48	383.02	14.46	584.75	546.9	1.39009	0.0988191
Planting	2017	1	TTSSCP	Severe	60.96	383.02	14.46	603.16	532.98	1.35375	0.1832266
Planting	2017	1	TTSSCP	Severe	91.44	383.02	14.46	673.49	603.77	1.53857	0.1820256
Planting	2017	1	TTSSCP	Severe	121.92	383.02	14.46	685.33	623.62	1.59039	0.1611131
Planting	2017	1	TTSSCP	Check	30.48	383.02	14.46	558.8	522.97	1.32761	0.0935453
Planting	2017	1	TTSSCP	Check	60.96	383.02	14.46	584.58	513.71	1.30344	0.1850281
Planting	2017	1	TTSSCP	Check	91.44	383.02	14.46	685.35	606.72	1.54627	0.2052879
Planting	2017	1	TTSSCP	Check	121.92	383.02	14.46	681.68	614.48	1.56653	0.1754464
Planting	2017	1	TTSSCP	Proper	30.48	383.02	14.46	547.65	510.58	1.29526	0.0967827
Planting	2017	1	TTSSCP	Proper	60.96	383.02	14.46	611.16	537.31	1.36505	0.1928083
Planting	2017	1	TTSSCP	Proper	91.44	383.02	14.46	671.74	596.25	1.51893	0.19709
Planting	2017	1	TTSSCP	Proper	121.92	383.02	14.46	654.43	593.09	1.51068	0.1601471
Planting	2017	2	PMMB	Check	30.48	383.02	14.46	581.74	540.85	1.37429	0.106756
Planting	2017	2	PMMB	Check	60.96	383.02	14.46	598.13	528.74	1.34268	0.1811641

Planting	2017	2	PMMB	Check	91.44	383.02	14.46	687.8	614.16	1.56569	0.19226
Planting	2017	2	PMMB	Check	121.92	383.02	14.46	668.46	611.27	1.55815	0.1493122
Planting	2017	2	PMMB	Proper	30.48	383.02	14.46	615.23	566.97	1.44249	0.1259977
Planting	2017	2	PMMB	Proper	60.96	383.02	14.46	598.74	526.85	1.33774	0.1876911
Planting	2017	2	PMMB	Proper	91.44	383.02	14.46	608.2	540.22	1.37265	0.1774828
Planting	2017	2	PMMB	Proper	121.92	383.02	14.46	580.72	527.61	1.33973	0.1386601
Planting	2017	2	PMMB	Severe	30.48	383.02	14.46	584.32	537.54	1.36565	0.1221337
Planting	2017	2	PMMB	Severe	60.96	383.02	14.46	614.99	537.63	1.36589	0.2019722
Planting	2017	2	PMMB	Severe	91.44	383.02	14.46	674.08	599.98	1.52867	0.193461
Planting	2017	2	PMMB	Severe	121.92	383.02	14.46	638.4	582.21	1.48228	0.1467014
Planting	2017	2	TTSSCP	Proper	30.48	383.02	14.46	590.13	543.85	1.38213	0.1208283
Planting	2017	2	TTSSCP	Proper	60.96	383.02	14.46	616.29	539.06	1.36962	0.2016328
Planting	2017	2	TTSSCP	Proper	91.44	383.02	14.46	645.43	578.92	1.47369	0.1736449
Planting	2017	2	TTSSCP	Proper	121.92	383.02	14.46	631.78	576.98	1.46862	0.1430724
Planting	2017	2	TTSSCP	Severe	30.48	383.02	14.46	542.44	502.7	1.27469	0.1037536
Planting	2017	2	TTSSCP	Severe	60.96	383.02	14.46	607.02	531.01	1.3486	0.1984476
Planting	2017	2	TTSSCP	Severe	91.44	383.02	14.46	666.96	597.16	1.52131	0.1822345

Planting	2017	2	TTSSCP	Severe	121.92	383.02	14.46	651.82	594.57	1.51455	0.1494688
Planting	2017	2	TTSSCP	Check	30.48	383.02	14.46	595.36	544.58	1.38403	0.1325769
Planting	2017	2	TTSSCP	Check	60.96	383.02	14.46	612.69	539.72	1.37134	0.1905108
Planting	2017	2	TTSSCP	Check	91.44	383.02	14.46	645.57	577.82	1.47081	0.1768823
Planting	2017	2	TTSSCP	Check	121.92	383.02	14.46	710.46	645.7	1.64804	0.169076
Planting	2017	2	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
Planting	2017	2	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
Planting	2017	2	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
Planting	2017	2	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
Planting	2017	2	FALLOW	Fallow	30.48	383.02	14.46	562.31	516.11	1.3097	0.1206194
Planting	2017	2	FALLOW	Fallow	60.96	383.02	14.46	622.29	547.59	1.39189	0.1950275
Planting	2017	2	FALLOW	Fallow	91.44	383.02	14.46	669.33	599.74	1.52804	0.1816862
Planting	2017	2	FALLOW	Fallow	121.92	383.02	14.46	636.54	583.57	1.48583	0.1382946
Planting	2017	2	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
Planting	2017	2	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
Planting	2017	2	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
Planting	2017	2	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0

Planting	2017	2	PM	Check	30.48	383.02	14.46	581.48	534.28	1.35714	0.1232302
Planting	2017	2	PM	Check	60.96	383.02	14.46	592.81	521.87	1.32474	0.1852108
Planting	2017	2	PM	Check	91.44	383.02	14.46	683.93	613.49	1.56394	0.1839054
Planting	2017	2	PM	Check	121.92	383.02	14.46	668.64	614.28	1.566	0.1419236
Planting	2017	2	PM	Proper	30.48	383.02	14.46	605.44	551.03	1.40087	0.1420541
Planting	2017	2	PM	Proper	60.96	383.02	14.46	596.07	523.6	1.32926	0.1892054
Planting	2017	2	PM	Proper	91.44	383.02	14.46	656.96	588.31	1.4982	0.1792321
Planting	2017	2	PM	Proper	121.92	383.02	14.46	591.34	541.81	1.3768	0.1293134
Planting	2017	2	PM	Severe	30.48	383.02	14.46	583.05	537.44	1.36539	0.119079
Planting	2017	2	PM	Severe	60.96	383.02	14.46	603.58	533.15	1.35419	0.1838793
Planting	2017	2	PM	Severe	91.44	383.02	14.46	655.83	586.46	1.49337	0.1811119
Planting	2017	2	PM	Severe	121.92	383.02	14.46	663.98	605.62	1.5434	0.1523668
Planting	2017	2	SS	Check	30.48	383.02	14.46	581.5	541.58	1.3762	0.1042235
Planting	2017	2	SS	Check	60.96	383.02	14.46	596.17	531.61	1.35017	0.1685539
Planting	2017	2	SS	Check	91.44	383.02	14.46	617.6	561.13	1.42724	0.1474324
Planting	2017	2	SS	Check	121.92	383.02	14.46	617.15	573.6	1.4598	0.1137008
Planting	2017	2	SS	Proper	30.48	383.02	14.46	585.73	542.07	1.37748	0.1139879

Planting	2017	2	SS	Proper	60.96	383.02	14.46	625.9	552.44	1.40455	0.1917901
Planting	2017	2	SS	Proper	91.44	383.02	14.46	647.35	581.93	1.48154	0.1707992
Planting	2017	2	SS	Proper	121.92	383.02	14.46	647.64	564.71	1.43659	0.2165144
Planting	2017	2	SS	Severe	30.48	383.02	14.46	589.69	543.74	1.38184	0.1199667
Planting	2017	2	SS	Severe	60.96	383.02	14.46	656.54	578.83	1.47345	0.202886
Planting	2017	2	SS	Severe	91.44	383.02	14.46	656.51	592.45	1.50901	0.1672485
Planting	2017	2	SS	Severe	121.92	383.02	14.46	643	591.26	1.5059	0.1350833
Planting	2017	2	CP	Severe	30.48	383.02	14.46	579.93	538.99	1.36944	0.1068865
Planting	2017	2	CP	Severe	60.96	383.02	14.46	615.11	546.01	1.38776	0.1804069
Planting	2017	2	CP	Severe	91.44	383.02	14.46	679.51	612.55	1.56149	0.1748198
Planting	2017	2	CP	Severe	121.92	383.02	14.46	678.31	621.62	1.58517	0.1480068
Planting	2017	2	CP	Proper	30.48	383.02	14.46	599.82	556.92	1.41625	0.1120037
Planting	2017	2	CP	Proper	60.96	383.02	14.46	581.94	515.2	1.30733	0.1742454
Planting	2017	2	CP	Proper	91.44	383.02	14.46	578.79	536.39	1.36265	0.1106983
Planting	2017	2	CP	Proper	121.92	383.02	14.46	539.92	510.91	1.29613	0.0757396
Planting	2017	2	CP	Check	30.48	383.02	14.46	588.5	548.23	1.39356	0.1051373
Planting	2017	2	CP	Check	60.96	383.02	14.46	591.85	528.87	1.34302	0.1644288

Planting	2017	2	CP	Check	91.44	383.02	14.46	610.77	565.85	1.43956	0.1172776
Planting	2017	2	CP	Check	121.92	383.02	14.46	614.78	576.79	1.46813	0.0991847
Planting	2017	2	TTSS	Severe	30.48	383.02	14.46	499.51	467.17	1.18193	0.0844336
Planting	2017	2	TTSS	Severe	60.96	383.02	14.46	645.03	566.67	1.4417	0.204583
Planting	2017	2	TTSS	Severe	91.44	383.02	14.46	650.02	579.98	1.47645	0.1828611
Planting	2017	2	TTSS	Severe	121.92	383.02	14.46	635.56	578.33	1.47215	0.1494166
Planting	2017	2	TTSS	Check	30.48	383.02	14.46	588.48	533.92	1.3562	0.1424458
Planting	2017	2	TTSS	Check	60.96	383.02	14.46	638.25	561.59	1.42844	0.2001447
Planting	2017	2	TTSS	Check	91.44	383.02	14.46	653.79	586.16	1.49259	0.176569
Planting	2017	2	TTSS	Check	121.92	383.02	14.46	657.89	602.7	1.53577	0.1440906
Planting	2017	2	TTSS	Proper	30.48	383.02	14.46	576.08	534.93	1.35884	0.1074348
Planting	2017	2	TTSS	Proper	60.96	383.02	14.46	621.14	555.69	1.41304	0.1708775
Planting	2017	2	TTSS	Proper	91.44	383.02	14.46	634.61	570.69	1.4522	0.1668829
Planting	2017	2	TTSS	Proper	121.92	383.02	14.46	620.04	566.85	1.44217	0.138869
Planting	2017	2	FS	Check	30.48	383.02	14.46	569.76	528.16	1.34116	0.1086097
Planting	2017	2	FS	Check	60.96	383.02	14.46	645.97	567.71	1.44442	0.2043219
Planting	2017	2	FS	Check	91.44	383.02	14.46	686.32	613	1.56266	0.1914245

Planting	2017	2	FS	Check	121.92	383.02	14.46	651.92	594.53	1.51444	0.1498344
Planting	2017	2	FS	Severe	30.48	383.02	14.46	537.64	510.02	1.2938	0.0721106
Planting	2017	2	FS	Severe	60.96	383.02	14.46	636.31	560.71	1.42614	0.1973772
Planting	2017	2	FS	Severe	91.44	383.02	14.46	660.12	592.87	1.51011	0.1755769
Planting	2017	2	FS	Severe	121.92	383.02	14.46	647.68	592.34	1.50872	0.1444822
Planting	2017	2	FS	Proper	30.48	383.02	14.46	554.74	522.16	1.3255	0.0850602
Planting	2017	2	FS	Proper	60.96	383.02	14.46	672.16	595.49	1.51695	0.2001708
Planting	2017	2	FS	Proper	91.44	383.02	14.46	649.51	585.76	1.49154	0.1664391
Planting	2017	2	FS	Proper	121.92	383.02	14.46	618.99	564.06	1.43489	0.1434118
Planting	2017	2	MB	Proper	30.48	383.02	14.46	578.58	537.37	1.36521	0.1075915
Planting	2017	2	MB	Proper	60.96	383.02	14.46	595.32	529.79	1.34542	0.1710863
Planting	2017	2	MB	Proper	91.44	383.02	14.46	595.88	547.1	1.39061	0.1273553
Planting	2017	2	MB	Proper	121.92	383.02	14.46	693.29	641.54	1.63718	0.1351094
Planting	2017	2	MB	Check	30.48	383.02	14.46	609.58	561.26	1.42758	0.1261543
Planting	2017	2	MB	Check	60.96	383.02	14.46	606.46	536.94	1.36408	0.1815035
Planting	2017	2	MB	Check	91.44	383.02	14.46	658.82	592.62	1.50945	0.1728356
Planting	2017	2	MB	Check	121.92	383.02	14.46	654.12	600.03	1.5288	0.1412187

Planting	2017	2	MB	Severe	30.48	383.02	14.46	611.42	565.07	1.43753	0.121011
Planting	2017	2	MB	Severe	60.96	383.02	14.46	600.21	528.55	1.34218	0.1870906
Planting	2017	2	MB	Severe	91.44	383.02	14.46	626.72	560.86	1.42654	0.1719479
Planting	2017	2	MB	Severe	121.92	383.02	14.46	657.71	600.15	1.52911	0.1502782
Planting	2017	3	SS	Severe	30.48	383.02	14.46	546.55	508.3	1.28931	0.0998635
Planting	2017	3	SS	Severe	60.96	383.02	14.46	605.11	529.19	1.34385	0.1982127
Planting	2017	3	SS	Severe	91.44	383.02	14.46	668.17	597.63	1.52253	0.1841665
Planting	2017	3	SS	Severe	121.92	383.02	14.46	636.16	587.39	1.4958	0.1273292
Planting	2017	3	SS	Proper	30.48	383.02	14.46	528.58	499.3	1.26581	0.0764445
Planting	2017	3	SS	Proper	60.96	383.02	14.46	641.72	560.63	1.42593	0.2117105
Planting	2017	3	SS	Proper	91.44	383.02	14.46	645.26	573.05	1.45836	0.1885266
Planting	2017	3	SS	Proper	121.92	383.02	14.46	639.85	582.28	1.48246	0.1503043
Planting	2017	3	SS	Check	30.48	383.02	14.46	555.66	516.96	1.31192	0.1010383
Planting	2017	3	SS	Check	60.96	383.02	14.46	632.88	550.09	1.39842	0.2161489
Planting	2017	3	SS	Check	91.44	383.02	14.46	640.37	566.2	1.44048	0.1936437
Planting	2017	3	SS	Check	121.92	383.02	14.46	675.65	613.89	1.56499	0.1612436
Planting	2017	3	MB	Check	30.48	383.02	14.46	587.32	538.36	1.36779	0.1278252

Planting	2017	3	MB	Check	60.96	383.02	14.46	623.34	548.25	1.39361	0.1960457
Planting	2017	3	MB	Check	91.44	383.02	14.46	647.27	575.92	1.46585	0.1862813
Planting	2017	3	MB	Check	121.92	383.02	14.46	616.74	563.47	1.43335	0.1390778
Planting	2017	3	MB	Severe	30.48	383.02	14.46	574.27	531.62	1.3502	0.111351
Planting	2017	3	MB	Severe	60.96	383.02	14.46	631.04	553.32	1.40685	0.2029121
Planting	2017	3	MB	Severe	91.44	383.02	14.46	632.24	566.9	1.4423	0.1705903
Planting	2017	3	MB	Severe	121.92	383.02	14.46	646.67	593.09	1.51068	0.1398872
Planting	2017	3	MB	Proper	30.48	383.02	14.46	553.52	518.04	1.31474	0.0926315
Planting	2017	3	MB	Proper	60.96	383.02	14.46	617.79	542.57	1.37878	0.1963851
Planting	2017	3	MB	Proper	91.44	383.02	14.46	640.74	574.44	1.46199	0.1730967
Planting	2017	3	MB	Proper	121.92	383.02	14.46	648.46	591.32	1.50606	0.1491817
Planting	2017	3	CP	Check	30.48	383.02	14.46	574.08	529.89	1.34568	0.1153717
Planting	2017	3	CP	Check	60.96	383.02	14.46	598.53	522.68	1.32685	0.1980299
Planting	2017	3	CP	Check	91.44	383.02	14.46	721.05	642.7	1.6402	0.2045569
Planting	2017	3	CP	Check	121.92	383.02	14.46	624.76	567.31	1.44337	0.149991
Planting	2017	3	CP	Proper	30.48	383.02	14.46	556.88	510.04	1.29385	0.1222903
Planting	2017	3	CP	Proper	60.96	383.02	14.46	667.22	581.66	1.48084	0.2233809

Planting	2017	3	CP	Proper	91.44	383.02	14.46	663.18	591.53	1.50661	0.1870645
Planting	2017	3	CP	Proper	121.92	383.02	14.46	622.21	567.59	1.44411	0.1426024
Planting	2017	3	CP	Severe	30.48	383.02	14.46	571.94	532.31	1.352	0.1034664
Planting	2017	3	CP	Severe	60.96	383.02	14.46	591.92	517.02	1.31208	0.1955496
Planting	2017	3	CP	Severe	91.44	383.02	14.46	642.93	570.72	1.45228	0.1885266
Planting	2017	3	CP	Severe	121.92	383.02	14.46	630.46	576.53	1.46745	0.140801
Planting	2017	3	PMMB	Proper	30.48	383.02	14.46	544.61	501.13	1.27059	0.113518
Planting	2017	3	PMMB	Proper	60.96	383.02	14.46	629.4	551.48	1.40205	0.2034343
Planting	2017	3	PMMB	Proper	91.44	383.02	14.46	626.98	557.01	1.41648	0.1826783
Planting	2017	3	PMMB	Proper	121.92	383.02	14.46	658.16	596.69	1.52008	0.1604865
Planting	2017	3	PMMB	Check	30.48	383.02	14.46	572.09	327.96	0.81848	0.6373769
Planting	2017	3	PMMB	Check	60.96	383.02	14.46	612.61	536.18	1.3621	0.1995442
Planting	2017	3	PMMB	Check	91.44	383.02	14.46	632.67	565.32	1.43818	0.175838
Planting	2017	3	PMMB	Check	121.92	383.02	14.46	653.12	592.76	1.50982	0.1575885
Planting	2017	3	PMMB	Severe	30.48	383.02	14.46	578.68	539.73	1.37137	0.101691
Planting	2017	3	PMMB	Severe	60.96	383.02	14.46	649.2	576.91	1.46844	0.1887354
Planting	2017	3	PMMB	Severe	91.44	383.02	14.46	611.34	554.82	1.41077	0.147563

Planting	2017	3	PMMB	Severe	121.92	383.02	14.46	634.41	555.32	1.41207	0.2064889
Planting	2017	3	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
Planting	2017	3	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
Planting	2017	3	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
Planting	2017	3	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
Planting	2017	3	FALLOW	Fallow	30.48	383.02	14.46	545.69	506.43	1.28443	0.1025004
Planting	2017	3	FALLOW	Fallow	60.96	383.02	14.46	618.68	539.54	1.37087	0.2066195
Planting	2017	3	FALLOW	Fallow	91.44	383.02	14.46	680.42	607.75	1.54896	0.1897275
Planting	2017	3	FALLOW	Fallow	121.92	383.02	14.46	629.26	571.49	1.45429	0.1508265
Planting	2017	3	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
Planting	2017	3	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
Planting	2017	3	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
Planting	2017	3	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
Planting	2017	3	TTSSCP	Check	30.48	383.02	14.46	584.52	544.05	1.38265	0.1056595
Planting	2017	3	TTSSCP	Check	60.96	383.02	14.46	609.25	535.06	1.35918	0.193696
Planting	2017	3	TTSSCP	Check	91.44	383.02	14.46	688.23	614.72	1.56715	0.1919206
Planting	2017	3	TTSSCP	Check	121.92	383.02	14.46	624.78	567.04	1.44267	0.1507481

Planting	2017	3	TTSSCP	Proper	30.48	383.02	14.46	548.68	503.71	1.27733	0.1174081
Planting	2017	3	TTSSCP	Proper	60.96	383.02	14.46	658.64	579.19	1.47439	0.2074288
Planting	2017	3	TTSSCP	Proper	91.44	383.02	14.46	641.69	575.83	1.46562	0.1719479
Planting	2017	3	TTSSCP	Proper	121.92	383.02	14.46	696.71	633.15	1.61527	0.165943
Planting	2017	3	TTSSCP	Severe	30.48	383.02	14.46	557.89	513.49	1.30286	0.1159199
Planting	2017	3	TTSSCP	Severe	60.96	383.02	14.46	613.18	536.64	1.3633	0.1998314
Planting	2017	3	TTSSCP	Severe	91.44	383.02	14.46	640.38	567.94	1.44502	0.189127
Planting	2017	3	TTSSCP	Severe	121.92	383.02	14.46	613.29	558.57	1.42056	0.1428635
Planting	2017	3	FS	Proper	30.48	383.02	14.46	580.62	539.17	1.36991	0.1082181
Planting	2017	3	FS	Proper	60.96	383.02	14.46	621.32	543.42	1.381	0.2033821
Planting	2017	3	FS	Proper	91.44	383.02	14.46	652.26	580.52	1.47786	0.1872995
Planting	2017	3	FS	Proper	121.92	383.02	14.46	681.62	616.23	1.5711	0.1707208
Planting	2017	3	FS	Check	30.48	383.02	14.46	538.38	502.5	1.27417	0.0936758
Planting	2017	3	FS	Check	60.96	383.02	14.46	627.11	548.08	1.39317	0.2063323
Planting	2017	3	FS	Check	91.44	383.02	14.46	643.11	573.84	1.46042	0.1808508
Planting	2017	3	FS	Check	121.92	383.02	14.46	622	565.37	1.43831	0.1478501
Planting	2017	3	FS	Severe	30.48	383.02	14.46	572.21	533.02	1.35385	0.1023176

Planting	2017	3	FS	Severe	60.96	383.02	14.46	632.17	556.7	1.41567	0.1970378
Planting	2017	3	FS	Severe	91.44	383.02	14.46	662.19	591.56	1.50669	0.1844015
Planting	2017	3	FS	Severe	121.92	383.02	14.46	634.6	576.42	1.46716	0.1518969
Planting	2017	3	PM	Proper	30.48	383.02	14.46	580.21	535.3	1.3598	0.1172515
Planting	2017	3	PM	Proper	60.96	383.02	14.46	631.1	550.86	1.40043	0.2094914
Planting	2017	3	PM	Proper	91.44	383.02	14.46	714.41	635.15	1.62049	0.2069328
Planting	2017	3	PM	Proper	121.92	383.02	14.46	621.36	566.49	1.44123	0.1432551
Planting	2017	3	PM	Severe	30.48	383.02	14.46	597.9	551.78	1.40283	0.1204105
Planting	2017	3	PM	Severe	60.96	383.02	14.46	632.88	552.97	1.40594	0.2086298
Planting	2017	3	PM	Severe	91.44	383.02	14.46	665.16	596.53	1.51966	0.1791799
Planting	2017	3	PM	Severe	121.92	383.02	14.46	656.34	601.73	1.53324	0.1425763
Planting	2017	3	PM	Check	30.48	383.02	14.46	546.6	512.95	1.30145	0.0878537
Planting	2017	3	PM	Check	60.96	383.02	14.46	634.44	559.35	1.42259	0.1960457
Planting	2017	3	PM	Check	91.44	383.02	14.46	686.36	610.65	1.55653	0.1976644
Planting	2017	3	PM	Check	121.92	383.02	14.46	661.12	598.75	1.52546	0.1628362
Planting	2017	3	TTSS	Severe	30.48	383.02	14.46	575.7	532.53	1.35257	0.1127086
Planting	2017	3	TTSS	Severe	60.96	383.02	14.46	607.59	530.09	1.3462	0.2023377

Planting	2017	3	TTSS	Severe	91.44	383.02	14.46	667.85	594.24	1.51368	0.1921817
Planting	2017	3	TTSS	Severe	121.92	383.02	14.46	645.84	587.31	1.49559	0.1528107
Planting	2017	3	TTSS	Proper	30.48	383.02	14.46	591.21	550.03	1.39826	0.1075131
Planting	2017	3	TTSS	Proper	60.96	383.02	14.46	630.99	552.01	1.40343	0.2062017
Planting	2017	3	TTSS	Proper	91.44	383.02	14.46	666.79	592.7	1.50966	0.1934349
Planting	2017	3	TTSS	Proper	121.92	383.02	14.46	622.69	565.5	1.43865	0.1493122
Planting	2017	3	TTSS	Check	30.48	383.02	14.46	548.23	507.46	1.28712	0.1064427
Planting	2017	3	TTSS	Check	60.96	383.02	14.46	635.65	555.57	1.41272	0.2090736
Planting	2017	3	TTSS	Check	91.44	383.02	14.46	695.69	620.27	1.58164	0.1969072
Planting	2017	3	TTSS	Check	121.92	383.02	14.46	634.29	574.43	1.46196	0.1562831
Planting	2017	4	FS	Proper	30.48	383.02	14.46	560.81	535.07	1.3592	0.0672022
Planting	2017	4	FS	Proper	60.96	383.02	14.46	631.37	556.54	1.41526	0.1953669
Planting	2017	4	FS	Proper	91.44	383.02	14.46	649.19	576.98	1.46862	0.1885266
Planting	2017	4	FS	Proper	121.92	383.02	14.46	693.42	628.81	1.60394	0.1686844
Planting	2017	4	FS	Check	30.48	383.02	14.46	568.47	529.93	1.34578	0.1006206
Planting	2017	4	FS	Check	60.96	383.02	14.46	636.51	559.34	1.42257	0.2014762
Planting	2017	4	FS	Check	91.44	383.02	14.46	662.54	593.88	1.51274	0.1792582

Planting	2017	4	FS	Check	121.92	383.02	14.46	613.75	562.23	1.43011	0.1345089
Planting	2017	4	FS	Severe	30.48	383.02	14.46	543.71	512.16	1.29939	0.082371
Planting	2017	4	FS	Severe	60.96	383.02	14.46	612.46	534.48	1.35766	0.2035909
Planting	2017	4	FS	Severe	91.44	383.02	14.46	665.69	590.31	1.50342	0.1968028
Planting	2017	4	FS	Severe	121.92	383.02	14.46	634.6	575.1	1.46371	0.1553432
Planting	2017	4	SS	Severe	30.48	383.02	14.46	568.84	544.1	1.38278	0.0645914
Planting	2017	4	SS	Severe	60.96	383.02	14.46	612.25	545.04	1.38523	0.1754725
Planting	2017	4	SS	Severe	91.44	383.02	14.46	609.93	559.84	1.42387	0.1307754
Planting	2017	4	SS	Severe	121.92	383.02	14.46	597.14	554.02	1.40868	0.1125781
Planting	2017	4	SS	Proper	30.48	383.02	14.46	549.06	515.38	1.3078	0.0879321
Planting	2017	4	SS	Proper	60.96	383.02	14.46	628.54	551.79	1.40286	0.2003796
Planting	2017	4	SS	Proper	91.44	383.02	14.46	641.34	574.68	1.46262	0.1740366
Planting	2017	4	SS	Proper	121.92	383.02	14.46	650.17	591.82	1.50737	0.1523407
Planting	2017	4	SS	Check	30.48	383.02	14.46	553.71	516.1	1.30968	0.0981925
Planting	2017	4	SS	Check	60.96	383.02	14.46	616.88	537.37	1.36521	0.2075855
Planting	2017	4	SS	Check	91.44	383.02	14.46	657.2	587.74	1.49671	0.1813468
Planting	2017	4	SS	Check	121.92	383.02	14.46	669.16	608.14	1.54997	0.1593116

Planting	2017	4	PMMB	Check	30.48	383.02	14.46	543.73	512.84	1.30116	0.0806479
Planting	2017	4	PMMB	Check	60.96	383.02	14.46	618.5	543.23	1.38051	0.1965156
Planting	2017	4	PMMB	Check	91.44	383.02	14.46	661.86	602.42	1.53504	0.1551865
Planting	2017	4	PMMB	Check	121.92	383.02	14.46	645.83	590.6	1.50418	0.144195
Planting	2017	4	PMMB	Proper	30.48	383.02	14.46	551.29	528.22	1.34132	0.0602314
Planting	2017	4	PMMB	Proper	60.96	383.02	14.46	604.21	528.25	1.3414	0.1983171
Planting	2017	4	PMMB	Proper	91.44	383.02	14.46	674.06	600.82	1.53086	0.1912157
Planting	2017	4	PMMB	Proper	121.92	383.02	14.46	617.85	564.17	1.43518	0.1401483
Planting	2017	4	PMMB	Severe	30.48	383.02	14.46	566.77	530.31	1.34677	0.0951901
Planting	2017	4	PMMB	Severe	60.96	383.02	14.46	561.2	507.84	1.28811	0.1393128
Planting	2017	4	PMMB	Severe	91.44	383.02	14.46	586.13	546.38	1.38873	0.1037797
Planting	2017	4	PMMB	Severe	121.92	383.02	14.46	609.55	575.46	1.46465	0.0890025
Planting	2017	4	TTSS	Proper	30.48	383.02	14.46	573	534.2	1.35693	0.1012994
Planting	2017	4	TTSS	Proper	60.96	383.02	14.46	638.92	563.85	1.43434	0.1959935
Planting	2017	4	TTSS	Proper	91.44	383.02	14.46	620.32	557.88	1.41875	0.1630189
Planting	2017	4	TTSS	Proper	121.92	383.02	14.46	630.93	580.16	1.47692	0.1325508
Planting	2017	4	TTSS	Check	30.48	383.02	14.46	591.68	544.9	1.38487	0.1221337

Planting	2017	4	TTSS	Check	60.96	383.02	14.46	617.95	544.25	1.38317	0.1924167
Planting	2017	4	TTSS	Check	91.44	383.02	14.46	625.9	570.46	1.4516	0.1447433
Planting	2017	4	TTSS	Check	121.92	383.02	14.46	632.8	587.66	1.4965	0.1178519
Planting	2017	4	TTSS	Severe	30.48	383.02	14.46	569.03	527.79	1.3402	0.1076698
Planting	2017	4	TTSS	Severe	60.96	383.02	14.46	605.59	533.22	1.35437	0.1889443
Planting	2017	4	TTSS	Severe	91.44	383.02	14.46	648.98	586	1.49217	0.1644288
Planting	2017	4	TTSS	Severe	121.92	383.02	14.46	637.77	620.6	1.5825	0.0448276
Planting	2017	4	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	0
Planting	2017	4	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0
Planting	2017	4	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
Planting	2017	4	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
Planting	2017	4	FALLOW	Fallow	30.48	383.02	14.46	520.31	487.85	1.23592	0.0847469
Planting	2017	4	FALLOW	Fallow	60.96	383.02	14.46	614.18	541.68	1.37646	0.1892837
Planting	2017	4	FALLOW	Fallow	91.44	383.02	14.46	641.21	576.82	1.4682	0.16811
Planting	2017	4	FALLOW	Fallow	121.92	383.02	14.46	676.49	624.78	1.59342	0.135005
Planting	2017	4	FALLOW	Fallow	30.48	383.02	14.46			-0.03776	#VALUE!
Planting	2017	4	FALLOW	Fallow	60.96	383.02	14.46			-0.03776	0

Planting	2017	4	FALLOW	Fallow	91.44	383.02	14.46			-0.03776	0
Planting	2017	4	FALLOW	Fallow	121.92	383.02	14.46			-0.03776	0
Planting	2017	4	PM	Check	30.48	383.02	14.46	519.99	492.71	1.24861	0.0712229
Planting	2017	4	PM	Check	60.96	383.02	14.46	609.44	544.94	1.38497	0.1683972
Planting	2017	4	PM	Check	91.44	383.02	14.46	631.54	571.85	1.45523	0.1558392
Planting	2017	4	PM	Check	121.92	383.02	14.46	647.28	598.32	1.52434	0.1278252
Planting	2017	4	PM	Severe	30.48	383.02	14.46	553.71	525.88	1.33521	0.0726588
Planting	2017	4	PM	Severe	60.96	383.02	14.46	609.43	544.85	1.38474	0.1686061
Planting	2017	4	PM	Severe	91.44	383.02	14.46	661.86	592.51	1.50917	0.1810596
Planting	2017	4	PM	Severe	121.92	383.02	14.46	610.25	557.29	1.41721	0.1382685
Planting	2017	4	PM	Proper	30.48	383.02	14.46	583.24	544.87	1.38479	0.1001768
Planting	2017	4	PM	Proper	60.96	383.02	14.46	579.17	516.64	1.31109	0.1632539
Planting	2017	4	PM	Proper	91.44	383.02	14.46	664.26	600.57	1.53021	0.1662825
Planting	2017	4	PM	Proper	121.92	383.02	14.46	570.65	527.46	1.33933	0.1127609
Planting	2017	4	MB	Proper	30.48	383.02	14.46	581.05	547.64	1.39202	0.0872271
Planting	2017	4	MB	Proper	60.96	383.02	14.46	597.15	533.36	1.35474	0.1665435
Planting	2017	4	MB	Proper	91.44	383.02	14.46	655.86	591.42	1.50632	0.1682406

Planting	2017	4	MB	Proper	121.92	383.02	14.46	661.92	614.49	1.56655	0.1238307
Planting	2017	4	MB	Check	30.48	383.02	14.46	582.38	545.99	1.38771	0.0950074
Planting	2017	4	MB	Check	60.96	383.02	14.46	627.52	555.65	1.41293	0.1876389
Planting	2017	4	MB	Check	91.44	383.02	14.46	587.58	539.19	1.36996	0.1263371
Planting	2017	4	MB	Check	121.92	383.02	14.46	656.18	614.31	1.56608	0.1093146
Planting	2017	4	MB	Severe	30.48	383.02	14.46	606.81	572.06	1.45578	0.0907256
Planting	2017	4	MB	Severe	60.96	383.02	14.46	561.15	507.65	1.28761	0.1396783
Planting	2017	4	MB	Severe	91.44	383.02	14.46	601.06	560.95	1.42677	0.1047196
Planting	2017	4	MB	Severe	121.92	383.02	14.46	584.01	554.85	1.41084	0.0761312
Planting	2017	4	TTSSCP	Severe	30.48	383.02	14.46	564.29	530.48	1.34722	0.0882715
Planting	2017	4	TTSSCP	Severe	60.96	383.02	14.46	604.68	539.36	1.3704	0.1705381
Planting	2017	4	TTSSCP	Severe	91.44	383.02	14.46	616.79	578.25	1.47194	0.1006206
Planting	2017	4	TTSSCP	Severe	121.92	383.02	14.46	604.35	559.92	1.42408	0.1159983
Planting	2017	4	TTSSCP	Proper	30.48	383.02	14.46	560.73	525.73	1.33482	0.0913783
Planting	2017	4	TTSSCP	Proper	60.96	383.02	14.46	592.44	526.51	1.33685	0.1721307
Planting	2017	4	TTSSCP	Proper	91.44	383.02	14.46	622.32	566.36	1.44089	0.1461009
Planting	2017	4	TTSSCP	Proper	121.92	383.02	14.46	627.5	590.95	1.50509	0.0954251

Planting	2017	4	TTSSCP	Check	30.48	383.02	14.46	599.66	567.05	1.4427	0.0851385
Planting	2017	4	TTSSCP	Check	60.96	383.02	14.46	589.49	526.26	1.3362	0.1650815
Planting	2017	4	TTSSCP	Check	91.44	383.02	14.46	611.39	560.9	1.42664	0.1318198
Planting	2017	4	TTSSCP	Check	121.92	383.02	14.46	641.26	600.15	1.52911	0.1073304
Planting	2017	4	CP	Proper	30.48	383.02	14.46	610.15	562.82	1.43165	0.1235696
Planting	2017	4	CP	Proper	60.96	383.02	14.46	544.98	516.98	1.31197	0.0731027
Planting	2017	4	CP	Proper	91.44	383.02	14.46	640.76	585.03	1.48964	0.1455004
Planting	2017	4	CP	Proper	121.92	383.02	14.46	709.78	649.54	1.65806	0.1572752
Planting	2017	4	CP	Severe	30.48	383.02	14.46	571.91	544.45	1.38369	0.0716928
Planting	2017	4	CP	Severe	60.96	383.02	14.46	621.47	548.67	1.39471	0.1900669
Planting	2017	4	CP	Severe	91.44	383.02	14.46	607.65	545.99	1.38771	0.1609825
Planting	2017	4	CP	Severe	121.92	383.02	14.46	714.98	650.15	1.65965	0.1692588
Planting	2017	4	CP	Check	30.48	383.02	14.46	581.38	564.42	1.43583	0.0442793
Planting	2017	4	CP	Check	60.96	383.02	14.46	564.4	520.03	1.31994	0.1158416
Planting	2017	4	CP	Check	91.44	383.02	14.46	637.58	576.1	1.46632	0.1605126
Planting	2017	4	CP	Check	121.92	383.02	14.46	537.01	502.7	1.27469	0.0895769
14WAP	2017	1	PM		30.48	383.02	14.46	618.81	545.97	1.38766	0.1901714

14WAP	2017	1	PM		60.96	383.02	14.46	626.95	544.32	1.38335	0.2157312
14WAP	2017	1	PM		91.44	383.02	14.46	670.03	591.68	1.507	0.2045569
14WAP	2017	1	PM		121.92	383.02	14.46	564.85	510.03	1.29383	0.1431246
14WAP	2017	1	PMMB		30.48	383.02	14.46	562.04	501.71	1.27211	0.1575101
14WAP	2017	1	PMMB		60.96	383.02	14.46	685.88	597.08	1.5211	0.2318399
14WAP	2017	1	PMMB		91.44	383.02	14.46	643.47	573.37	1.4592	0.1830177
14WAP	2017	1	PMMB		121.92	383.02	14.46	595.22	541.5	1.37599	0.1402527
14WAP	2017	1	FS		30.48	383.02	14.46	598.7	533.58	1.35531	0.1700159
14WAP	2017	1	FS		60.96	383.02	14.46	557.59	485.02	1.22853	0.1894664
14WAP	2017	1	FS		91.44	383.02	14.46	672.01	595.97	1.5182	0.198526
14WAP	2017	1	FS		121.92	383.02	14.46	714.46	650.2	1.65978	0.1677706
14WAP	2017	1	TTSS		30.48	383.02	14.46	604.53	536.86	1.36388	0.1766735
14WAP	2017	1	TTSS		60.96	383.02	14.46	634.67	552.81	1.40552	0.2137209
14WAP	2017	1	TTSS		91.44	383.02	14.46	621.26	554.83	1.41079	0.1734361
14WAP	2017	1	TTSS		121.92	383.02	14.46	638.26	587.21	1.49533	0.1332818
14WAP	2017	1	FALLOW		30.48	383.02	14.46	602.21	536.71	1.36348	0.171008
14WAP	2017	1	FALLOW		60.96	383.02	14.46	623.53	541.25	1.37534	0.2148174

14WAP	2017	1	FALLOW		91.44	383.02	14.46	649.57	573.5	1.45954	0.1986043
14WAP	2017	1	FALLOW		121.92	383.02	14.46	504.83	456.98	1.15532	0.1249272
14WAP	2017	1	SS		30.48	383.02	14.46	624.91	555.01	1.41126	0.1824956
14WAP	2017	1	SS		60.96	383.02	14.46	554.67	480.37	1.21639	0.1939831
14WAP	2017	1	SS		91.44	383.02	14.46	709.65	623.86	1.59102	0.2239813
14WAP	2017	1	SS		121.92	383.02	14.46	733.02	662.83	1.69276	0.1832527
14WAP	2017	1	CP		30.48	383.02	14.46	564.95	499.28	1.26576	0.1714519
14WAP	2017	1	CP		60.96	383.02	14.46	613.85	533.08	1.35401	0.2108751
14WAP	2017	1	CP		91.44	383.02	14.46	556.86	488.19	1.23681	0.1792843
14WAP	2017	1	CP		121.92	383.02	14.46	689.53	620.94	1.58339	0.1790754
14WAP	2017	1	MB		30.48	383.02	14.46	572.51	516.89	1.31174	0.1452132
14WAP	2017	1	MB		60.96	383.02	14.46	747.22	657.37	1.6785	0.2345812
14WAP	2017	1	MB		91.44	383.02	14.46	381.08	339.2	0.84782	0.1093407
14WAP	2017	1	MB		121.92	383.02	14.46	863.44	778.32	1.99428	0.2222321
14WAP	2017	1	TTSSCP		30.48	383.02	14.46	741.38	655.2	1.67284	0.2249996
14WAP	2017	1	TTSSCP		60.96	383.02	14.46	294.57	257.48	0.63447	0.0968349
14WAP	2017	1	TTSSCP		91.44	383.02	14.46	558.92	492.89	1.24908	0.1723917

14WAP	2017	1	TTSSCP		121.92	383.02	14.46	949.41	852.6	2.18821	0.2527525
14WAP	2017	2	PMMB		30.48	383.02	14.46	554.94	503.13	1.27581	0.135266
14WAP	2017	2	PMMB		60.96	383.02	14.46	589.27	515.3	1.30759	0.1931216
14WAP	2017	2	PMMB		91.44	383.02	14.46	624.28	558.9	1.42142	0.1706947
14WAP	2017	2	PMMB		121.92	383.02	14.46	807.53	738.77	1.89102	0.1795193
14WAP	2017	2	TTSSCP		30.48	383.02	14.46	523.41	467.85	1.1837	0.1450566
14WAP	2017	2	TTSSCP		60.96	383.02	14.46	563.4	495.26	1.25527	0.1779006
14WAP	2017	2	TTSSCP		91.44	383.02	14.46	708.76	627.6	1.60078	0.2118933
14WAP	2017	2	TTSSCP		121.92	383.02	14.46	690.42	624.07	1.59156	0.1732272
14WAP	2017	2	FALLOW		30.48	383.02	14.46	631.01	561.72	1.42878	0.180903
14WAP	2017	2	FALLOW		60.96	383.02	14.46	590.8	511.71	1.29821	0.2064889
14WAP	2017	2	FALLOW		91.44	383.02	14.46	573.3	507.44	1.28707	0.1719479
14WAP	2017	2	FALLOW		121.92	383.02	14.46	672.07	605.35	1.54269	0.1741932
14WAP	2017	2	PM		30.48	383.02	14.46	610.48	541.86	1.37693	0.1791537
14WAP	2017	2	PM		60.96	383.02	14.46	582.77	507.66	1.28764	0.1960979
14WAP	2017	2	PM		91.44	383.02	14.46	605.96	538.46	1.36805	0.1762296
14WAP	2017	2	PM		121.92	383.02	14.46	784.21	716.95	1.83406	0.175603

14WAP	2017	2	SS		30.48	383.02	14.46	602.26	533.98	1.35636	0.1782661
14WAP	2017	2	SS		60.96	383.02	14.46	1119.45	982.79	2.52811	0.3567932
14WAP	2017	2	SS		91.44	383.02	14.46	482.47	439.84	1.11058	0.1112988
14WAP	2017	2	SS		121.92	383.02	14.46	340.75	313.32	0.78026	0.0716145
14WAP	2017	2	CP		30.48	383.02	14.46	592.24	526.38	1.33651	0.1719479
14WAP	2017	2	CP		60.96	383.02	14.46	635.41	555.15	1.41163	0.2095436
14WAP	2017	2	CP		91.44	383.02	14.46	613.6	547.99	1.39293	0.1712952
14WAP	2017	2	CP		121.92	383.02	14.46	727.97	665.35	1.69934	0.1634889
14WAP	2017	2	TTSS		30.48	383.02	14.46	599.22	528.59	1.34228	0.1844015
14WAP	2017	2	TTSS		60.96	383.02	14.46	567.67	494.31	1.25279	0.191529
14WAP	2017	2	TTSS		91.44	383.02	14.46	615.39	547.66	1.39207	0.1768301
14WAP	2017	2	TTSS		121.92	383.02	14.46	793.23	720.8	1.84411	0.1891009
14WAP	2017	2	FS		30.48	383.02	14.46	598.84	535.05	1.35915	0.1665435
14WAP	2017	2	FS		60.96	383.02	14.46	526.17	457.74	1.15731	0.1786577
14WAP	2017	2	FS		91.44	383.02	14.46	660.89	582.3	1.48251	0.2051835
14WAP	2017	2	FS		121.92	383.02	14.46	689.3	623.12	1.58908	0.1727834
14WAP	2017	2	MB		30.48	383.02	14.46	508.74	454.28	1.14828	0.1421847

14WAP	2017	2	MB		60.96	383.02	14.46	526.65	458.34	1.15888	0.1783444
14WAP	2017	2	MB		91.44	383.02	14.46	637.76	559.52	1.42304	0.2042697
14WAP	2017	2	MB		121.92	383.02	14.46	801.58	720.27	1.84272	0.2122849
14WAP	2017	3	SS		30.48	383.02	14.46	521.87	466.75	1.18083	0.1439078
14WAP	2017	3	SS		60.96	383.02	14.46	524.82	458.52	1.15934	0.1730967
14WAP	2017	3	SS		91.44	383.02	14.46	645.99	570.76	1.45238	0.1964112
14WAP	2017	3	SS		121.92	383.02	14.46	831.51	759.37	1.94481	0.1883438
14WAP	2017	3	MB		30.48	383.02	14.46	590.18	532.07	1.35137	0.1517141
14WAP	2017	3	MB		60.96	383.02	14.46	641.97	556.65	1.41554	0.2227543
14WAP	2017	3	MB		91.44	383.02	14.46	619.18	548.05	1.39309	0.1857069
14WAP	2017	3	MB		121.92	383.02	14.46	649.88	591.01	1.50525	0.1536984
14WAP	2017	3	CP		30.48	383.02	14.46	600.8	535.66	1.36074	0.1700681
14WAP	2017	3	CP		60.96	383.02	14.46	450.18	391.36	0.984	0.1535678
14WAP	2017	3	CP		91.44	383.02	14.46	645.27	566.99	1.44254	0.2043742
14WAP	2017	3	CP		121.92	383.02	14.46	825.1	747.8	1.9146	0.2018156
14WAP	2017	3	PMMB		30.48	383.02	14.46	477.86	427.01	1.07708	0.1327597
14WAP	2017	3	PMMB		60.96	383.02	14.46	593.71	522.23	1.32568	0.1866207

14WAP	2017	3	PMMB		91.44	383.02	14.46	619.12	554.4	1.40967	0.1689716
14WAP	2017	3	PMMB		121.92	383.02	14.46	736.5	673.68	1.72109	0.1640111
14WAP	2017	3	FALLOW		30.48	383.02	14.46	597.87	534.34	1.3573	0.1658647
14WAP	2017	3	FALLOW		60.96	383.02	14.46	606.98	527.21	1.33868	0.2082643
14WAP	2017	3	FALLOW		91.44	383.02	14.46	440.82	389.41	0.97891	0.1342217
14WAP	2017	3	FALLOW		121.92	383.02	14.46	663.47	596.77	1.52029	0.174141
14WAP	2017	3	TTSSCP		30.48	383.02	14.46	645.94	573.76	1.46021	0.1884482
14WAP	2017	3	TTSSCP		60.96	383.02	14.46	523.14	459.49	1.16188	0.166178
14WAP	2017	3	TTSSCP		91.44	383.02	14.46	579.68	519.26	1.31793	0.1577451
14WAP	2017	3	TTSSCP		121.92	383.02	14.46	776.08	707.48	1.80933	0.1791015
14WAP	2017	3	FS		30.48	383.02	14.46	449.83	404.53	1.01839	0.1182697
14WAP	2017	3	FS		60.96	383.02	14.46	638.56	555.94	1.41369	0.2157051
14WAP	2017	3	FS		91.44	383.02	14.46	489.4	431.02	1.08755	0.1524191
14WAP	2017	3	FS		121.92	383.02	14.46	793.27	711.72	1.8204	0.2129115
14WAP	2017	3	PM		30.48	383.02	14.46	603.28	540.45	1.37325	0.1640372
14WAP	2017	3	PM		60.96	383.02	14.46	476.05	415.63	1.04737	0.1577451
14WAP	2017	3	PM		91.44	383.02	14.46	617.58	541.7	1.37651	0.1981082

14WAP	2017	3	PM		121.92	383.02	14.46	699.73	633.55	1.61631	0.1727834
14WAP	2017	3	TTSS		30.48	383.02	14.46	622.49	560.48	1.42554	0.1618963
14WAP	2017	3	TTSS		60.96	383.02	14.46	608.5	530.61	1.34756	0.2033559
14WAP	2017	3	TTSS		91.44	383.02	14.46	636.54	567.69	1.44437	0.1797542
14WAP	2017	3	TTSS		121.92	383.02	14.46	699.28	638.5	1.62924	0.158685
14WAP	2017	4	FS		30.48	383.02	14.46	625.85	557.54	1.41787	0.1783444
14WAP	2017	4	FS		60.96	383.02	14.46	587.56	511.58	1.29787	0.1983693
14WAP	2017	4	FS		91.44	383.02	14.46	649.23	576.24	1.46669	0.190563
14WAP	2017	4	FS		121.92	383.02	14.46	638.01	580.6	1.47807	0.1498866
14WAP	2017	4	SS		30.48	383.02	14.46	558.37	494.09	1.25221	0.1678228
14WAP	2017	4	SS		60.96	383.02	14.46	588.78	513.75	1.30354	0.195889
14WAP	2017	4	SS		91.44	383.02	14.46	730.63	646.5	1.65012	0.2196474
14WAP	2017	4	SS		121.92	383.02	14.46	622.27	564.62	1.43635	0.1505132
14WAP	2017	4	PMMB		30.48	383.02	14.46	526.55	465.04	1.17637	0.1605909
14WAP	2017	4	PMMB		60.96	383.02	14.46	494.67	431.37	1.08846	0.1652642
14WAP	2017	4	PMMB		91.44	383.02	14.46	619.72	546.37	1.3887	0.1915029
14WAP	2017	4	PMMB		121.92	383.02	14.46	720.56	650.78	1.6613	0.1821823

14WAP	2017	4	TTSS		30.48	383.02	14.46	584.66	515.56	1.30827	0.1804069
14WAP	2017	4	TTSS		60.96	383.02	14.46	640.6	558.98	1.42163	0.2130943
14WAP	2017	4	TTSS		91.44	383.02	14.46	505.33	450.17	1.13754	0.1440122
14WAP	2017	4	TTSS		121.92	383.02	14.46	746.05	681.17	1.74064	0.1693893
14WAP	2017	4	FALLOW		30.48	383.02	14.46	674.29	596.19	1.51878	0.2039042
14WAP	2017	4	FALLOW		60.96	383.02	14.46	496.86	432.69	1.09191	0.1675356
14WAP	2017	4	FALLOW		91.44	383.02	14.46	629.47	557.8	1.41855	0.1871167
14WAP	2017	4	FALLOW		121.92	383.02	14.46	689.71	623.33	1.58963	0.1733055
14WAP	2017	4	PM		30.48	383.02	14.46	442.61	396.86	0.99836	0.1194445
14WAP	2017	4	PM		60.96	383.02	14.46	549.93	476.44	1.20613	0.1918684
14WAP	2017	4	PM		91.44	383.02	14.46	766.89	680.97	1.74012	0.2243207
14WAP	2017	4	PM		121.92	383.02	14.46	737.28	667.74	1.70558	0.1815557
14WAP	2017	4	MB		30.48	383.02	14.46	662.02	588.76	1.49938	0.1912679
14WAP	2017	4	MB		60.96	383.02	14.46	512.24	447.52	1.13063	0.1689716
14WAP	2017	4	MB		91.44	383.02	14.46	752.02	670.19	1.71197	0.2136425
14WAP	2017	4	MB		121.92	383.02	14.46	654.66	597.31	1.5217	0.1497299
14WAP	2017	4	TTSSCP		30.48	383.02	14.46	527.98	466.09	1.17911	0.161583

14WAP	2017	4	TTSSCP		60.96	383.02	14.46	772.38	672.7	1.71853	0.2602455
14WAP	2017	4	TTSSCP		91.44	383.02	14.46	645.59	579.04	1.474	0.1737494
14WAP	2017	4	TTSSCP		121.92	383.02	14.46	622.21	572.48	1.45687	0.1298356
14WAP	2017	4	CP		30.48	383.02	14.46	555.42	495.23	1.25519	0.1571446
14WAP	2017	4	CP		60.96	383.02	14.46	577.88	500.34	1.26853	0.2024422
14WAP	2017	4	CP		91.44	383.02	14.46	549.88	481.25	1.21869	0.1791799
14WAP	2017	4	CP		121.92	383.02	14.46	808.64	725.17	1.85552	0.2179243
Planting	2018	1	PM		30.48	324.90	14.46	618.81	545.97	1.63593	0.224195
Planting	2018	1	PM		30.48	324.90	14.46	626.95	544.32	1.63085	0.2543277
Planting	2018	1	PM		30.48	324.90	14.46	670.03	591.68	1.77662	0.2411542
Planting	2018	1	PM		30.48	324.90	14.46	564.85	510.03	1.52531	0.168731
Planting	2018	1	PMMB		30.48	324.90	14.46	562.04	501.71	1.4997	0.1856903
Planting	2018	1	PMMB		30.48	324.90	14.46	685.88	597.08	1.79324	0.2733184
Planting	2018	1	PMMB		30.48	324.90	14.46	643.47	573.37	1.72026	0.2157615
Planting	2018	1	PMMB		30.48	324.90	14.46	595.22	541.5	1.62217	0.1653453
Planting	2018	1	FS		30.48	324.90	14.46	598.7	533.58	1.59779	0.2004335
Planting	2018	1	FS		30.48	324.90	14.46	557.59	485.02	1.44833	0.2233639

Planting	2018	1	FS		30.48	324.90	14.46	672.01	595.97	1.78982	0.2340443
Planting	2018	1	FS		30.48	324.90	14.46	714.46	650.2	1.95674	0.1977865
Planting	2018	1	TTSS		30.48	324.90	14.46	604.53	536.86	1.60789	0.2082822
Planting	2018	1	TTSS		30.48	324.90	14.46	634.67	552.81	1.65698	0.2519577
Planting	2018	1	TTSS		30.48	324.90	14.46	621.26	554.83	1.6632	0.2044656
Planting	2018	1	TTSS		30.48	324.90	14.46	638.26	587.21	1.76286	0.1571273
Planting	2018	1	FALLOW		30.48	324.90	14.46	602.21	536.71	1.60743	0.2016031
Planting	2018	1	FALLOW		30.48	324.90	14.46	623.53	541.25	1.6214	0.2532504
Planting	2018	1	FALLOW		30.48	324.90	14.46	649.57	573.5	1.72066	0.2341366
Planting	2018	1	FALLOW		30.48	324.90	14.46	504.83	456.98	1.36202	0.147278
Planting	2018	1	SS		30.48	324.90	14.46	624.91	555.01	1.66375	0.2151459
Planting	2018	1	SS		30.48	324.90	14.46	554.67	480.37	1.43402	0.2286887
Planting	2018	1	SS		30.48	324.90	14.46	709.65	623.86	1.87567	0.2640539
Planting	2018	1	SS		30.48	324.90	14.46	733.02	662.83	1.99561	0.2160385
Planting	2018	1	CP		30.48	324.90	14.46	564.95	499.28	1.49222	0.2021263
Planting	2018	1	CP		30.48	324.90	14.46	613.85	533.08	1.59625	0.2486028
Planting	2018	1	CP		30.48	324.90	14.46	556.86	488.19	1.45809	0.2113601

Planting	2018	1	CP		30.48	324.90	14.46	689.53	620.94	1.86668	0.2111138
Planting	2018	1	MB		30.48	324.90	14.46	572.51	516.89	1.54642	0.1711934
Planting	2018	1	MB		30.48	324.90	14.46	747.22	657.37	1.97881	0.2765502
Planting	2018	1	MB		30.48	324.90	14.46	381.08	339.2	0.99951	0.1289029
Planting	2018	1	MB		30.48	324.90	14.46	863.44	778.32	2.35108	0.2619917
Planting	2018	1	TTSSCP		30.48	324.90	14.46	741.38	655.2	1.97213	0.2652543
Planting	2018	1	TTSSCP		30.48	324.90	14.46	294.57	257.48	0.74798	0.1141597
Planting	2018	1	TTSSCP		30.48	324.90	14.46	558.92	492.89	1.47255	0.2032344
Planting	2018	1	TTSSCP		30.48	324.90	14.46	949.41	852.6	2.57971	0.2979725
Planting	2018	2	PMMB		30.48	324.90	14.46	554.94	503.13	1.50407	0.1594665
Planting	2018	2	PMMB		30.48	324.90	14.46	589.27	515.3	1.54153	0.227673
Planting	2018	2	PMMB		30.48	324.90	14.46	624.28	558.9	1.67572	0.2012338
Planting	2018	2	PMMB		30.48	324.90	14.46	807.53	738.77	2.22935	0.2116371
Planting	2018	2	TTSSCP		30.48	324.90	14.46	523.41	467.85	1.39548	0.1710087
Planting	2018	2	TTSSCP		30.48	324.90	14.46	563.4	495.26	1.47985	0.2097288
Planting	2018	2	TTSSCP		30.48	324.90	14.46	708.76	627.6	1.88718	0.2498032
Planting	2018	2	TTSSCP		30.48	324.90	14.46	690.42	624.07	1.87631	0.2042193

Planting	2018	2	FALLOW		30.48	324.90	14.46	631.01	561.72	1.6844	0.2132684
Planting	2018	2	FALLOW		30.48	324.90	14.46	590.8	511.71	1.53048	0.2434319
Planting	2018	2	FALLOW		30.48	324.90	14.46	573.3	507.44	1.51733	0.2027112
Planting	2018	2	FALLOW		30.48	324.90	14.46	672.07	605.35	1.81869	0.2053582
Planting	2018	2	PM		30.48	324.90	14.46	610.48	541.86	1.62328	0.2112062
Planting	2018	2	PM		30.48	324.90	14.46	582.77	507.66	1.51801	0.2311818
Planting	2018	2	PM		30.48	324.90	14.46	605.96	538.46	1.61281	0.2077589
Planting	2018	2	PM		30.48	324.90	14.46	784.21	716.95	2.16219	0.2070202
Planting	2018	2	SS		30.48	324.90	14.46	602.26	533.98	1.59902	0.2101597
Planting	2018	2	SS		30.48	324.90	14.46	1119.45	982.79	2.98042	0.4206272
Planting	2018	2	SS		30.48	324.90	14.46	482.47	439.84	1.30927	0.1312113
Planting	2018	2	SS		30.48	324.90	14.46	340.75	313.32	0.91985	0.0844271
Planting	2018	2	CP		30.48	324.90	14.46	592.24	526.38	1.57563	0.2027112
Planting	2018	2	CP		30.48	324.90	14.46	635.41	555.15	1.66418	0.2470331
Planting	2018	2	CP		30.48	324.90	14.46	613.6	547.99	1.64214	0.2019417
Planting	2018	2	CP		30.48	324.90	14.46	727.97	665.35	2.00337	0.1927387
Planting	2018	2	TTSS		30.48	324.90	14.46	599.22	528.59	1.58243	0.2173928

Planting	2018	2	TTSS		30.48	324.90	14.46	567.67	494.31	1.47692	0.2257955
Planting	2018	2	TTSS		30.48	324.90	14.46	615.39	547.66	1.64113	0.2084668
Planting	2018	2	TTSS		30.48	324.90	14.46	793.23	720.8	2.17404	0.222933
Planting	2018	2	FS		30.48	324.90	14.46	598.84	535.05	1.60232	0.1963399
Planting	2018	2	FS		30.48	324.90	14.46	526.17	457.74	1.36436	0.2106214
Planting	2018	2	FS		30.48	324.90	14.46	660.89	582.3	1.74775	0.2418929
Planting	2018	2	FS		30.48	324.90	14.46	689.3	623.12	1.87339	0.2036961
Planting	2018	2	MB		30.48	324.90	14.46	508.74	454.28	1.35371	0.167623
Planting	2018	2	MB		30.48	324.90	14.46	526.65	458.34	1.36621	0.210252
Planting	2018	2	MB		30.48	324.90	14.46	637.76	559.52	1.67763	0.2408157
Planting	2018	2	MB		30.48	324.90	14.46	801.58	720.27	2.17241	0.2502649
Planting	2018	3	SS		30.48	324.90	14.46	521.87	466.75	1.39209	0.1696544
Planting	2018	3	SS		30.48	324.90	14.46	524.82	458.52	1.36676	0.2040654
Planting	2018	3	SS		30.48	324.90	14.46	645.99	570.76	1.71223	0.2315512
Planting	2018	3	SS		30.48	324.90	14.46	831.51	759.37	2.29275	0.2220404
Planting	2018	3	MB		30.48	324.90	14.46	590.18	532.07	1.59314	0.1788573
Planting	2018	3	MB		30.48	324.90	14.46	641.97	556.65	1.6688	0.2626073

Planting	2018	3	MB		30.48	324.90	14.46	619.18	548.05	1.64233	0.2189317
Planting	2018	3	MB		30.48	324.90	14.46	649.88	591.01	1.77456	0.1811966
Planting	2018	3	CP		30.48	324.90	14.46	600.8	535.66	1.60419	0.2004951
Planting	2018	3	CP		30.48	324.90	14.46	450.18	391.36	1.16005	0.1810427
Planting	2018	3	CP		30.48	324.90	14.46	645.27	566.99	1.70062	0.2409388
Planting	2018	3	CP		30.48	324.90	14.46	825.1	747.8	2.25714	0.2379224
Planting	2018	3	PMMB		30.48	324.90	14.46	477.86	427.01	1.26978	0.1565117
Planting	2018	3	PMMB		30.48	324.90	14.46	593.71	522.23	1.56286	0.220009
Planting	2018	3	PMMB		30.48	324.90	14.46	619.12	554.4	1.66187	0.1992023
Planting	2018	3	PMMB		30.48	324.90	14.46	736.5	673.68	2.02901	0.1933543
Planting	2018	3	FALLOW		30.48	324.90	14.46	597.87	534.34	1.60013	0.1955396
Planting	2018	3	FALLOW		30.48	324.90	14.46	606.98	527.21	1.57819	0.2455249
Planting	2018	3	FALLOW		30.48	324.90	14.46	440.82	389.41	1.15405	0.1582354
Planting	2018	3	FALLOW		30.48	324.90	14.46	663.47	596.77	1.79228	0.2052966
Planting	2018	3	TTSSCP		30.48	324.90	14.46	645.94	573.76	1.72146	0.2221635
Planting	2018	3	TTSSCP		30.48	324.90	14.46	523.14	459.49	1.36975	0.195909
Planting	2018	3	TTSSCP		30.48	324.90	14.46	579.68	519.26	1.55372	0.1859673

Planting	2018	3	TTSSCP		30.48	324.90	14.46	776.08	707.48	2.13304	0.2111446
Planting	2018	3	FS		30.48	324.90	14.46	449.83	404.53	1.20059	0.1394293
Planting	2018	3	FS		30.48	324.90	14.46	638.56	555.94	1.66661	0.2542969
Planting	2018	3	FS		30.48	324.90	14.46	489.4	431.02	1.28212	0.1796884
Planting	2018	3	FS		30.48	324.90	14.46	793.27	711.72	2.14609	0.2510036
Planting	2018	3	PM		30.48	324.90	14.46	603.28	540.45	1.61894	0.1933851
Planting	2018	3	PM		30.48	324.90	14.46	476.05	415.63	1.23475	0.1859673
Planting	2018	3	PM		30.48	324.90	14.46	617.58	541.7	1.62278	0.2335518
Planting	2018	3	PM		30.48	324.90	14.46	699.73	633.55	1.90549	0.2036961
Planting	2018	3	TTSS		30.48	324.90	14.46	622.49	560.48	1.68059	0.1908612
Planting	2018	3	TTSS		30.48	324.90	14.46	608.5	530.61	1.58865	0.2397384
Planting	2018	3	TTSS		30.48	324.90	14.46	636.54	567.69	1.70278	0.2119141
Planting	2018	3	TTSS		30.48	324.90	14.46	699.28	638.5	1.92073	0.1870754
Planting	2018	4	FS		30.48	324.90	14.46	625.85	557.54	1.67154	0.210252
Planting	2018	4	FS		30.48	324.90	14.46	587.56	511.58	1.53008	0.2338596
Planting	2018	4	FS		30.48	324.90	14.46	649.23	576.24	1.7291	0.2246566
Planting	2018	4	FS		30.48	324.90	14.46	638.01	580.6	1.74251	0.1767028

Planting	2018	4	SS		30.48	324.90	14.46	558.37	494.09	1.47624	0.1978481
Planting	2018	4	SS		30.48	324.90	14.46	588.78	513.75	1.53676	0.2309356
Planting	2018	4	SS		30.48	324.90	14.46	730.63	646.5	1.94535	0.2589446
Planting	2018	4	SS		30.48	324.90	14.46	622.27	564.62	1.69333	0.1774415
Planting	2018	4	PMMB		30.48	324.90	14.46	526.55	465.04	1.38683	0.1893222
Planting	2018	4	PMMB		30.48	324.90	14.46	494.67	431.37	1.2832	0.1948317
Planting	2018	4	PMMB		30.48	324.90	14.46	619.72	546.37	1.63716	0.2257647
Planting	2018	4	PMMB		30.48	324.90	14.46	720.56	650.78	1.95852	0.2147766
Planting	2018	4	TTSS		30.48	324.90	14.46	584.66	515.56	1.54233	0.2126836
Planting	2018	4	TTSS		30.48	324.90	14.46	640.6	558.98	1.67597	0.251219
Planting	2018	4	TTSS		30.48	324.90	14.46	505.33	450.17	1.34106	0.1697775
Planting	2018	4	TTSS		30.48	324.90	14.46	746.05	681.17	2.05206	0.1996948
Planting	2018	4	FALLOW		30.48	324.90	14.46	674.29	596.19	1.7905	0.2403848
Planting	2018	4	FALLOW		30.48	324.90	14.46	496.86	432.69	1.28726	0.1975095
Planting	2018	4	FALLOW		30.48	324.90	14.46	629.47	557.8	1.67234	0.2205938
Planting	2018	4	FALLOW		30.48	324.90	14.46	689.71	623.33	1.87403	0.2043117
Planting	2018	4	PM		30.48	324.90	14.46	442.61	396.86	1.17698	0.1408144

Planting	2018	4	PM		30.48	324.90	14.46	549.93	476.44	1.42192	0.2261956
Planting	2018	4	PM		30.48	324.90	14.46	766.89	680.97	2.05144	0.264454
Planting	2018	4	PM		30.48	324.90	14.46	737.28	667.74	2.01072	0.2140379
Planting	2018	4	MB		30.48	324.90	14.46	662.02	588.76	1.76763	0.2254877
Planting	2018	4	MB		30.48	324.90	14.46	512.24	447.52	1.33291	0.1992023
Planting	2018	4	MB		30.48	324.90	14.46	752.02	670.19	2.01826	0.2518654
Planting	2018	4	MB		30.48	324.90	14.46	654.66	597.31	1.79395	0.1765181
Planting	2018	4	TTSSCP		30.48	324.90	14.46	527.98	466.09	1.39006	0.1904918
Planting	2018	4	TTSSCP		30.48	324.90	14.46	772.38	672.7	2.02599	0.3068061
Planting	2018	4	TTSSCP		30.48	324.90	14.46	645.59	579.04	1.73771	0.2048349
Planting	2018	4	TTSSCP		30.48	324.90	14.46	622.21	572.48	1.71752	0.1530645
Planting	2018	4	CP		30.48	324.90	14.46	555.42	495.23	1.47975	0.1852594
Planting	2018	4	CP		30.48	324.90	14.46	577.88	500.34	1.49548	0.2386611
Planting	2018	4	CP		30.48	324.90	14.46	549.88	481.25	1.43672	0.211237
Planting	2018	4	CP		30.48	324.90	14.46	808.64	725.17	2.18749	0.2569131

Chickasha Soil Moisture

Event	Year	Rep	Crop	Cut	Depth (cm)	V_T (cm^3)	M_{bag} (g)	$M_{bag,wet}$ (g)	$M_{bag,dry}$ (g)	P_b (g cm^{-3})	Θ (cm^3 cm^3)
Planting	2016	1	PM		30.48	222.25	14.46	297.1	264.36	1.1243697	0.14730888
Planting	2016	1	PM		60.96	222.25	14.46	386.26	339.4	1.4620012	0.21083977
Planting	2016	1	PM		91.44	222.25	14.46	352.94	311.7	1.3373691	0.18555339
Planting	2016	1	PM		121.92	222.25	14.46	430.87	386.2	1.6725711	0.20098618
Planting	2016	1	PMMB		30.48	222.25	14.46	368.01	325.5	1.3994602	0.19126758
Planting	2016	1	PMMB		60.96	222.25	14.46	332.06	289.35	1.2368085	0.19216745
Planting	2016	1	PMMB		91.44	222.25	14.46	369.83	323.96	1.3925312	0.20638541
Planting	2016	1	PMMB		121.92	222.25	14.46	385.26	341.13	1.4697851	0.19855653
Planting	2016	1	FS		30.48	222.25	14.46	402.85	355.73	1.5354757	0.2120096
Planting	2016	1	FS		60.96	222.25	14.46	354.7	317.06	1.3614857	0.16935572
Planting	2016	1	FS		91.44	222.25	14.46	353.5	318.55	1.3681897	0.15725245
Planting	2016	1	FS		121.92	222.25	14.46	336.38	304.67	1.3057387	0.14267454
Planting	2016	1	TTSS		30.48	222.25	14.46	380.4	341.32	1.47064	0.17583479
Planting	2016	1	TTSS		60.96	222.25	14.46	334.68	294.71	1.2609251	0.17983921
Planting	2016	1	TTSS		91.44	222.25	14.46	163.06	150.67	0.612838	0.05574701

Planting	2016	1	TTSS		121.92	222.25	14.46	121.25	110.9	0.4338987	0.04656832
Planting	2016	1	FALLOW		30.48	222.25	14.46	403.44	353.1	1.5236424	0.22649752
Planting	2016	1	FALLOW		60.96	222.25	14.46	378.1	338.42	1.4575919	0.1785344
Planting	2016	1	FALLOW		91.44	222.25	14.46	331.63	297.73	1.2745131	0.15252813
Planting	2016	1	FALLOW		121.92	222.25	14.46	292.31	265.65	1.1301738	0.1199528
Planting	2016	1	SS		30.48	222.25	14.46	376.6	333.53	1.43559	0.19378721
Planting	2016	1	SS		60.96	222.25	14.46	320.02	281.43	1.2011736	0.1736301
Planting	2016	1	SS		91.44	222.25	14.46	345.72	309.67	1.3282354	0.16220174
Planting	2016	1	SS		121.92	222.25	14.46	345.54	288.86	1.2346039	0.25502343
Planting	2016	1	CP		30.48	222.25	14.46	303.2	268.38	1.1424571	0.15666754
Planting	2016	1	CP		60.96	222.25	14.46	362.65	317.1	1.3616656	0.20494561
Planting	2016	1	CP		91.44	222.25	14.46	345.85	312.75	1.3420934	0.14892865
Planting	2016	1	CP		121.92	222.25	14.46	402.22	372.13	1.6092651	0.13538559
Planting	2016	1	MB		30.48	222.25	14.46	345.1	305.3	1.3085732	0.17907432
Planting	2016	1	MB		60.96	222.25	14.46	399.44	348.55	1.5031703	0.22897217
Planting	2016	1	MB		91.44	222.25	14.46	329.76	296.5	1.2689789	0.14964854
Planting	2016	1	MB		121.92	222.25	14.46	458.88	418.56	1.8181702	0.18141399

Planting	2016	1	TTSSCP		30.48	222.25	14.46	367.78	327.88	1.4101687	0.17952426
Planting	2016	1	TTSSCP		60.96	222.25	14.46	372.8	323.93	1.3923962	0.21988347
Planting	2016	1	TTSSCP		91.44	222.25	14.46	385.2	336.72	1.449943	0.21812872
Planting	2016	1	TTSSCP		121.92	222.25	14.46	403.44	360.75	1.5580625	0.19207746
Planting	2016	2	FALLOW		30.48	222.25	14.46	385.65	341.38	1.47091	0.19918644
Planting	2016	2	FALLOW		60.96	222.25	14.46	381.73	330.89	1.4237117	0.2287472
Planting	2016	2	FALLOW		91.44	222.25	14.46	427.4	372.46	1.6107499	0.24719456
Planting	2016	2	FALLOW		121.92	222.25	14.46	307.53	275.1	1.1726927	0.14591408
Planting	2016	2	TTSSCP		30.48	222.25	14.46	402.5	352.5	1.5209428	0.22496774
Planting	2016	2	TTSSCP		60.96	222.25	14.46	386.13	335.84	1.4459835	0.22627256
Planting	2016	2	TTSSCP		91.44	222.25	14.46	366.65	326.22	1.4026998	0.18190892
Planting	2016	2	TTSSCP		121.92	222.25	14.46	374.29	341.36	1.47082	0.14816376
Planting	2016	2	PMMB		30.48	222.25	14.46	374.7	334.97	1.4420691	0.17875937
Planting	2016	2	PMMB		60.96	222.25	14.46	401.1	355.68	1.5352507	0.2043607
Planting	2016	2	PMMB		91.44	222.25	14.46	315	287.44	1.2282148	0.12400222
Planting	2016	2	PMMB		121.92	222.25	14.46	282.3	263.84	1.12203	0.08305809
Planting	2016	2	PM		30.48	222.25	14.46	352.15	312.67	1.3417335	0.17763453

Planting	2016	2	PM		60.96	222.25	14.46	264.1	236	0.996768	0.12643187
Planting	2016	2	PM		91.44	222.25	14.46	351.75	315.12	1.3527569	0.16481137
Planting	2016	2	PM		121.92	222.25	14.46	401.5	356.84	1.54047	0.20094119
Planting	2016	2	SS		30.48	222.25	14.46	354.65	316.8	1.3603158	0.17030058
Planting	2016	2	SS		60.96	222.25	14.46	412.88	362.98	1.568096	0.22451781
Planting	2016	2	SS		91.44	222.25	14.46	343.3	298.32	1.2771678	0.20238098
Planting	2016	2	SS		121.92	222.25	14.46	280.23	248.6	1.0534598	0.14231459
Planting	2016	2	CP		30.48	222.25	14.46	370.85	329.88	1.4191674	0.18433857
Planting	2016	2	CP		60.96	222.25	14.46	288.46	257.08	1.0916144	0.14118976
Planting	2016	2	CP		91.44	222.25	14.46	389.73	345.96	1.491517	0.19693676
Planting	2016	2	CP		121.92	222.25	14.46	373.94	328.55	1.4131832	0.20422572
Planting	2016	2	TTSS		30.48	222.25	14.46	340.27	300.08	1.2850866	0.18082907
Planting	2016	2	TTSS		60.96	222.25	14.46	328.34	288.36	1.2323542	0.17988421
Planting	2016	2	TTSS		91.44	222.25	14.46	329.2	299.32	1.2816671	0.13444072
Planting	2016	2	TTSS		121.92	222.25	14.46	425.68	377.22	1.6321668	0.21803874
Planting	2016	2	FS		30.48	222.25	14.46	360.06	318.86	1.3695845	0.18537342
Planting	2016	2	FS		60.96	222.25	14.46	299.04	262.75	1.1171257	0.16328159

Planting	2016	2	FS		91.44	222.25	14.46	258.2	231.65	0.9771958	0.11945787
Planting	2016	2	FS		121.92	222.25	14.46	396.24	351.54	1.5166234	0.20112116
Planting	2016	2	MB		30.48	222.25	14.46	394.9	346.4	1.4934967	0.21821871
Planting	2016	2	MB		60.96	222.25	14.46	358.94	311.76	1.3376391	0.21227956
Planting	2016	2	MB		91.44	222.25	14.46	334.1	294.17	1.2584954	0.17965924
Planting	2016	2	MB		121.92	222.25	14.46	355.58	317.6	1.3639153	0.1708855
Planting	2016	3	SS		30.48	222.25	14.46	409.54	361.2	1.5600872	0.21749881
Planting	2016	3	SS		60.96	222.25	14.46	339.25	293.8	1.2568307	0.20449568
Planting	2016	3	SS		91.44	222.25	14.46	355.73	309.78	1.3287304	0.20674536
Planting	2016	3	SS		121.92	222.25	14.46	412.38	365.62	1.5799743	0.21038983
Planting	2016	3	MB		30.48	222.25	14.46	349.26	307.18	1.317032	0.18933285
Planting	2016	3	MB		60.96	222.25	14.46	291.2	252.5	1.0710073	0.17412503
Planting	2016	3	MB		91.44	222.25	14.46	346.98	302.94	1.2979548	0.19815159
Planting	2016	3	MB		121.92	222.25	14.46	363.2	320.8	1.3783132	0.19077265
Planting	2016	3	CP		30.48	222.25	14.46	324.71	285.76	1.2206559	0.17524987
Planting	2016	3	CP		60.96	222.25	14.46	355.2	307.5	1.3184718	0.21461923
Planting	2016	3	CP		91.44	222.25	14.46	355.27	312.36	1.3403387	0.19306732

Planting	2016	3	CP		121.92	222.25	14.46	436.07	393.28	1.7044265	0.19252739
Planting	2016	3	PMMB		30.48	222.25	14.46	365.13	325.1	1.3976605	0.18010918
Planting	2016	3	PMMB		60.96	222.25	14.46	318.04	276.45	1.1787669	0.18712817
Planting	2016	3	PMMB		91.44	222.25	14.46	381.78	341	1.4692002	0.18348369
Planting	2016	3	PMMB		121.92	222.25	14.46	397.71	353.75	1.526567	0.19779164
Planting	2016	3	FALLOW		30.48	222.25	14.46	378.2	330.9	1.4237567	0.21281949
Planting	2016	3	FALLOW		60.96	222.25	14.46	371.64	326.71	1.4049044	0.20215601
Planting	2016	3	FALLOW		91.44	222.25	14.46	290.77	258.2	1.0966536	0.14654399
Planting	2016	3	FALLOW		121.92	222.25	14.46	400.48	359.7	1.5533382	0.18348369
Planting	2016	3	TTSSCP		30.48	222.25	14.46	374.87	329.2	1.4161078	0.20548554
Planting	2016	3	TTSSCP		60.96	222.25	14.46	331.16	291.5	1.2464821	0.17844441
Planting	2016	3	TTSSCP		91.44	222.25	14.46	408.68	367.3	1.5875332	0.1861833
Planting	2016	3	TTSSCP		121.92	222.25	14.46	247.96	226.15	0.9524493	0.09813093
Planting	2016	3	FS		30.48	222.25	14.46	381.1	334.88	1.4416642	0.20796018
Planting	2016	3	FS		60.96	222.25	14.46	379.72	333.56	1.435725	0.20769022
Planting	2016	3	FS		91.44	222.25	14.46	299.11	268.4	1.1425471	0.13817519
Planting	2016	3	FS		121.92	222.25	14.46	217.6	198.81	0.8294369	0.08454288

Planting	2016	3	PM		30.48	222.25	14.46	261.16	240.98	1.0191747	0.09079698
Planting	2016	3	PM		60.96	222.25	14.46	391.22	345.75	1.4905722	0.20458567
Planting	2016	3	PM		91.44	222.25	14.46	544.59	484.67	2.1156225	0.26960134
Planting	2016	3	PM		121.92	222.25	14.46	387.05	342.23	1.4747344	0.20166109
Planting	2016	3	TTSS		30.48	222.25	14.46	371.75	335	1.4422041	0.16535129
Planting	2016	3	TTSS		60.96	222.25	14.46	378.3	334.86	1.4415742	0.19545198
Planting	2016	3	TTSS		91.44	222.25	14.46	298.02	265.66	1.1302188	0.14559912
Planting	2016	3	TTSS		121.92	222.25	14.46	282.4	254.2	1.0786562	0.12688181
Planting	2016	4	FS		30.48	222.25	14.46	364.09	321.91	1.3833075	0.18978279
Planting	2016	4	FS		60.96	222.25	14.46	306.2	268.73	1.1440318	0.16859083
Planting	2016	4	FS		91.44	222.25	14.46	283.5	253.72	1.0764965	0.13399079
Planting	2016	4	FS		121.92	222.25	14.46	460.04	409.3	1.7765062	0.22829727
Planting	2016	4	SS		30.48	222.25	14.46	379.77	338.26	1.456872	0.18676822
Planting	2016	4	SS		60.96	222.25	14.46	274.75	241.7	1.0224143	0.14870368
Planting	2016	4	SS		91.44	222.25	14.46	332.28	296.14	1.2673592	0.16260668
Planting	2016	4	SS		121.92	222.25	14.46	392.92	346.88	1.4956564	0.2071503
Planting	2016	4	PMMB		30.48	222.25	14.46	359.52	317	1.3612157	0.19131257

Planting	2016	4	PMMB		60.96	222.25	14.46	401.5	349.45	1.5072198	0.23419142
Planting	2016	4	PMMB		91.44	222.25	14.46	380.4	331.93	1.4283911	0.21808373
Planting	2016	4	PMMB		121.92	222.25	14.46	304.8	279.36	1.19186	0.11446359
Planting	2016	4	TTSS		30.48	222.25	14.46	370.5	326.6	1.4044095	0.19752168
Planting	2016	4	TTSS		60.96	222.25	14.46	344.34	302.44	1.2957051	0.18852297
Planting	2016	4	TTSS		91.44	222.25	14.46	361.33	324.14	1.3933411	0.16733101
Planting	2016	4	TTSS		121.92	222.25	14.46	301.85	275.95	1.1765172	0.11653329
Planting	2016	4	FALLOW		30.48	222.25	14.46	317.14	282.88	1.2076977	0.1541479
Planting	2016	4	FALLOW		60.96	222.25	14.46	345.11	301.94	1.2934554	0.19423715
Planting	2016	4	FALLOW		91.44	222.25	14.46	380.98	338.48	1.4578618	0.19122258
Planting	2016	4	FALLOW		121.92	222.25	14.46	332.38	296.02	1.2668192	0.16359654
Planting	2016	4	PM		30.48	222.25	14.46	292.5	256.83	1.0904895	0.16049199
Planting	2016	4	PM		60.96	222.25	14.46	347.33	301	1.289226	0.20845511
Planting	2016	4	PM		91.44	222.25	14.46	368.28	323.96	1.3925312	0.19941141
Planting	2016	4	PM		121.92	222.25	14.46	283.32	252.64	1.0716372	0.13804021
Planting	2016	4	MB		30.48	222.25	14.46	337.8	296.75	1.2701038	0.18469852
Planting	2016	4	MB		60.96	222.25	14.46	308.3	263.3	1.1196003	0.20247097

Planting	2016	4	MB		91.44	222.25	14.46	323.09	281.05	1.1994639	0.18915288
Planting	2016	4	MB		121.92	222.25	14.46	306.02	273.68	1.1663036	0.14550914
Planting	2016	4	TTSSCP		30.48	222.25	14.46	335.58	297.04	1.2714086	0.17340514
Planting	2016	4	TTSSCP		60.96	222.25	14.46	317.27	271.44	1.1562251	0.20620543
Planting	2016	4	TTSSCP		91.44	222.25	14.46	322.76	282.1	1.2041882	0.18294377
Planting	2016	4	TTSSCP		121.92	222.25	14.46	451.3	400.64	1.7375417	0.22793732
Planting	2016	4	CP		30.48	222.25	14.46	367.65	317.12	1.3617556	0.2273524
Planting	2016	4	CP		60.96	222.25	14.46	371.5	320.53	1.3770984	0.22933212
Planting	2016	4	CP		91.44	222.25	14.46	352.1	308.46	1.3227912	0.19635185
Planting	2016	4	CP		121.92	222.25	14.46	463.1	410.23	1.7806906	0.23788089
6WAP	2016	1	PM		30.48	222.25	14.46	352	328	1.4107086	0.10798452
6WAP	2016	1	PM		60.96	222.25	14.46	284	265	1.1272492	0.08548774
6WAP	2016	1	PM		91.44	222.25	14.46	280	261	1.1092518	0.08548774
6WAP	2016	1	PM		121.92	222.25	14.46	345	320	1.3747138	0.11248387
6WAP	2016	1	PMMB		30.48	222.25	14.46	357	337	1.4512028	0.0899871
6WAP	2016	1	PMMB		60.96	222.25	14.46	295	280	1.1947396	0.06749032
6WAP	2016	1	PMMB		91.44	222.25	14.46	315	300	1.2847267	0.06749032

6WAP	2016	1	PMMB		121.92	222.25	14.46	355	337	1.4512028	0.08098839
6WAP	2016	1	FS		30.48	222.25	14.46	473	443	1.9281344	0.13498065
6WAP	2016	1	FS		60.96	222.25	14.46	320	306	1.3117228	0.06299097
6WAP	2016	1	FS		91.44	222.25	14.46	230	215	0.9022815	0.06749032
6WAP	2016	1	FS		121.92	222.25	14.46	310	293	1.2532312	0.07648903
6WAP	2016	1	TTSS		30.48	222.25	14.46	309	289	1.2352338	0.0899871
6WAP	2016	1	TTSS		60.96	222.25	14.46	313	292	1.2487318	0.09448645
6WAP	2016	1	TTSS		91.44	222.25	14.46	294	281	1.1992389	0.05849161
6WAP	2016	1	TTSS		121.92	222.25	14.46	397	382	1.6536738	0.06749032
6WAP	2016	1	FALLOW		30.48	222.25	14.46	350	328	1.4107086	0.09898581
6WAP	2016	1	FALLOW		60.96	222.25	14.46	362	341	1.4692002	0.09448645
6WAP	2016	1	FALLOW		91.44	222.25	14.46	301	282	1.2037383	0.08548774
6WAP	2016	1	FALLOW		121.92	222.25	14.46	379	346	1.491697	0.14847871
6WAP	2016	1	SS		30.48	222.25	14.46	383	360	1.554688	0.10348516
6WAP	2016	1	SS		60.96	222.25	14.46	341	322	1.3837125	0.08548774
6WAP	2016	1	SS		91.44	222.25	14.46	323	309	1.3252209	0.06299097
6WAP	2016	1	SS		121.92	222.25	14.46	259	245	1.0372621	0.06299097

6WAP	2016	1	CP		30.48	222.25	14.46	411	385	1.6671718	0.11698323
6WAP	2016	1	CP		60.96	222.25	14.46	397	375	1.6221783	0.09898581
6WAP	2016	1	CP		91.44	222.25	14.46	301	292	1.2487318	0.04049419
6WAP	2016	1	CP		121.92	222.25	14.46	247	237	1.0012673	0.04499355
6WAP	2016	1	MB		30.48	222.25	14.46	365	344	1.4826983	0.09448645
6WAP	2016	1	MB		60.96	222.25	14.46	380	352	1.5186931	0.12598194
6WAP	2016	1	MB		91.44	222.25	14.46	366	346	1.491697	0.0899871
6WAP	2016	1	MB		121.92	222.25	14.46	388	364	1.5726854	0.10798452
6WAP	2016	1	TTSSCP		30.48	222.25	14.46	363	344	1.4826983	0.08548774
6WAP	2016	1	TTSSCP		60.96	222.25	14.46	306	290	1.2397331	0.07198968
6WAP	2016	1	TTSSCP		91.44	222.25	14.46	356	340	1.4647009	0.07198968
6WAP	2016	1	TTSSCP		121.92	222.25	14.46	290	279	1.1902402	0.0494929
6WAP	2016	2	FALLOW		30.48	222.25	14.46	314	291	1.2442325	0.10348516
6WAP	2016	2	FALLOW		60.96	222.25	14.46	282	256	1.0867551	0.11698323
6WAP	2016	2	FALLOW		91.44	222.25	14.46	253	228	0.9607731	0.11248387
6WAP	2016	2	FALLOW		121.92	222.25	14.46	341	305	1.3072234	0.16197678
6WAP	2016	2	TTSSCP		30.48	222.25	14.46	358	333	1.4332054	0.11248387

6WAP	2016	2	TTSSCP		60.96	222.25	14.46	360	334	1.4377047	0.11698323
6WAP	2016	2	TTSSCP		91.44	222.25	14.46	352	334	1.4377047	0.08098839
6WAP	2016	2	TTSSCP		121.92	222.25	14.46	347	326	1.4017099	0.09448645
6WAP	2016	2	PMMB		30.48	222.25	14.46	359	334	1.4377047	0.11248387
6WAP	2016	2	PMMB		60.96	222.25	14.46	359	337	1.4512028	0.09898581
6WAP	2016	2	PMMB		91.44	222.25	14.46	348	330	1.4197073	0.08098839
6WAP	2016	2	PMMB		121.92	222.25	14.46	315	299	1.2802273	0.07198968
6WAP	2016	2	PM		30.48	222.25	14.46	341	319	1.3702144	0.09898581
6WAP	2016	2	PM		60.96	222.25	14.46	351	329	1.415208	0.09898581
6WAP	2016	2	PM		91.44	222.25	14.46	318	301	1.289226	0.07648903
6WAP	2016	2	PM		121.92	222.25	14.46	288	273	1.1632441	0.06749032
6WAP	2016	2	SS		30.48	222.25	14.46	337	314	1.3477176	0.10348516
6WAP	2016	2	SS		60.96	222.25	14.46	297	280	1.1947396	0.07648903
6WAP	2016	2	SS		91.44	222.25	14.46	273	259	1.1002531	0.06299097
6WAP	2016	2	SS		121.92	222.25	14.46	363	341	1.4692002	0.09898581
6WAP	2016	2	CP		30.48	222.25	14.46	361	337	1.4512028	0.10798452
6WAP	2016	2	CP		60.96	222.25	14.46	338	320	1.3747138	0.08098839

6WAP	2016	2	CP		91.44	222.25	14.46	330	313	1.3432183	0.07648903
6WAP	2016	2	CP		121.92	222.25	14.46	357	334	1.4377047	0.10348516
6WAP	2016	2	TTSS		30.48	222.25	14.46	369	346	1.491697	0.10348516
6WAP	2016	2	TTSS		60.96	222.25	14.46	346	325	1.3972105	0.09448645
6WAP	2016	2	TTSS		91.44	222.25	14.46	322	306	1.3117228	0.07198968
6WAP	2016	2	TTSS		121.92	222.25	14.46	362	348	1.5006957	0.06299097
6WAP	2016	2	FS		30.48	222.25	14.46	379	355	1.5321912	0.10798452
6WAP	2016	2	FS		60.96	222.25	14.46	399	368	1.5906828	0.13948
6WAP	2016	2	FS		91.44	222.25	14.46	345	315	1.352217	0.13498065
6WAP	2016	2	FS		121.92	222.25	14.46	315	299	1.2802273	0.07198968
6WAP	2016	2	MB		30.48	222.25	14.46	358	339	1.4602015	0.08548774
6WAP	2016	2	MB		60.96	222.25	14.46	349	330	1.4197073	0.08548774
6WAP	2016	2	MB		91.44	222.25	14.46	372	354	1.5276918	0.08098839
6WAP	2016	2	MB		121.92	222.25	14.46	305	286	1.2217357	0.08548774
6WAP	2016	3	SS		30.48	222.25	14.46	373	342	1.4736996	0.13948
6WAP	2016	3	SS		60.96	222.25	14.46	367	340	1.4647009	0.12148258
6WAP	2016	3	SS		91.44	222.25	14.46	352	331	1.4242067	0.09448645

6WAP	2016	3	SS		121.92	222.25	14.46	289	268	1.1407473	0.09448645
6WAP	2016	3	MB		30.48	222.25	14.46	347	323	1.3882118	0.10798452
6WAP	2016	3	MB		60.96	222.25	14.46	360	332	1.428706	0.12598194
6WAP	2016	3	MB		91.44	222.25	14.46	356	328	1.4107086	0.12598194
6WAP	2016	3	MB		121.92	222.25	14.46	387	349	1.5051951	0.17097548
6WAP	2016	3	CP		30.48	222.25	14.46	370	344	1.4826983	0.11698323
6WAP	2016	3	CP		60.96	222.25	14.46	383	349	1.5051951	0.15297807
6WAP	2016	3	CP		91.44	222.25	14.46	363	338	1.4557022	0.11248387
6WAP	2016	3	CP		121.92	222.25	14.46	372	340	1.4647009	0.14397936
6WAP	2016	3	PMMB		30.48	222.25	14.46	358	335	1.4422041	0.10348516
6WAP	2016	3	PMMB		60.96	222.25	14.46	336	316	1.3567163	0.0899871
6WAP	2016	3	PMMB		91.44	222.25	14.46	345	327	1.4062092	0.08098839
6WAP	2016	3	PMMB		121.92	222.25	14.46	357	336	1.4467034	0.09448645
6WAP	2016	3	FALLOW		30.48	222.25	14.46	348	328	1.4107086	0.0899871
6WAP	2016	3	FALLOW		60.96	222.25	14.46	338	317	1.3612157	0.09448645
6WAP	2016	3	FALLOW		91.44	222.25	14.46	358	337	1.4512028	0.09448645
6WAP	2016	3	FALLOW		121.92	222.25	14.46	388	349	1.5051951	0.17547484

6WAP	2016	3	TTSSCP		30.48	222.25	14.46	367	345	1.4871976	0.09898581
6WAP	2016	3	TTSSCP		60.96	222.25	14.46	358	340	1.4647009	0.08098839
6WAP	2016	3	TTSSCP		91.44	222.25	14.46	337	324	1.3927112	0.05849161
6WAP	2016	3	TTSSCP		121.92	222.25	14.46	341	330	1.4197073	0.0494929
6WAP	2016	3	FS		30.48	222.25	14.46	374	351	1.5141938	0.10348516
6WAP	2016	3	FS		60.96	222.25	14.46	340	323	1.3882118	0.07648903
6WAP	2016	3	FS		91.44	222.25	14.46	327	315	1.352217	0.05399226
6WAP	2016	3	FS		121.92	222.25	14.46	345	335	1.4422041	0.04499355
6WAP	2016	3	PM		30.48	222.25	14.46	385	360	1.554688	0.11248387
6WAP	2016	3	PM		60.96	222.25	14.46	367	340	1.4647009	0.12148258
6WAP	2016	3	PM		91.44	222.25	14.46	402	367	1.5861834	0.15747742
6WAP	2016	3	PM		121.92	222.25	14.46	339	328	1.4107086	0.0494929
6WAP	2016	3	TTSS		30.48	222.25	14.46	364	342	1.4736996	0.09898581
6WAP	2016	3	TTSS		60.96	222.25	14.46	331	312	1.3387189	0.08548774
6WAP	2016	3	TTSS		91.44	222.25	14.46	350	335	1.4422041	0.06749032
6WAP	2016	3	TTSS		121.92	222.25	14.46	313	301	1.289226	0.05399226
6WAP	2016	4	FS		30.48	222.25	14.46	333	309	1.3252209	0.10798452

6WAP	2016	4	FS		60.96	222.25	14.46	368	339	1.4602015	0.13048129
6WAP	2016	4	FS		91.44	222.25	14.46	350	322	1.3837125	0.12598194
6WAP	2016	4	FS		121.92	222.25	14.46	381	342	1.4736996	0.17547484
6WAP	2016	4	SS		30.48	222.25	14.46	356	332	1.428706	0.10798452
6WAP	2016	4	SS		60.96	222.25	14.46	367	341	1.4692002	0.11698323
6WAP	2016	4	SS		91.44	222.25	14.46	350	332	1.428706	0.08098839
6WAP	2016	4	SS		121.92	222.25	14.46	354	335	1.4422041	0.08548774
6WAP	2016	4	PMMB		30.48	222.25	14.46	381	356	1.5366905	0.11248387
6WAP	2016	4	PMMB		60.96	222.25	14.46	365	339	1.4602015	0.11698323
6WAP	2016	4	PMMB		91.44	222.25	14.46	356	339	1.4602015	0.07648903
6WAP	2016	4	PMMB		121.92	222.25	14.46	368	352	1.5186931	0.07198968
6WAP	2016	4	TTSS		30.48	222.25	14.46	349	325	1.3972105	0.10798452
6WAP	2016	4	TTSS		60.96	222.25	14.46	341	321	1.3792131	0.0899871
6WAP	2016	4	TTSS		91.44	222.25	14.46	346	329	1.415208	0.07648903
6WAP	2016	4	TTSS		121.92	222.25	14.46	287	272	1.1587447	0.06749032
6WAP	2016	4	FALLOW		30.48	222.25	14.46	381	357	1.5411899	0.10798452
6WAP	2016	4	FALLOW		60.96	222.25	14.46	336	319	1.3702144	0.07648903

6WAP	2016	4	FALLOW		91.44	222.25	14.46	369	352	1.5186931	0.07648903
6WAP	2016	4	FALLOW		121.92	222.25	14.46	275	262	1.1137512	0.05849161
6WAP	2016	4	PM		30.48	222.25	14.46	379	355	1.5321912	0.10798452
6WAP	2016	4	PM		60.96	222.25	14.46	390	365	1.5771847	0.11248387
6WAP	2016	4	PM		91.44	222.25	14.46	344	327	1.4062092	0.07648903
6WAP	2016	4	PM		121.92	222.25	14.46	351	340	1.4647009	0.0494929
6WAP	2016	4	MB		30.48	222.25	14.46	365	345	1.4871976	0.0899871
6WAP	2016	4	MB		60.96	222.25	14.46	422	390	1.6896686	0.14397936
6WAP	2016	4	MB		91.44	222.25	14.46	371	350	1.5096944	0.09448645
6WAP	2016	4	MB		121.92	222.25	14.46	360	343	1.4781989	0.07648903
6WAP	2016	4	TTSSCP		30.48	222.25	14.46	357	335	1.4422041	0.09898581
6WAP	2016	4	TTSSCP		60.96	222.25	14.46	334	312	1.3387189	0.09898581
6WAP	2016	4	TTSSCP		91.44	222.25	14.46	354	332	1.428706	0.09898581
6WAP	2016	4	TTSSCP		121.92	222.25	14.46	439	421	1.8291486	0.08098839
6WAP	2016	4	CP		30.48	222.25	14.46	375	352	1.5186931	0.10348516
6WAP	2016	4	CP		60.96	222.25	14.46	326	309	1.3252209	0.07648903
6WAP	2016	4	CP		91.44	222.25	14.46	390	368	1.5906828	0.09898581

6WAP	2016	4	CP		121.92	222.25	14.46	354	332	1.428706	0.09898581
14WAP	2016	1	PM	Proper	30.48	383.02	14.46	653	581	1.4791169	0.18797828
14WAP	2016	1	PM	Proper	60.96	383.02	14.46	563	514	1.3041926	0.12792966
14WAP	2016	1	PM	Proper	91.44	383.02	14.46	540	507	1.285917	0.08615671
14WAP	2016	1	PM	Proper	121.92	383.02	14.46	429	410	1.0326685	0.04960538
14WAP	2016	1	PM	Severe	30.48	383.02	14.46	663	596	1.518279	0.17492423
14WAP	2016	1	PM	Severe	60.96	383.02	14.46	573	534	1.3564088	0.10182157
14WAP	2016	1	PM	Severe	91.44	383.02	14.46	598	566	1.4399547	0.0835459
14WAP	2016	1	PM	Severe	121.92	383.02	14.46	530	504	1.2780846	0.06788105
14WAP	2016	1	PM	Check	30.48	383.02	14.46	675	597	1.5208898	0.20364314
14WAP	2016	1	PM	Check	60.96	383.02	14.46	639	592	1.5078358	0.12270804
14WAP	2016	1	PM	Check	91.44	383.02	14.46	559	534	1.3564088	0.06527024
14WAP	2016	1	PM	Check	121.92	383.02	14.46	687	654	1.669706	0.08615671
14WAP	2016	1	PMMB	Proper	30.48	383.02	14.46	625	551	1.4007926	0.1931999
14WAP	2016	1	PMMB	Proper	60.96	383.02	14.46	581	526	1.3355224	0.14359452
14WAP	2016	1	PMMB	Proper	91.44	383.02	14.46	591	559	1.4216791	0.0835459
14WAP	2016	1	PMMB	Proper	121.92	383.02	14.46	675	639	1.6305438	0.09398914

14WAP	2016	1	PMMB	Check	30.48	383.02	14.46	679	597	1.5208898	0.21408637
14WAP	2016	1	PMMB	Check	60.96	383.02	14.46	559	504	1.2780846	0.14359452
14WAP	2016	1	PMMB	Check	91.44	383.02	14.46	584	546	1.3877386	0.09921076
14WAP	2016	1	PMMB	Check	121.92	383.02	14.46	842	770	1.9725599	0.18797828
14WAP	2016	1	PMMB	Severe	30.48	383.02	14.46	632	575	1.463452	0.14881614
14WAP	2016	1	PMMB	Severe	60.96	383.02	14.46	644	597	1.5208898	0.12270804
14WAP	2016	1	PMMB	Severe	91.44	383.02	14.46	591	557	1.4164575	0.08876752
14WAP	2016	1	PMMB	Severe	121.92	383.02	14.46	685	658	1.6801492	0.07049185
14WAP	2016	1	FS	Severe	30.48	383.02	14.46	659	594	1.5130574	0.16970261
14WAP	2016	1	FS	Severe	60.96	383.02	14.46	576	546	1.3877386	0.07832428
14WAP	2016	1	FS	Severe	91.44	383.02	14.46	614	589	1.5000034	0.06527024
14WAP	2016	1	FS	Severe	121.92	383.02	14.46	684	641	1.6357654	0.11226481
14WAP	2016	1	FS	Check	30.48	383.02	14.46	686	607	1.5469979	0.20625395
14WAP	2016	1	FS	Check	60.96	383.02	14.46	586	545	1.3851277	0.10704319
14WAP	2016	1	FS	Check	91.44	383.02	14.46	580	542	1.3772953	0.09921076
14WAP	2016	1	FS	Check	121.92	383.02	14.46	704	638	1.627933	0.17231342
14WAP	2016	1	FS	Proper	30.48	383.02	14.46	631	563	1.4321223	0.17753504

14WAP	2016	1	FS	Proper	60.96	383.02	14.46	656	618	1.5757168	0.09921076
14WAP	2016	1	FS	Proper	91.44	383.02	14.46	668	635	1.6201006	0.08615671
14WAP	2016	1	FS	Proper	121.92	383.02	14.46	588	557	1.4164575	0.08093509
14WAP	2016	1	TTSS	Proper	30.48	383.02	14.46	713	628	1.6018249	0.2219188
14WAP	2016	1	TTSS	Proper	60.96	383.02	14.46	677	630	1.6070465	0.12270804
14WAP	2016	1	TTSS	Proper	91.44	383.02	14.46	610	584	1.4869493	0.06788105
14WAP	2016	1	TTSS	Proper	121.92	383.02	14.46	534	514	1.3041926	0.05221619
14WAP	2016	1	TTSS	Severe	30.48	383.02	14.46	491	446	1.1266576	0.11748642
14WAP	2016	1	TTSS	Severe	60.96	383.02	14.46	621	577	1.4686736	0.11487562
14WAP	2016	1	TTSS	Severe	91.44	383.02	14.46	649	617	1.573106	0.0835459
14WAP	2016	1	TTSS	Severe	121.92	383.02	14.46	542	524	1.3303007	0.04699457
14WAP	2016	1	TTSS	Check	30.48	383.02	14.46	683	602	1.5339439	0.21147556
14WAP	2016	1	TTSS	Check	60.96	383.02	14.46	623	574	1.4608412	0.12792966
14WAP	2016	1	TTSS	Check	91.44	383.02	14.46	656	625	1.5939925	0.08093509
14WAP	2016	1	TTSS	Check	121.92	383.02	14.46	534	505	1.2806954	0.07571347
14WAP	2016	1	FALLOW	Fallow	30.48	383.02	14.46			-0.0377634	0

14WAP	2016	1	FALLOW	Fallow	60.96	383.02	14.46			-0.0377634	0
14WAP	2016	1	FALLOW	Fallow	91.44	383.02	14.46			-0.0377634	0
14WAP	2016	1	FALLOW	Fallow	121.92	383.02	14.46			-0.0377634	0
14WAP	2016	1	FALLOW	Fallow	30.48	383.02	14.46	657	581	1.4791169	0.19842152
14WAP	2016	1	FALLOW	Fallow	60.96	383.02	14.46	610	569	1.4477872	0.10704319
14WAP	2016	1	FALLOW	Fallow	91.44	383.02	14.46	622	592	1.5078358	0.07832428
14WAP	2016	1	FALLOW	Fallow	121.92	383.02	14.46	692	660	1.6853708	0.0835459
14WAP	2016	1	FALLOW	Fallow	30.48	383.02	14.46			-0.0377634	0
14WAP	2016	1	FALLOW	Fallow	60.96	383.02	14.46			-0.0377634	0
14WAP	2016	1	FALLOW	Fallow	91.44	383.02	14.46			-0.0377634	0
14WAP	2016	1	FALLOW	Fallow	121.92	383.02	14.46			-0.0377634	0
14WAP	2016	1	SS	Proper	30.48	383.02	14.46	614	543	1.3799061	0.18536747
14WAP	2016	1	SS	Proper	60.96	383.02	14.46	625	582	1.4817277	0.11226481

14WAP	2016	1	SS	Proper	91.44	383.02	14.46	546	523	1.3276899	0.06004862
14WAP	2016	1	SS	Proper	121.92	383.02	14.46	823	785	2.011722	0.09921076
14WAP	2016	1	SS	Severe	30.48	383.02	14.46	612	545	1.3851277	0.17492423
14WAP	2016	1	SS	Severe	60.96	383.02	14.46	494	462	1.1684306	0.0835459
14WAP	2016	1	SS	Severe	91.44	383.02	14.46	561	537	1.3642413	0.06265943
14WAP	2016	1	SS	Severe	121.92	383.02	14.46	796	762	1.9516734	0.08876752
14WAP	2016	1	SS	Check	30.48	383.02	14.46	680	597	1.5208898	0.21669718
14WAP	2016	1	SS	Check	60.96	383.02	14.46	563	511	1.2963602	0.13576209
14WAP	2016	1	SS	Check	91.44	383.02	14.46	608	575	1.463452	0.08615671
14WAP	2016	1	SS	Check	121.92	383.02	14.46	775	698	1.7845816	0.20103233
14WAP	2016	1	CP	Check	30.48	383.02	14.46	647	583	1.4843385	0.1670918
14WAP	2016	1	CP	Check	60.96	383.02	14.46	633	584	1.4869493	0.12792966
14WAP	2016	1	CP	Check	91.44	383.02	14.46	595	562	1.4295115	0.08615671
14WAP	2016	1	CP	Check	121.92	383.02	14.46	616	587	1.4947817	0.07571347
14WAP	2016	1	CP	Severe	30.48	383.02	14.46	671	618	1.5757168	0.1383729
14WAP	2016	1	CP	Severe	60.96	383.02	14.46	629	588	1.4973925	0.10704319
14WAP	2016	1	CP	Severe	91.44	383.02	14.46	708	682	1.7428086	0.06788105

14WAP	2016	1	CP	Severe	121.92	383.02	14.46	651	628	1.6018249	0.06004862
14WAP	2016	1	CP	Proper	30.48	383.02	14.46	659	585	1.4895601	0.1931999
14WAP	2016	1	CP	Proper	60.96	383.02	14.46	633	589	1.5000034	0.11487562
14WAP	2016	1	CP	Proper	91.44	383.02	14.46	549	530	1.3459656	0.04960538
14WAP	2016	1	CP	Proper	121.92	383.02	14.46	707	685	1.7506411	0.05743781
14WAP	2016	1	MB	Severe	30.48	383.02	14.46	612	562	1.4295115	0.13054047
14WAP	2016	1	MB	Severe	60.96	383.02	14.46	599	549	1.395571	0.13054047
14WAP	2016	1	MB	Severe	91.44	383.02	14.46	663	591	1.505225	0.18797828
14WAP	2016	1	MB	Severe	121.92	383.02	14.46	796	753	1.9281761	0.11226481
14WAP	2016	1	MB	Check	30.48	383.02	14.46	721	637	1.6253222	0.21930799
14WAP	2016	1	MB	Check	60.96	383.02	14.46	639	575	1.463452	0.1670918
14WAP	2016	1	MB	Check	91.44	383.02	14.46	662	588	1.4973925	0.1931999
14WAP	2016	1	MB	Check	121.92	383.02	14.46	797	743	1.902068	0.14098371
14WAP	2016	1	MB	Proper	30.48	383.02	14.46	676	607	1.5469979	0.18014585
14WAP	2016	1	MB	Proper	60.96	383.02	14.46	662	608	1.5496087	0.14098371
14WAP	2016	1	MB	Proper	91.44	383.02	14.46	621	589	1.5000034	0.0835459
14WAP	2016	1	MB	Proper	121.92	383.02	14.46	769	743	1.902068	0.06788105

14WAP	2016	1	TTSSCP	Proper	30.48	383.02	14.46	662	595	1.5156682	0.17492423
14WAP	2016	1	TTSSCP	Proper	60.96	383.02	14.46	627	590	1.5026142	0.09659995
14WAP	2016	1	TTSSCP	Proper	91.44	383.02	14.46	630	598	1.5235006	0.0835459
14WAP	2016	1	TTSSCP	Proper	121.92	383.02	14.46	608	582	1.4817277	0.06788105
14WAP	2016	1	TTSSCP	Check	30.48	383.02	14.46	653	594	1.5130574	0.15403776
14WAP	2016	1	TTSSCP	Check	60.96	383.02	14.46	654	610	1.5548304	0.11487562
14WAP	2016	1	TTSSCP	Check	91.44	383.02	14.46	637	571	1.4530088	0.17231342
14WAP	2016	1	TTSSCP	Check	121.92	383.02	14.46	737	691	1.7663059	0.12009723
14WAP	2016	1	TTSSCP	Severe	30.48	383.02	14.46	638	593	1.5104466	0.11748642
14WAP	2016	1	TTSSCP	Severe	60.96	383.02	14.46	654	607	1.5469979	0.12270804
14WAP	2016	1	TTSSCP	Severe	91.44	383.02	14.46	682	609	1.5522195	0.19058909
14WAP	2016	1	TTSSCP	Severe	121.92	383.02	14.46	725	679	1.7349762	0.12009723
14WAP	2016	2	FALLOW	Fallow	30.48	383.02	14.46			-0.0377634	0
14WAP	2016	2	FALLOW	Fallow	60.96	383.02	14.46			-0.0377634	0
14WAP	2016	2	FALLOW	Fallow	91.44	383.02	14.46			-0.0377634	0

14WAP	2016	2	FALLOW	Fallow	121.92	383.02	14.46			-0.0377634	0
14WAP	2016	2	FALLOW	Fallow	30.48	383.02	14.46	627	554	1.408625	0.19058909
14WAP	2016	2	FALLOW	Fallow	60.96	383.02	14.46	584	515	1.3068035	0.18014585
14WAP	2016	2	FALLOW	Fallow	91.44	383.02	14.46	568	528	1.340744	0.10443238
14WAP	2016	2	FALLOW	Fallow	121.92	383.02	14.46	795	729	1.8655167	0.17231342
14WAP	2016	2	FALLOW	Fallow	30.48	383.02	14.46			-0.0377634	0
14WAP	2016	2	FALLOW	Fallow	60.96	383.02	14.46			-0.0377634	0
14WAP	2016	2	FALLOW	Fallow	91.44	383.02	14.46			-0.0377634	0
14WAP	2016	2	FALLOW	Fallow	121.92	383.02	14.46			-0.0377634	0
14WAP	2016	2	TTSSCP	Check	30.48	383.02	14.46	670	585	1.4895601	0.2219188
14WAP	2016	2	TTSSCP	Check	60.96	383.02	14.46	628	542	1.3772953	0.22452961
14WAP	2016	2	TTSSCP	Check	91.44	383.02	14.46	659	626	1.5966033	0.08615671
14WAP	2016	2	TTSSCP	Check	121.92	383.02	14.46	728	674	1.7219222	0.14098371
14WAP	2016	2	TTSSCP	Severe	30.48	383.02	14.46	679	594	1.5130574	0.2219188
14WAP	2016	2	TTSSCP	Severe	60.96	383.02	14.46	616	565	1.4373439	0.13315128

14WAP	2016	2	TTSSCP	Severe	91.44	383.02	14.46	625	594	1.5130574	0.08093509
14WAP	2016	2	TTSSCP	Severe	121.92	383.02	14.46	650	622	1.5861601	0.07310266
14WAP	2016	2	TTSSCP	Proper	30.48	383.02	14.46	612	538	1.3668521	0.1931999
14WAP	2016	2	TTSSCP	Proper	60.96	383.02	14.46	585	525	1.3329116	0.15664857
14WAP	2016	2	TTSSCP	Proper	91.44	383.02	14.46	607	577	1.4686736	0.07832428
14WAP	2016	2	TTSSCP	Proper	121.92	383.02	14.46	689	660	1.6853708	0.07571347
14WAP	2016	2	PMMB	Severe	30.48	383.02	14.46	622	550	1.3981818	0.18797828
14WAP	2016	2	PMMB	Severe	60.96	383.02	14.46	568	521	1.3224683	0.12270804
14WAP	2016	2	PMMB	Severe	91.44	383.02	14.46	582	552	1.4034034	0.07832428
14WAP	2016	2	PMMB	Severe	121.92	383.02	14.46	759	728	1.8629059	0.08093509
14WAP	2016	2	PMMB	Proper	30.48	383.02	14.46	628	555	1.4112358	0.19058909
14WAP	2016	2	PMMB	Proper	60.96	383.02	14.46	641	589	1.5000034	0.13576209
14WAP	2016	2	PMMB	Proper	91.44	383.02	14.46	508	483	1.2232576	0.06527024
14WAP	2016	2	PMMB	Proper	121.92	383.02	14.46	514	498	1.2624197	0.04177295
14WAP	2016	2	PMMB	Check	30.48	383.02	14.46	610	530	1.3459656	0.20886475
14WAP	2016	2	PMMB	Check	60.96	383.02	14.46	659	571	1.4530088	0.22975123
14WAP	2016	2	PMMB	Check	91.44	383.02	14.46	685	646	1.6488195	0.10182157

14WAP	2016	2	PMMB	Check	121.92	383.02	14.46	589	555	1.4112358	0.08876752
14WAP	2016	2	PM	Severe	30.48	383.02	14.46	614	544	1.3825169	0.18275666
14WAP	2016	2	PM	Severe	60.96	383.02	14.46	655	597	1.5208898	0.15142695
14WAP	2016	2	PM	Severe	91.44	383.02	14.46	711	681	1.7401978	0.07832428
14WAP	2016	2	PM	Severe	121.92	383.02	14.46	449	426	1.0744414	0.06004862
14WAP	2016	2	PM	Proper	30.48	383.02	14.46	572	506	1.2833062	0.17231342
14WAP	2016	2	PM	Proper	60.96	383.02	14.46	568	527	1.3381332	0.10704319
14WAP	2016	2	PM	Proper	91.44	383.02	14.46	567	542	1.3772953	0.06527024
14WAP	2016	2	PM	Proper	121.92	383.02	14.46	783	742	1.8994572	0.10704319
14WAP	2016	2	PM	Check	30.48	383.02	14.46	658	590	1.5026142	0.17753504
14WAP	2016	2	PM	Check	60.96	383.02	14.46	574	539	1.3694629	0.09137833
14WAP	2016	2	PM	Check	91.44	383.02	14.46	579	545	1.3851277	0.08876752
14WAP	2016	2	PM	Check	121.92	383.02	14.46	629	599	1.5261115	0.07832428
14WAP	2016	2	SS	Severe	30.48	383.02	14.46	676	596	1.518279	0.20886475
14WAP	2016	2	SS	Severe	60.96	383.02	14.46	575	536	1.3616305	0.10182157
14WAP	2016	2	SS	Severe	91.44	383.02	14.46	543	519	1.3172467	0.06265943
14WAP	2016	2	SS	Severe	121.92	383.02	14.46	550	530	1.3459656	0.05221619

14WAP	2016	2	SS	Proper	30.48	383.02	14.46	591	519	1.3172467	0.18797828
14WAP	2016	2	SS	Proper	60.96	383.02	14.46	597	544	1.3825169	0.1383729
14WAP	2016	2	SS	Proper	91.44	383.02	14.46	578	540	1.3720737	0.09921076
14WAP	2016	2	SS	Proper	121.92	383.02	14.46	692	656	1.6749276	0.09398914
14WAP	2016	2	SS	Check	30.48	383.02	14.46	659	579	1.4738953	0.20886475
14WAP	2016	2	SS	Check	60.96	383.02	14.46	596	513	1.3015818	0.21669718
14WAP	2016	2	SS	Check	91.44	383.02	14.46	612	580	1.4765061	0.0835459
14WAP	2016	2	SS	Check	121.92	383.02	14.46	689	649	1.6566519	0.10443238
14WAP	2016	2	CP	Check	30.48	383.02	14.46	636	575	1.463452	0.15925938
14WAP	2016	2	CP	Check	60.96	383.02	14.46	598	537	1.3642413	0.15925938
14WAP	2016	2	CP	Check	91.44	383.02	14.46	588	559	1.4216791	0.07571347
14WAP	2016	2	CP	Check	121.92	383.02	14.46	652	622	1.5861601	0.07832428
14WAP	2016	2	CP	Proper	30.48	383.02	14.46	675	619	1.5783276	0.14620533
14WAP	2016	2	CP	Proper	60.96	383.02	14.46	611	579	1.4738953	0.0835459
14WAP	2016	2	CP	Proper	91.44	383.02	14.46	553	528	1.340744	0.06527024
14WAP	2016	2	CP	Proper	121.92	383.02	14.46	621	593	1.5104466	0.07310266
14WAP	2016	2	CP	Severe	30.48	383.02	14.46	688	633	1.614879	0.14359452

14WAP	2016	2	CP	Severe	60.96	383.02	14.46	595	564	1.4347331	0.08093509
14WAP	2016	2	CP	Severe	91.44	383.02	14.46	572	548	1.3929602	0.06265943
14WAP	2016	2	CP	Severe	121.92	383.02	14.46	575	548	1.3929602	0.07049185
14WAP	2016	2	TTSS	Proper	30.48	383.02	14.46	651	576	1.4660628	0.19581071
14WAP	2016	2	TTSS	Proper	60.96	383.02	14.46	601	560	1.4242899	0.10704319
14WAP	2016	2	TTSS	Proper	91.44	383.02	14.46	554	531	1.3485764	0.06004862
14WAP	2016	2	TTSS	Proper	121.92	383.02	14.46	652	635	1.6201006	0.04438376
14WAP	2016	2	TTSS	Check	30.48	383.02	14.46	615	550	1.3981818	0.16970261
14WAP	2016	2	TTSS	Check	60.96	383.02	14.46	610	573	1.4582304	0.09659995
14WAP	2016	2	TTSS	Check	91.44	383.02	14.46	547	524	1.3303007	0.06004862
14WAP	2016	2	TTSS	Check	121.92	383.02	14.46	672	648	1.6540411	0.06265943
14WAP	2016	2	TTSS	Severe	30.48	383.02	14.46	602	539	1.3694629	0.16448099
14WAP	2016	2	TTSS	Severe	60.96	383.02	14.46	571	537	1.3642413	0.08876752
14WAP	2016	2	TTSS	Severe	91.44	383.02	14.46	599	571	1.4530088	0.07310266
14WAP	2016	2	TTSS	Severe	121.92	383.02	14.46	689	662	1.6905924	0.07049185
14WAP	2016	2	FS	Proper	30.48	383.02	14.46	709	629	1.6044357	0.20886475
14WAP	2016	2	FS	Proper	60.96	383.02	14.46	619	565	1.4373439	0.14098371

14WAP	2016	2	FS	Proper	91.44	383.02	14.46	639	579	1.4738953	0.15664857
14WAP	2016	2	FS	Proper	121.92	383.02	14.46	847	798	2.0456625	0.12792966
14WAP	2016	2	FS	Severe	30.48	383.02	14.46	674	604	1.5391655	0.18275666
14WAP	2016	2	FS	Severe	60.96	383.02	14.46	665	606	1.5443871	0.15403776
14WAP	2016	2	FS	Severe	91.44	383.02	14.46	727	674	1.7219222	0.1383729
14WAP	2016	2	FS	Severe	121.92	383.02	14.46	591	556	1.4138466	0.09137833
14WAP	2016	2	FS	Check	30.48	383.02	14.46	672	600	1.5287223	0.18797828
14WAP	2016	2	FS	Check	60.96	383.02	14.46	569	531	1.3485764	0.09921076
14WAP	2016	2	FS	Check	91.44	383.02	14.46	557	519	1.3172467	0.09921076
14WAP	2016	2	FS	Check	121.92	383.02	14.46	408	392	0.9856739	0.04177295
14WAP	2016	2	MB	Severe	30.48	383.02	14.46	678	629	1.6044357	0.12792966
14WAP	2016	2	MB	Severe	60.96	383.02	14.46	524	496	1.2571981	0.07310266
14WAP	2016	2	MB	Severe	91.44	383.02	14.46	569	544	1.3825169	0.06527024
14WAP	2016	2	MB	Severe	121.92	383.02	14.46	640	612	1.560052	0.07310266
14WAP	2016	2	MB	Check	30.48	383.02	14.46	638	583	1.4843385	0.14359452
14WAP	2016	2	MB	Check	60.96	383.02	14.46	653	605	1.5417763	0.12531885
14WAP	2016	2	MB	Check	91.44	383.02	14.46	607	555	1.4112358	0.13576209

14WAP	2016	2	MB	Check	121.92	383.02	14.46	816	768	1.9673382	0.12531885
14WAP	2016	2	MB	Proper	30.48	383.02	14.46	616	562	1.4295115	0.14098371
14WAP	2016	2	MB	Proper	60.96	383.02	14.46	645	601	1.5313331	0.11487562
14WAP	2016	2	MB	Proper	91.44	383.02	14.46	657	633	1.614879	0.06265943
14WAP	2016	2	MB	Proper	121.92	383.02	14.46	624	565	1.4373439	0.15403776
14WAP	2016	3	SS	Check	30.48	383.02	14.46	654	569	1.4477872	0.2219188
14WAP	2016	3	SS	Check	60.96	383.02	14.46	575	494	1.2519765	0.21147556
14WAP	2016	3	SS	Check	91.44	383.02	14.46	588	541	1.3746845	0.12270804
14WAP	2016	3	SS	Check	121.92	383.02	14.46	708	659	1.68276	0.12792966
14WAP	2016	3	SS	Proper	30.48	383.02	14.46	659	589	1.5000034	0.18275666
14WAP	2016	3	SS	Proper	60.96	383.02	14.46	634	582	1.4817277	0.13576209
14WAP	2016	3	SS	Proper	91.44	383.02	14.46	587	549	1.395571	0.09921076
14WAP	2016	3	SS	Proper	121.92	383.02	14.46	717	667	1.7036465	0.13054047
14WAP	2016	3	SS	Severe	30.48	383.02	14.46	668	594	1.5130574	0.1931999
14WAP	2016	3	SS	Severe	60.96	383.02	14.46	556	514	1.3041926	0.109654
14WAP	2016	3	SS	Severe	91.44	383.02	14.46	531	497	1.2598089	0.08876752
14WAP	2016	3	SS	Severe	121.92	383.02	14.46	626	590	1.5026142	0.09398914

14WAP	2016	3	MB	Proper	30.48	383.02	14.46	721	633	1.614879	0.22975123
14WAP	2016	3	MB	Proper	60.96	383.02	14.46	573	532	1.3511872	0.10704319
14WAP	2016	3	MB	Proper	91.44	383.02	14.46	587	554	1.408625	0.08615671
14WAP	2016	3	MB	Proper	121.92	383.02	14.46	803	760	1.9464518	0.11226481
14WAP	2016	3	MB	Severe	30.48	383.02	14.46	655	585	1.4895601	0.18275666
14WAP	2016	3	MB	Severe	60.96	383.02	14.46	590	542	1.3772953	0.12531885
14WAP	2016	3	MB	Severe	91.44	383.02	14.46	597	568	1.4451764	0.07571347
14WAP	2016	3	MB	Severe	121.92	383.02	14.46	787	740	1.8942356	0.12270804
14WAP	2016	3	MB	Check	30.48	383.02	14.46	644	560	1.4242899	0.21930799
14WAP	2016	3	MB	Check	60.96	383.02	14.46	675	595	1.5156682	0.20886475
14WAP	2016	3	MB	Check	91.44	383.02	14.46	544	499	1.2650305	0.11748642
14WAP	2016	3	MB	Check	121.92	383.02	14.46	708	646	1.6488195	0.16187018
14WAP	2016	3	CP	Severe	30.48	383.02	14.46	675	602	1.5339439	0.19058909
14WAP	2016	3	CP	Severe	60.96	383.02	14.46	597	554	1.408625	0.11226481
14WAP	2016	3	CP	Severe	91.44	383.02	14.46	627	592	1.5078358	0.09137833
14WAP	2016	3	CP	Severe	121.92	383.02	14.46	721	697	1.7819708	0.06265943
14WAP	2016	3	CP	Proper	30.48	383.02	14.46	666	600	1.5287223	0.17231342

14WAP	2016	3	CP	Proper	60.96	383.02	14.46	576	531	1.3485764	0.11748642
14WAP	2016	3	CP	Proper	91.44	383.02	14.46	516	487	1.2337008	0.07571347
14WAP	2016	3	CP	Proper	121.92	383.02	14.46	773	738	1.889014	0.09137833
14WAP	2016	3	CP	Check	30.48	383.02	14.46	642	563	1.4321223	0.20625395
14WAP	2016	3	CP	Check	60.96	383.02	14.46	629	563	1.4321223	0.17231342
14WAP	2016	3	CP	Check	91.44	383.02	14.46	571	534	1.3564088	0.09659995
14WAP	2016	3	CP	Check	121.92	383.02	14.46	803	736	1.8837923	0.17492423
14WAP	2016	3	PMMB	Severe	30.48	383.02	14.46	612	540	1.3720737	0.18797828
14WAP	2016	3	PMMB	Severe	60.96	383.02	14.46	582	546	1.3877386	0.09398914
14WAP	2016	3	PMMB	Severe	91.44	383.02	14.46	584	558	1.4190683	0.06788105
14WAP	2016	3	PMMB	Severe	121.92	383.02	14.46	772	740	1.8942356	0.0835459
14WAP	2016	3	PMMB	Check	30.48	383.02	14.46	650	568	1.4451764	0.21408637
14WAP	2016	3	PMMB	Check	60.96	383.02	14.46	590	540	1.3720737	0.13054047
14WAP	2016	3	PMMB	Check	91.44	383.02	14.46	579	549	1.395571	0.07832428
14WAP	2016	3	PMMB	Check	121.92	383.02	14.46	684	632	1.6122682	0.13576209
14WAP	2016	3	PMMB	Proper	30.48	383.02	14.46	610	545	1.3851277	0.16970261
14WAP	2016	3	PMMB	Proper	60.96	383.02	14.46	556	512	1.298971	0.11487562

14WAP	2016	3	PMMB	Proper	91.44	383.02	14.46	565	536	1.3616305	0.07571347
14WAP	2016	3	PMMB	Proper	121.92	383.02	14.46	668	640	1.6331546	0.07310266
14WAP	2016	3	FALLOW	Fallow	30.48	383.02	14.46			-0.0377634	0
14WAP	2016	3	FALLOW	Fallow	60.96	383.02	14.46			-0.0377634	0
14WAP	2016	3	FALLOW	Fallow	91.44	383.02	14.46			-0.0377634	0
14WAP	2016	3	FALLOW	Fallow	121.92	383.02	14.46			-0.0377634	0
14WAP	2016	3	FALLOW	Fallow	30.48	383.02	14.46	638	563	1.4321223	0.19581071
14WAP	2016	3	FALLOW	Fallow	60.96	383.02	14.46	525	479	1.2128143	0.12009723
14WAP	2016	3	FALLOW	Fallow	91.44	383.02	14.46	546	519	1.3172467	0.07049185
14WAP	2016	3	FALLOW	Fallow	121.92	383.02	14.46	712	680	1.737587	0.0835459
14WAP	2016	3	FALLOW	Fallow	30.48	383.02	14.46			-0.0377634	0
14WAP	2016	3	FALLOW	Fallow	60.96	383.02	14.46			-0.0377634	0
14WAP	2016	3	FALLOW	Fallow	91.44	383.02	14.46			-0.0377634	0

14WAP	2016	3	FALLOW	Fallow	121.92	383.02	14.46			-0.0377634	0
14WAP	2016	3	TTSSCP	Severe	30.48	383.02	14.46	643	577	1.4686736	0.17231342
14WAP	2016	3	TTSSCP	Severe	60.96	383.02	14.46	590	557	1.4164575	0.08615671
14WAP	2016	3	TTSSCP	Severe	91.44	383.02	14.46	598	575	1.463452	0.06004862
14WAP	2016	3	TTSSCP	Severe	121.92	383.02	14.46	632	612	1.560052	0.05221619
14WAP	2016	3	TTSSCP	Proper	30.48	383.02	14.46	639	569	1.4477872	0.18275666
14WAP	2016	3	TTSSCP	Proper	60.96	383.02	14.46	586	553	1.4060142	0.08615671
14WAP	2016	3	TTSSCP	Proper	91.44	383.02	14.46	550	531	1.3485764	0.04960538
14WAP	2016	3	TTSSCP	Proper	121.92	383.02	14.46	619	598	1.5235006	0.054827
14WAP	2016	3	TTSSCP	Check	30.48	383.02	14.46	633	557	1.4164575	0.19842152
14WAP	2016	3	TTSSCP	Check	60.96	383.02	14.46	532	490	1.2415332	0.109654
14WAP	2016	3	TTSSCP	Check	91.44	383.02	14.46	523	497	1.2598089	0.06788105
14WAP	2016	3	TTSSCP	Check	121.92	383.02	14.46	790	745	1.9072896	0.11748642
14WAP	2016	3	FS	Severe	30.48	383.02	14.46	681	603	1.5365547	0.20364314
14WAP	2016	3	FS	Severe	60.96	383.02	14.46	639	580	1.4765061	0.15403776
14WAP	2016	3	FS	Severe	91.44	383.02	14.46	741	706	1.8054681	0.09137833
14WAP	2016	3	FS	Severe	121.92	383.02	14.46	514	447	1.1292684	0.17492423

14WAP	2016	3	FS	Check	30.48	383.02	14.46	661	582	1.4817277	0.20625395
14WAP	2016	3	FS	Check	60.96	383.02	14.46	566	521	1.3224683	0.11748642
14WAP	2016	3	FS	Check	91.44	383.02	14.46	600	571	1.4530088	0.07571347
14WAP	2016	3	FS	Check	121.92	383.02	14.46	714	688	1.7584735	0.06788105
14WAP	2016	3	FS	Proper	30.48	383.02	14.46	627	560	1.4242899	0.17492423
14WAP	2016	3	FS	Proper	60.96	383.02	14.46	549	514	1.3041926	0.09137833
14WAP	2016	3	FS	Proper	91.44	383.02	14.46	582	559	1.4216791	0.06004862
14WAP	2016	3	FS	Proper	121.92	383.02	14.46	747	737	1.8864032	0.02610809
14WAP	2016	3	PM	Check	30.48	383.02	14.46	710	623	1.5887709	0.22714042
14WAP	2016	3	PM	Check	60.96	383.02	14.46	626	574	1.4608412	0.13576209
14WAP	2016	3	PM	Check	91.44	383.02	14.46	660	588	1.4973925	0.18797828
14WAP	2016	3	PM	Check	121.92	383.02	14.46	890	776	1.9882247	0.29763228
14WAP	2016	3	PM	Severe	30.48	383.02	14.46	625	551	1.4007926	0.1931999
14WAP	2016	3	PM	Severe	60.96	383.02	14.46	674	581	1.4791169	0.24280528
14WAP	2016	3	PM	Severe	91.44	383.02	14.46	685	581	1.4791169	0.27152418
14WAP	2016	3	PM	Severe	121.92	383.02	14.46	728	654	1.669706	0.1931999
14WAP	2016	3	PM	Proper	30.48	383.02	14.46	693	609	1.5522195	0.21930799

14WAP	2016	3	PM	Proper	60.96	383.02	14.46	706	640	1.6331546	0.17231342
14WAP	2016	3	PM	Proper	91.44	383.02	14.46	668	612	1.560052	0.14620533
14WAP	2016	3	PM	Proper	121.92	383.02	14.46	655	631	1.6096574	0.06265943
14WAP	2016	3	TTSS	Check	30.48	383.02	14.46	593	526	1.3355224	0.17492423
14WAP	2016	3	TTSS	Check	60.96	383.02	14.46	641	573	1.4582304	0.17753504
14WAP	2016	3	TTSS	Check	91.44	383.02	14.46	526	499	1.2650305	0.07049185
14WAP	2016	3	TTSS	Check	121.92	383.02	14.46	707	661	1.6879816	0.12009723
14WAP	2016	3	TTSS	Proper	30.48	383.02	14.46	645	575	1.463452	0.18275666
14WAP	2016	3	TTSS	Proper	60.96	383.02	14.46	520	489	1.2389224	0.08093509
14WAP	2016	3	TTSS	Proper	91.44	383.02	14.46	544	516	1.3094143	0.07310266
14WAP	2016	3	TTSS	Proper	121.92	383.02	14.46	762	729	1.8655167	0.08615671
14WAP	2016	3	TTSS	Severe	30.48	383.02	14.46	584	541	1.3746845	0.11226481
14WAP	2016	3	TTSS	Severe	60.96	383.02	14.46	638	565	1.4373439	0.19058909
14WAP	2016	3	TTSS	Severe	91.44	383.02	14.46	569	538	1.3668521	0.08093509
14WAP	2016	3	TTSS	Severe	121.92	383.02	14.46	654	630	1.6070465	0.06265943
14WAP	2016	4	FS	Severe	30.48	383.02	14.46	578	515	1.3068035	0.16448099
14WAP	2016	4	FS	Severe	60.96	383.02	14.46	606	557	1.4164575	0.12792966

14WAP	2016	4	FS	Severe	91.44	383.02	14.46	594	558	1.4190683	0.09398914
14WAP	2016	4	FS	Severe	121.92	383.02	14.46	801	759	1.943841	0.109654
14WAP	2016	4	FS	Check	30.48	383.02	14.46	709	622	1.5861601	0.22714042
14WAP	2016	4	FS	Check	60.96	383.02	14.46	536	489	1.2389224	0.12270804
14WAP	2016	4	FS	Check	91.44	383.02	14.46	565	529	1.3433548	0.09398914
14WAP	2016	4	FS	Check	121.92	383.02	14.46	769	720	1.8420194	0.12792966
14WAP	2016	4	FS	Proper	30.48	383.02	14.46	635	555	1.4112358	0.20886475
14WAP	2016	4	FS	Proper	60.96	383.02	14.46	567	483	1.2232576	0.21930799
14WAP	2016	4	FS	Proper	91.44	383.02	14.46	614	541	1.3746845	0.19058909
14WAP	2016	4	FS	Proper	121.92	383.02	14.46	729	654	1.669706	0.19581071
14WAP	2016	4	SS	Check	30.48	383.02	14.46	664	581	1.4791169	0.21669718
14WAP	2016	4	SS	Check	60.96	383.02	14.46	557	508	1.2885278	0.12792966
14WAP	2016	4	SS	Check	91.44	383.02	14.46	520	490	1.2415332	0.07832428
14WAP	2016	4	SS	Check	121.92	383.02	14.46	793	734	1.8785707	0.15403776
14WAP	2016	4	SS	Proper	30.48	383.02	14.46	613	540	1.3720737	0.19058909
14WAP	2016	4	SS	Proper	60.96	383.02	14.46	597	545	1.3851277	0.13576209
14WAP	2016	4	SS	Proper	91.44	383.02	14.46	537	505	1.2806954	0.0835459

14WAP	2016	4	SS	Proper	121.92	383.02	14.46	657	623	1.5887709	0.08876752
14WAP	2016	4	SS	Severe	30.48	383.02	14.46	679	601	1.5313331	0.20364314
14WAP	2016	4	SS	Severe	60.96	383.02	14.46	565	521	1.3224683	0.11487562
14WAP	2016	4	SS	Severe	91.44	383.02	14.46	572	540	1.3720737	0.0835459
14WAP	2016	4	SS	Severe	121.92	383.02	14.46	665	634	1.6174898	0.08093509
14WAP	2016	4	PMMB	Severe	30.48	383.02	14.46	591	519	1.3172467	0.18797828
14WAP	2016	4	PMMB	Severe	60.96	383.02	14.46	592	541	1.3746845	0.13315128
14WAP	2016	4	PMMB	Severe	91.44	383.02	14.46	554	523	1.3276899	0.08093509
14WAP	2016	4	PMMB	Severe	121.92	383.02	14.46	665	640	1.6331546	0.06527024
14WAP	2016	4	PMMB	Proper	30.48	383.02	14.46	631	572	1.4556196	0.15403776
14WAP	2016	4	PMMB	Proper	60.96	383.02	14.46	573	521	1.3224683	0.13576209
14WAP	2016	4	PMMB	Proper	91.44	383.02	14.46	589	556	1.4138466	0.08615671
14WAP	2016	4	PMMB	Proper	121.92	383.02	14.46	818	784	2.0091112	0.08876752
14WAP	2016	4	PMMB	Check	30.48	383.02	14.46	589	510	1.2937494	0.20625395
14WAP	2016	4	PMMB	Check	60.96	383.02	14.46	652	565	1.4373439	0.22714042
14WAP	2016	4	PMMB	Check	91.44	383.02	14.46	593	547	1.3903494	0.12009723
14WAP	2016	4	PMMB	Check	121.92	383.02	14.46	632	589	1.5000034	0.11226481

14WAP	2016	4	TTSS	Severe	30.48	383.02	14.46	622	556	1.4138466	0.17231342
14WAP	2016	4	TTSS	Severe	60.96	383.02	14.46	588	546	1.3877386	0.109654
14WAP	2016	4	TTSS	Severe	91.44	383.02	14.46	577	545	1.3851277	0.0835459
14WAP	2016	4	TTSS	Severe	121.92	383.02	14.46	697	654	1.669706	0.11226481
14WAP	2016	4	TTSS	Check	30.48	383.02	14.46	655	579	1.4738953	0.19842152
14WAP	2016	4	TTSS	Check	60.96	383.02	14.46	551	506	1.2833062	0.11748642
14WAP	2016	4	TTSS	Check	91.44	383.02	14.46	529	497	1.2598089	0.0835459
14WAP	2016	4	TTSS	Check	121.92	383.02	14.46	782	726	1.8576842	0.14620533
14WAP	2016	4	TTSS	Proper	30.48	383.02	14.46	631	557	1.4164575	0.1931999
14WAP	2016	4	TTSS	Proper	60.96	383.02	14.46	577	538	1.3668521	0.10182157
14WAP	2016	4	TTSS	Proper	91.44	383.02	14.46	565	533	1.353798	0.0835459
14WAP	2016	4	TTSS	Proper	121.92	383.02	14.46	646	614	1.5652736	0.0835459
14WAP	2016	4	FALLOW	Fallow	30.48	383.02	14.46			-0.0377634	0
14WAP	2016	4	FALLOW	Fallow	60.96	383.02	14.46			-0.0377634	0
14WAP	2016	4	FALLOW	Fallow	91.44	383.02	14.46			-0.0377634	0

14WAP	2016	4	FALLOW	Fallow	121.92	383.02	14.46			-0.0377634	0
14WAP	2016	4	FALLOW	Fallow	30.48	383.02	14.46	659	590	1.5026142	0.18014585
14WAP	2016	4	FALLOW	Fallow	60.96	383.02	14.46	588	548	1.3929602	0.10443238
14WAP	2016	4	FALLOW	Fallow	91.44	383.02	14.46	568	542	1.3772953	0.06788105
14WAP	2016	4	FALLOW	Fallow	121.92	383.02	14.46	684	653	1.6670952	0.08093509
14WAP	2016	4	FALLOW	Fallow	30.48	383.02	14.46			-0.0377634	0
14WAP	2016	4	FALLOW	Fallow	60.96	383.02	14.46			-0.0377634	0
14WAP	2016	4	FALLOW	Fallow	91.44	383.02	14.46			-0.0377634	0
14WAP	2016	4	FALLOW	Fallow	121.92	383.02	14.46			-0.0377634	0
14WAP	2016	4	PM	Proper	30.48	383.02	14.46	671	589	1.5000034	0.21408637
14WAP	2016	4	PM	Proper	60.96	383.02	14.46	608	563	1.4321223	0.11748642
14WAP	2016	4	PM	Proper	91.44	383.02	14.46	588	557	1.4164575	0.08093509
14WAP	2016	4	PM	Proper	121.92	383.02	14.46	742	721	1.8446302	0.054827
14WAP	2016	4	PM	Severe	30.48	383.02	14.46	688	615	1.5678844	0.19058909
14WAP	2016	4	PM	Severe	60.96	383.02	14.46	596	560	1.4242899	0.09398914

14WAP	2016	4	PM	Severe	91.44	383.02	14.46	541	514	1.3041926	0.07049185
14WAP	2016	4	PM	Severe	121.92	383.02	14.46	662	636	1.6227114	0.06788105
14WAP	2016	4	PM	Check	30.48	383.02	14.46	645	567	1.4425655	0.20364314
14WAP	2016	4	PM	Check	60.96	383.02	14.46	640	577	1.4686736	0.16448099
14WAP	2016	4	PM	Check	91.44	383.02	14.46	560	530	1.3459656	0.07832428
14WAP	2016	4	PM	Check	121.92	383.02	14.46	583	553	1.4060142	0.07832428
14WAP	2016	4	MB	Severe	30.48	383.02	14.46	669	597	1.5208898	0.18797828
14WAP	2016	4	MB	Severe	60.96	383.02	14.46	602	546	1.3877386	0.14620533
14WAP	2016	4	MB	Severe	91.44	383.02	14.46	631	577	1.4686736	0.14098371
14WAP	2016	4	MB	Severe	121.92	383.02	14.46	821	792	2.0299977	0.07571347
14WAP	2016	4	MB	Check	30.48	383.02	14.46	665	589	1.5000034	0.19842152
14WAP	2016	4	MB	Check	60.96	383.02	14.46	683	610	1.5548304	0.19058909
14WAP	2016	4	MB	Check	91.44	383.02	14.46	568	537	1.3642413	0.08093509
14WAP	2016	4	MB	Check	121.92	383.02	14.46	741	711	1.8185221	0.07832428
14WAP	2016	4	MB	Proper	30.48	383.02	14.46	651	581	1.4791169	0.18275666
14WAP	2016	4	MB	Proper	60.96	383.02	14.46	607	564	1.4347331	0.11226481
14WAP	2016	4	MB	Proper	91.44	383.02	14.46	541	510	1.2937494	0.08093509

14WAP	2016	4	MB	Proper	121.92	383.02	14.46	573	555	1.4112358	0.04699457
14WAP	2016	4	TTSSCP	Check	30.48	383.02	14.46	681	603	1.5365547	0.20364314
14WAP	2016	4	TTSSCP	Check	60.96	383.02	14.46	614	559	1.4216791	0.14359452
14WAP	2016	4	TTSSCP	Check	91.44	383.02	14.46	623	564	1.4347331	0.15403776
14WAP	2016	4	TTSSCP	Check	121.92	383.02	14.46	591	546	1.3877386	0.11748642
14WAP	2016	4	TTSSCP	Proper	30.48	383.02	14.46	662	590	1.5026142	0.18797828
14WAP	2016	4	TTSSCP	Proper	60.96	383.02	14.46	627	577	1.4686736	0.13054047
14WAP	2016	4	TTSSCP	Proper	91.44	383.02	14.46	651	576	1.4660628	0.19581071
14WAP	2016	4	TTSSCP	Proper	121.92	383.02	14.46	817	759	1.943841	0.15142695
14WAP	2016	4	TTSSCP	Severe	30.48	383.02	14.46	674	599	1.5261115	0.19581071
14WAP	2016	4	TTSSCP	Severe	60.96	383.02	14.46	597	549	1.395571	0.12531885
14WAP	2016	4	TTSSCP	Severe	91.44	383.02	14.46	674	597	1.5208898	0.20103233
14WAP	2016	4	TTSSCP	Severe	121.92	383.02	14.46	831	770	1.9725599	0.15925938
14WAP	2016	4	CP	Check	30.48	383.02	14.46	665	594	1.5130574	0.18536747
14WAP	2016	4	CP	Check	60.96	383.02	14.46	672	607	1.5469979	0.16970261
14WAP	2016	4	CP	Check	91.44	383.02	14.46	617	582	1.4817277	0.09137833
14WAP	2016	4	CP	Check	121.92	383.02	14.46	563	530	1.3459656	0.08615671

14WAP	2016	4	CP	Severe	30.48	383.02	14.46	669	597	1.5208898	0.18797828
14WAP	2016	4	CP	Severe	60.96	383.02	14.46	575	538	1.3668521	0.09659995
14WAP	2016	4	CP	Severe	91.44	383.02	14.46	541	514	1.3041926	0.07049185
14WAP	2016	4	CP	Severe	121.92	383.02	14.46	695	665	1.6984249	0.07832428
14WAP	2016	4	CP	Proper	30.48	383.02	14.46	652	580	1.4765061	0.18797828
14WAP	2016	4	CP	Proper	60.96	383.02	14.46	580	534	1.3564088	0.12009723
14WAP	2016	4	CP	Proper	91.44	383.02	14.46	566	537	1.3642413	0.07571347
14WAP	2016	4	CP	Proper	121.92	383.02	14.46	613	569	1.4477872	0.11487562
Planting	2017	1	PM	Proper	30.48	324.90	14.46	509.97	456.96	1.3619621	0.16316001
Planting	2017	1	PM	Proper	60.96	324.90	14.46	476.11	437.85	1.3031432	0.11776084
Planting	2017	1	PM	Proper	91.44	324.90	14.46	491.15	462.38	1.3786444	0.08855147
Planting	2017	1	PM	Proper	121.92	324.90	14.46	500.15	472.57	1.4100083	0.08488876
Planting	2017	1	PM	Severe	30.48	324.90	14.46	556.11	495.15	1.4795075	0.18762939
Planting	2017	1	PM	Severe	60.96	324.90	14.46	462.6	420.41	1.2494645	0.12985702
Planting	2017	1	PM	Severe	91.44	324.90	14.46	494.54	460.06	1.3715036	0.10612634
Planting	2017	1	PM	Severe	121.92	324.90	14.46	557.86	514.73	1.5397729	0.13275026
Planting	2017	1	PM	Check	30.48	324.90	14.46	488.4	439.87	1.3093606	0.14937097

Planting	2017	1	PM	Check	60.96	324.90	14.46	424.34	394.64	1.1701467	0.09141393
Planting	2017	1	PM	Check	91.44	324.90	14.46	423.82	399.31	1.1845206	0.07543957
Planting	2017	1	PM	Check	121.92	324.90	14.46	283.03	269.52	0.7850386	0.04158256
Planting	2017	1	PMMB	Proper	30.48	324.90	14.46	491.18	444.43	1.3233959	0.14389229
Planting	2017	1	PMMB	Proper	60.96	324.90	14.46	463.77	436.24	1.2981878	0.08473486
Planting	2017	1	PMMB	Proper	91.44	324.90	14.46	440.46	419.9	1.2478947	0.06328183
Planting	2017	1	PMMB	Proper	121.92	324.90	14.46	546.16	523.17	1.5657505	0.07076115
Planting	2017	1	PMMB	Check	30.48	324.90	14.46	501.94	444.27	1.3229034	0.17750307
Planting	2017	1	PMMB	Check	60.96	324.90	14.46	446.02	419.75	1.2474331	0.0808567
Planting	2017	1	PMMB	Check	91.44	324.90	14.46	489.75	462.7	1.3796293	0.08325746
Planting	2017	1	PMMB	Check	121.92	324.90	14.46	543.07	512.13	1.5317704	0.09523053
Planting	2017	1	PMMB	Severe	30.48	324.90	14.46	486.03	438.96	1.3065597	0.14487722
Planting	2017	1	PMMB	Severe	60.96	324.90	14.46	487.73	431.28	1.2829214	0.17374802
Planting	2017	1	PMMB	Severe	91.44	324.90	14.46	466.5	417.87	1.2416466	0.14967876
Planting	2017	1	PMMB	Severe	121.92	324.90	14.46	508.8	466.05	1.3899403	0.13158065
Planting	2017	1	FS	Severe	30.48	324.90	14.46	519.27	470.31	1.4030522	0.15069447
Planting	2017	1	FS	Severe	60.96	324.90	14.46	457.38	411.83	1.223056	0.1401988

Planting	2017	1	FS	Severe	91.44	324.90	14.46	473.19	438.42	1.3048976	0.10701893
Planting	2017	1	FS	Severe	121.92	324.90	14.46	498.29	462.76	1.379814	0.10935814
Planting	2017	1	FS	Check	30.48	324.90	14.46	535.96	492.85	1.4724283	0.1326887
Planting	2017	1	FS	Check	60.96	324.90	14.46	437.93	404.43	1.2002795	0.10310998
Planting	2017	1	FS	Check	91.44	324.90	14.46	470.38	451.11	1.3439563	0.05931133
Planting	2017	1	FS	Check	121.92	324.90	14.46	584.76	544.19	1.6304482	0.12487081
Planting	2017	1	FS	Proper	30.48	324.90	14.46	521.62	469.76	1.4013593	0.15962041
Planting	2017	1	FS	Proper	60.96	324.90	14.46	426.97	402.07	1.1930156	0.07663996
Planting	2017	1	FS	Proper	91.44	324.90	14.46	490.6	468.68	1.3980352	0.06746779
Planting	2017	1	FS	Proper	121.92	324.90	14.46	487.75	467.43	1.3941878	0.06254313
Planting	2017	1	TTSS	Proper	30.48	324.90	14.46	465.32	430.37	1.2801205	0.10757295
Planting	2017	1	TTSS	Proper	60.96	324.90	14.46	490.08	456.87	1.3616851	0.10221739
Planting	2017	1	TTSS	Proper	91.44	324.90	14.46	461.29	435.26	1.2951714	0.080118
Planting	2017	1	TTSS	Proper	121.92	324.90	14.46	548.85	528	1.5806168	0.06417442
Planting	2017	1	TTSS	Severe	30.48	324.90	14.46	536.93	490.36	1.4647643	0.14333827
Planting	2017	1	TTSS	Severe	60.96	324.90	14.46	489.58	455.51	1.3574991	0.10486439
Planting	2017	1	TTSS	Severe	91.44	324.90	14.46	457.51	432.79	1.287569	0.07608593

Planting	2017	1	TTSS	Severe	121.92	324.90	14.46	581.41	557.28	1.670738	0.07426997
Planting	2017	1	TTSS	Check	30.48	324.90	14.46	490.29	447.95	1.3342301	0.13031871
Planting	2017	1	TTSS	Check	60.96	324.90	14.46	499.79	468.29	1.3968348	0.09695416
Planting	2017	1	TTSS	Check	91.44	324.90	14.46	485.14	461.96	1.3773516	0.07134595
Planting	2017	1	TTSS	Check	121.92	324.90	14.46	397.69	382.11	1.1315805	0.04795384
Planting	2017	1	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2017	1	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2017	1	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2017	1	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2017	1	FALLOW	Fallow	30.48	324.90	14.46	494.19	452.12	1.347065	0.12948767
Planting	2017	1	FALLOW	Fallow	60.96	324.90	14.46	451.04	422.26	1.2551586	0.08858225
Planting	2017	1	FALLOW	Fallow	91.44	324.90	14.46	501.82	479.78	1.4322	0.06783714
Planting	2017	1	FALLOW	Fallow	121.92	324.90	14.46	633.08	606.68	1.8227868	0.08125682
Planting	2017	1	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0

Planting	2017	1	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2017	1	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2017	1	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2017	1	SS	Proper	30.48	324.90	14.46	542.86	491.07	1.4669496	0.15940496
Planting	2017	1	SS	Proper	60.96	324.90	14.46	432.27	400.85	1.1892606	0.09670793
Planting	2017	1	SS	Proper	91.44	324.90	14.46	494.23	470	1.402098	0.07457776
Planting	2017	1	SS	Proper	121.92	324.90	14.46	527.52	500.82	1.4969592	0.0821802
Planting	2017	1	SS	Severe	30.48	324.90	14.46	522.51	474.54	1.4160717	0.14764734
Planting	2017	1	SS	Severe	60.96	324.90	14.46	487.12	449.75	1.3397704	0.1150215
Planting	2017	1	SS	Severe	91.44	324.90	14.46	487.69	462.96	1.3804295	0.07611671
Planting	2017	1	SS	Severe	121.92	324.90	14.46	533.78	492.05	1.4699659	0.12844118
Planting	2017	1	SS	Check	30.48	324.90	14.46	527.11	475.36	1.4185956	0.15928184
Planting	2017	1	SS	Check	60.96	324.90	14.46	463.03	434.56	1.2930169	0.0876281
Planting	2017	1	SS	Check	91.44	324.90	14.46	493.51	470	1.402098	0.07236166
Planting	2017	1	SS	Check	121.92	324.90	14.46	491.39	456.55	1.3607001	0.10723438
Planting	2017	1	CP	Check	30.48	324.90	14.46	470.84	431.17	1.2825828	0.12210069

Planting	2017	1	CP	Check	60.96	324.90	14.46	524.03	487.09	1.4546995	0.11369799
Planting	2017	1	CP	Check	91.44	324.90	14.46	499.56	479.23	1.4305071	0.06257391
Planting	2017	1	CP	Check	121.92	324.90	14.46	645.53	615.29	1.8492876	0.093076
Planting	2017	1	CP	Severe	30.48	324.90	14.46	535.32	496.04	1.4822468	0.1209003
Planting	2017	1	CP	Severe	60.96	324.90	14.46	480.67	448.91	1.3371849	0.09775442
Planting	2017	1	CP	Severe	91.44	324.90	14.46	505.68	483.2	1.4427264	0.06919142
Planting	2017	1	CP	Severe	121.92	324.90	14.46	536.3	511.65	1.530293	0.07587048
Planting	2017	1	CP	Proper	30.48	324.90	14.46	505.55	463.42	1.3818454	0.12967235
Planting	2017	1	CP	Proper	60.96	324.90	14.46	459.84	428.76	1.275165	0.09566144
Planting	2017	1	CP	Proper	91.44	324.90	14.46	501.31	478.39	1.4279217	0.0705457
Planting	2017	1	CP	Proper	121.92	324.90	14.46	630.61	604.4	1.8157691	0.08067202
Planting	2017	1	MB	Severe	30.48	324.90	14.46	486.49	445.97	1.3281359	0.12471691
Planting	2017	1	MB	Severe	60.96	324.90	14.46	485.13	445.49	1.3266585	0.12200835
Planting	2017	1	MB	Severe	91.44	324.90	14.46	530.07	488.62	1.4594087	0.12757937
Planting	2017	1	MB	Severe	121.92	324.90	14.46	487.49	458.39	1.3663635	0.08956718
Planting	2017	1	MB	Check	30.48	324.90	14.46	533.52	477.64	1.4256133	0.17199361
Planting	2017	1	MB	Check	60.96	324.90	14.46	538.68	499.72	1.4935735	0.11991537

Planting	2017	1	MB	Check	91.44	324.90	14.46	477.7	441.76	1.3151779	0.11062008
Planting	2017	1	MB	Check	121.92	324.90	14.46	622.21	587.83	1.7647682	0.10581855
Planting	2017	1	MB	Proper	30.48	324.90	14.46	519.91	478.89	1.4294606	0.12625587
Planting	2017	1	MB	Proper	60.96	324.90	14.46	535.24	491.39	1.4679345	0.13496635
Planting	2017	1	MB	Proper	91.44	324.90	14.46	520.97	492.62	1.4717204	0.08725875
Planting	2017	1	MB	Proper	121.92	324.90	14.46	622.04	600.31	1.8031805	0.06688298
Planting	2017	1	TTSSCP	Proper	30.48	324.90	14.46	539.49	493.36	1.473998	0.14198399
Planting	2017	1	TTSSCP	Proper	60.96	324.90	14.46	459.66	434.57	1.2930477	0.07722476
Planting	2017	1	TTSSCP	Proper	91.44	324.90	14.46	478.09	455.54	1.3575915	0.06940687
Planting	2017	1	TTSSCP	Proper	121.92	324.90	14.46	487.31	471.15	1.4056376	0.04973903
Planting	2017	1	TTSSCP	Check	30.48	324.90	14.46	516.02	471.01	1.4052067	0.13853673
Planting	2017	1	TTSSCP	Check	60.96	324.90	14.46	485.51	455.54	1.3575915	0.09224496
Planting	2017	1	TTSSCP	Check	91.44	324.90	14.46	524.9	477.82	1.4261673	0.144908
Planting	2017	1	TTSSCP	Check	121.92	324.90	14.46	672.27	636.68	1.9151241	0.10954282
Planting	2017	1	TTSSCP	Severe	30.48	324.90	14.46	485.61	443.87	1.3216722	0.12847196
Planting	2017	1	TTSSCP	Severe	60.96	324.90	14.46	500.44	468.73	1.3981891	0.09760053
Planting	2017	1	TTSSCP	Severe	91.44	324.90	14.46	529.66	488.64	1.4594703	0.12625587

Planting	2017	1	TTSSCP	Severe	121.92	324.90	14.46	607.08	572.31	1.716999	0.10701893
Planting	2017	2	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2017	2	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2017	2	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2017	2	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2017	2	FALLOW	Fallow	30.48	324.90	14.46	513.79	461.65	1.3763975	0.16048223
Planting	2017	2	FALLOW	Fallow	60.96	324.90	14.46	483.36	447.16	1.3317986	0.11142034
Planting	2017	2	FALLOW	Fallow	91.44	324.90	14.46	399.45	377.91	1.1186533	0.06629818
Planting	2017	2	FALLOW	Fallow	121.92	324.90	14.46	678.87	644.45	1.9390394	0.10594166
Planting	2017	2	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2017	2	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2017	2	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2017	2	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0

Planting	2017	2	TTSSCP	Check	30.48	324.90	14.46	515.34	455.29	1.356822	0.18482849
Planting	2017	2	TTSSCP	Check	60.96	324.90	14.46	473.33	427.46	1.2711637	0.14118373
Planting	2017	2	TTSSCP	Check	91.44	324.90	14.46	448.81	422.15	1.25482	0.08205708
Planting	2017	2	TTSSCP	Check	121.92	324.90	14.46	602.9	560.72	1.681326	0.12982624
Planting	2017	2	TTSSCP	Severe	30.48	324.90	14.46	527.08	473.32	1.4123167	0.16546844
Planting	2017	2	TTSSCP	Severe	60.96	324.90	14.46	480.92	443.38	1.3201641	0.11554474
Planting	2017	2	TTSSCP	Severe	91.44	324.90	14.46	494.99	473.13	1.4117319	0.06728311
Planting	2017	2	TTSSCP	Severe	121.92	324.90	14.46	572.01	546.57	1.6377736	0.07830203
Planting	2017	2	TTSSCP	Proper	30.48	324.90	14.46	554.13	493.3	1.4738133	0.18722926
Planting	2017	2	TTSSCP	Proper	60.96	324.90	14.46	461.78	432.76	1.2874767	0.08932095
Planting	2017	2	TTSSCP	Proper	91.44	324.90	14.46	467.17	443.76	1.3213337	0.07205387
Planting	2017	2	TTSSCP	Proper	121.92	324.90	14.46	535.92	507.92	1.5188124	0.08618148
Planting	2017	2	PMMB	Severe	30.48	324.90	14.46	499.28	457.7	1.3642397	0.1279795
Planting	2017	2	PMMB	Severe	60.96	324.90	14.46	419.5	387.67	1.1486937	0.09796987
Planting	2017	2	PMMB	Severe	91.44	324.90	14.46	504.28	473.98	1.4143481	0.09326067
Planting	2017	2	PMMB	Severe	121.92	324.90	14.46	580.45	549.73	1.6474998	0.09455339
Planting	2017	2	PMMB	Proper	30.48	324.90	14.46	523.09	473.19	1.4119166	0.15358771

Planting	2017	2	PMMB	Proper	60.96	324.90	14.46	489.3	447.96	1.3342609	0.1272408
Planting	2017	2	PMMB	Proper	91.44	324.90	14.46	487.67	462.96	1.3804295	0.07605516
Planting	2017	2	PMMB	Proper	121.92	324.90	14.46	584.93	560.5	1.6806489	0.07519334
Planting	2017	2	PMMB	Check	30.48	324.90	14.46	527.51	473.67	1.413394	0.16571467
Planting	2017	2	PMMB	Check	60.96	324.90	14.46	492.18	456.74	1.3612849	0.10908113
Planting	2017	2	PMMB	Check	91.44	324.90	14.46	497.19	467.77	1.3952343	0.09055211
Planting	2017	2	PMMB	Check	121.92	324.90	14.46	538.23	516.15	1.5441436	0.06796025
Planting	2017	2	PM	Severe	30.48	324.90	14.46	540.3	491.25	1.4675036	0.15097148
Planting	2017	2	PM	Severe	60.96	324.90	14.46	467.96	430.32	1.2799666	0.11585253
Planting	2017	2	PM	Severe	91.44	324.90	14.46	446.75	415.71	1.2349983	0.09553833
Planting	2017	2	PM	Severe	121.92	324.90	14.46	470.82	443.67	1.3210567	0.08356526
Planting	2017	2	PM	Proper	30.48	324.90	14.46	524.9	480.87	1.4355549	0.13552038
Planting	2017	2	PM	Proper	60.96	324.90	14.46	453.9	421.92	1.2541121	0.09843156
Planting	2017	2	PM	Proper	91.44	324.90	14.46	459.81	434.49	1.2928014	0.07793268
Planting	2017	2	PM	Proper	121.92	324.90	14.46	468.31	426.06	1.2668547	0.1300417
Planting	2017	2	PM	Check	30.48	324.90	14.46	471.48	436.98	1.3004654	0.10618789
Planting	2017	2	PM	Check	60.96	324.90	14.46	479.61	451.6	1.3454645	0.08621226

Planting	2017	2	PM	Check	91.44	324.90	14.46	486.36	460.91	1.3741198	0.07833281
Planting	2017	2	PM	Check	121.92	324.90	14.46	486.66	462.76	1.379814	0.07356205
Planting	2017	2	SS	Severe	30.48	324.90	14.46	528.08	481.38	1.4371246	0.1437384
Planting	2017	2	SS	Severe	60.96	324.90	14.46	443.56	419.01	1.2451554	0.07556269
Planting	2017	2	SS	Severe	91.44	324.90	14.46	523.33	501.86	1.5001602	0.06608273
Planting	2017	2	SS	Severe	121.92	324.90	14.46	440.83	425.55	1.2652849	0.04703046
Planting	2017	2	SS	Proper	30.48	324.90	14.46	535.5	490.07	1.4638717	0.13982945
Planting	2017	2	SS	Proper	60.96	324.90	14.46	452.01	425.59	1.265408	0.08131838
Planting	2017	2	SS	Proper	91.44	324.90	14.46	474.67	449.45	1.338847	0.07762489
Planting	2017	2	SS	Proper	121.92	324.90	14.46	508.31	481.88	1.4386636	0.08134916
Planting	2017	2	SS	Check	30.48	324.90	14.46	488.25	444.39	1.3232728	0.13499713
Planting	2017	2	SS	Check	60.96	324.90	14.46	510.12	480.19	1.4334619	0.09212185
Planting	2017	2	SS	Check	91.44	324.90	14.46	462.72	444.02	1.3221339	0.05755692
Planting	2017	2	SS	Check	121.92	324.90	14.46	554.02	529.09	1.5839717	0.0767323
Planting	2017	2	CP	Check	30.48	324.90	14.46	544.76	502.22	1.5012683	0.13093429
Planting	2017	2	CP	Check	60.96	324.90	14.46	429	401.45	1.1911073	0.08479642
Planting	2017	2	CP	Check	91.44	324.90	14.46	435.38	411.36	1.2216094	0.0739314

Planting	2017	2	CP	Check	121.92	324.90	14.46	472.78	451.18	1.3441718	0.06648286
Planting	2017	2	CP	Proper	30.48	324.90	14.46	560.81	511.77	1.5306623	0.15094071
Planting	2017	2	CP	Proper	60.96	324.90	14.46	442.91	414.88	1.2324436	0.08627382
Planting	2017	2	CP	Proper	91.44	324.90	14.46	459.75	438.15	1.3040666	0.06648286
Planting	2017	2	CP	Proper	121.92	324.90	14.46	490.66	467.23	1.3935722	0.07211543
Planting	2017	2	CP	Severe	30.48	324.90	14.46	513.78	472.73	1.4105007	0.1263482
Planting	2017	2	CP	Severe	60.96	324.90	14.46	424.25	400.7	1.1887989	0.07248478
Planting	2017	2	CP	Severe	91.44	324.90	14.46	499.04	475.43	1.4188111	0.07266945
Planting	2017	2	CP	Severe	121.92	324.90	14.46	491.82	469.31	1.3999743	0.06928375
Planting	2017	2	TTSS	Proper	30.48	324.90	14.46	499.1	454.39	1.3540519	0.13761336
Planting	2017	2	TTSS	Proper	60.96	324.90	14.46	474.05	442.25	1.316686	0.09787754
Planting	2017	2	TTSS	Proper	91.44	324.90	14.46	439.52	414.04	1.2298582	0.07842515
Planting	2017	2	TTSS	Proper	121.92	324.90	14.46	556.42	535.27	1.6029932	0.0650978
Planting	2017	2	TTSS	Check	30.48	324.90	14.46	512.39	468.55	1.3976351	0.13493557
Planting	2017	2	TTSS	Check	60.96	324.90	14.46	452.16	425.97	1.2665777	0.08061046
Planting	2017	2	TTSS	Check	91.44	324.90	14.46	433.49	414.69	1.2318588	0.05786471
Planting	2017	2	TTSS	Check	121.92	324.90	14.46	369.89	355.24	1.0488771	0.04509138

Planting	2017	2	TTSS	Severe	30.48	324.90	14.46	533.91	483.17	1.4426341	0.15617315
Planting	2017	2	TTSS	Severe	60.96	324.90	14.46	461.05	428.28	1.2736876	0.10086311
Planting	2017	2	TTSS	Severe	91.44	324.90	14.46	459.73	434.73	1.2935401	0.07694775
Planting	2017	2	TTSS	Severe	121.92	324.90	14.46	453.48	427.81	1.272241	0.07900995
Planting	2017	2	FS	Proper	30.48	324.90	14.46	552.29	511.69	1.5304161	0.12496315
Planting	2017	2	FS	Proper	60.96	324.90	14.46	506.79	476.35	1.4216428	0.09369158
Planting	2017	2	FS	Proper	91.44	324.90	14.46	494.94	451.89	1.3463571	0.13250402
Planting	2017	2	FS	Proper	121.92	324.90	14.46			-0.0445197	0
Planting	2017	2	FS	Severe	30.48	324.90	14.46	513.49	470.24	1.4028367	0.13311961
Planting	2017	2	FS	Severe	60.96	324.90	14.46	527.01	493.83	1.4754446	0.10212505
Planting	2017	2	FS	Severe	91.44	324.90	14.46	519.01	483.71	1.4442962	0.10865022
Planting	2017	2	FS	Severe	121.92	324.90	14.46			-0.0445197	0
Planting	2017	2	FS	Check	30.48	324.90	14.46	511.54	467.7	1.3950188	0.13493557
Planting	2017	2	FS	Check	60.96	324.90	14.46	500.22	471.45	1.406561	0.08855147
Planting	2017	2	FS	Check	91.44	324.90	14.46	499.32	474.86	1.4170567	0.07528568
Planting	2017	2	FS	Check	121.92	324.90	14.46	548.79	541.06	1.6208143	0.02379224

Planting	2017	2	MB	Severe	30.48	324.90	14.46	517.39	471.76	1.4075152	0.14044503
Planting	2017	2	MB	Severe	60.96	324.90	14.46	451.75	425.65	1.2655927	0.08033345
Planting	2017	2	MB	Severe	91.44	324.90	14.46	472.13	448.09	1.334661	0.07399296
Planting	2017	2	MB	Severe	121.92	324.90	14.46	415.54	394.3	1.1691002	0.06537481
Planting	2017	2	MB	Check	30.48	324.90	14.46	518.49	474.06	1.4145943	0.13675154
Planting	2017	2	MB	Check	60.96	324.90	14.46	527.16	493.79	1.4753215	0.10270986
Planting	2017	2	MB	Check	91.44	324.90	14.46	531.45	502.44	1.5019454	0.08929017
Planting	2017	2	MB	Check	121.92	324.90	14.46			-0.0445197	0
Planting	2017	2	MB	Proper	30.48	324.90	14.46	515.35	477.82	1.4261673	0.11551396
Planting	2017	2	MB	Proper	60.96	324.90	14.46	483.53	452.5	1.3482346	0.09550755
Planting	2017	2	MB	Proper	91.44	324.90	14.46	493.79	461.5	1.3759358	0.09938571
Planting	2017	2	MB	Proper	121.92	324.90	14.46			-0.0445197	0
Planting	2017	3	SS	Check	30.48	324.90	14.46	551.21	495.05	1.4791997	0.17285542
Planting	2017	3	SS	Check	60.96	324.90	14.46	471.48	438.61	1.3054824	0.1011709
Planting	2017	3	SS	Check	91.44	324.90	14.46	468.63	441.49	1.3143468	0.08353448
Planting	2017	3	SS	Check	121.92	324.90	14.46	507.78	479.59	1.4316152	0.08676628

Planting	2017	3	SS	Proper	30.48	324.90	14.46	508.66	460.68	1.3734119	0.14767812
Planting	2017	3	SS	Proper	60.96	324.90	14.46	488.15	452.98	1.349712	0.10825009
Planting	2017	3	SS	Proper	91.44	324.90	14.46	491.58	466.03	1.3898787	0.0786406
Planting	2017	3	SS	Proper	121.92	324.90	14.46	503.79	460.63	1.373258	0.13284259
Planting	2017	3	SS	Severe	30.48	324.90	14.46	529.34	478.83	1.429276	0.15546523
Planting	2017	3	SS	Severe	60.96	324.90	14.46	454.53	418.8	1.244509	0.10997372
Planting	2017	3	SS	Severe	91.44	324.90	14.46	512.49	480.61	1.4347547	0.09812377
Planting	2017	3	SS	Severe	121.92	324.90	14.46	581.16	548.98	1.6451914	0.09904714
Planting	2017	3	MB	Proper	30.48	324.90	14.46	537.12	487.6	1.4562692	0.1524181
Planting	2017	3	MB	Proper	60.96	324.90	14.46	460.51	427.19	1.2703327	0.10255596
Planting	2017	3	MB	Proper	91.44	324.90	14.46	482.59	456.89	1.3617466	0.07910229
Planting	2017	3	MB	Proper	121.92	324.90	14.46	484.24	455.73	1.3581763	0.08775121
Planting	2017	3	MB	Severe	30.48	324.90	14.46	535.57	484.23	1.4458967	0.1580199
Planting	2017	3	MB	Severe	60.96	324.90	14.46	479.23	447.06	1.3314908	0.09901636
Planting	2017	3	MB	Severe	91.44	324.90	14.46	480.43	455.83	1.358484	0.07571659
Planting	2017	3	MB	Severe	121.92	324.90	14.46	523.6	491.55	1.468427	0.09864701
Planting	2017	3	MB	Check	30.48	324.90	14.46	532.96	475.92	1.4203193	0.17556399

Planting	2017	3	MB	Check	60.96	324.90	14.46	454.34	420.24	1.2489412	0.10495673
Planting	2017	3	MB	Check	91.44	324.90	14.46	487.45	463.95	1.3834767	0.07233088
Planting	2017	3	MB	Check	121.92	324.90	14.46	474.09	449.9	1.340232	0.07445464
Planting	2017	3	CP	Severe	30.48	324.90	14.46	523.95	481.67	1.4380172	0.13013403
Planting	2017	3	CP	Severe	60.96	324.90	14.46	471.53	438.29	1.3044975	0.10230973
Planting	2017	3	CP	Severe	91.44	324.90	14.46	498.14	473.92	1.4141634	0.07454698
Planting	2017	3	CP	Severe	121.92	324.90	14.46	563.73	545.52	1.6345418	0.05604874
Planting	2017	3	CP	Proper	30.48	324.90	14.46	539.02	487.68	1.4565155	0.1580199
Planting	2017	3	CP	Proper	60.96	324.90	14.46	488.92	451.3	1.3445411	0.11579097
Planting	2017	3	CP	Proper	91.44	324.90	14.46	462.11	440.31	1.3107149	0.06709844
Planting	2017	3	CP	Proper	121.92	324.90	14.46	503.57	480.97	1.4358627	0.06956077
Planting	2017	3	CP	Check	30.48	324.90	14.46	528.92	472.08	1.4085001	0.1749484
Planting	2017	3	CP	Check	60.96	324.90	14.46	506.08	465.89	1.3894478	0.1237012
Planting	2017	3	CP	Check	91.44	324.90	14.46	531.47	484.83	1.4477434	0.14355372
Planting	2017	3	CP	Check	121.92	324.90	14.46	504.2	475.14	1.4179185	0.08944406
Planting	2017	3	PMMB	Severe	30.48	324.90	14.46	531.4	488.28	1.4583622	0.13271948
Planting	2017	3	PMMB	Severe	60.96	324.90	14.46	466.68	440.57	1.3115151	0.08036423

Planting	2017	3	PMMB	Severe	91.44	324.90	14.46	491.1	467.34	1.3939108	0.07313114
Planting	2017	3	PMMB	Severe	121.92	324.90	14.46	495.45	472.89	1.4109932	0.06943765
Planting	2017	3	PMMB	Check	30.48	324.90	14.46	550.49	497.41	1.4864635	0.16337546
Planting	2017	3	PMMB	Check	60.96	324.90	14.46	497.08	466.83	1.3923411	0.09310678
Planting	2017	3	PMMB	Check	91.44	324.90	14.46	472.29	448.49	1.3358922	0.07325426
Planting	2017	3	PMMB	Check	121.92	324.90	14.46	522.45	494.54	1.4776299	0.08590447
Planting	2017	3	PMMB	Proper	30.48	324.90	14.46	526.34	476.4	1.4217967	0.15371082
Planting	2017	3	PMMB	Proper	60.96	324.90	14.46	455.86	421.92	1.2541121	0.10446426
Planting	2017	3	PMMB	Proper	91.44	324.90	14.46	483.67	455.24	1.3566681	0.08750498
Planting	2017	3	PMMB	Proper	121.92	324.90	14.46	546.66	516.75	1.5459903	0.09206029
Planting	2017	3	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2017	3	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2017	3	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2017	3	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2017	3	FALLOW	Fallow	30.48	324.90	14.46	524.45	473.91	1.4141327	0.15555757

Planting	2017	3	FALLOW	Fallow	60.96	324.90	14.46	480.93	447.95	1.3342301	0.10150947
Planting	2017	3	FALLOW	Fallow	91.44	324.90	14.46	478.81	455.58	1.3577146	0.07149985
Planting	2017	3	FALLOW	Fallow	121.92	324.90	14.46	510.19	480.5	1.4344161	0.09138315
Planting	2017	3	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2017	3	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2017	3	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2017	3	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2017	3	TTSSCP	Severe	30.48	324.90	14.46	544.71	491.69	1.4688579	0.16319079
Planting	2017	3	TTSSCP	Severe	60.96	324.90	14.46	437.32	411.4	1.2217325	0.07977943
Planting	2017	3	TTSSCP	Severe	91.44	324.90	14.46	449.63	421.7	1.253435	0.08596603
Planting	2017	3	TTSSCP	Severe	121.92	324.90	14.46	409.09	385.9	1.1432458	0.07137673
Planting	2017	3	TTSSCP	Proper	30.48	324.90	14.46	531.17	478.42	1.428014	0.16235975
Planting	2017	3	TTSSCP	Proper	60.96	324.90	14.46	456.42	423.81	1.2599294	0.10037064
Planting	2017	3	TTSSCP	Proper	91.44	324.90	14.46	486.8	456.97	1.3619929	0.09181405
Planting	2017	3	TTSSCP	Proper	121.92	324.90	14.46	500.2	471.72	1.407392	0.08765888

Planting	2017	3	TTSSCP	Check	30.48	324.90	14.46	517.07	470.45	1.4034831	0.14349216
Planting	2017	3	TTSSCP	Check	60.96	324.90	14.46	460.38	432.82	1.2876613	0.0848272
Planting	2017	3	TTSSCP	Check	91.44	324.90	14.46	409.03	387.09	1.1469085	0.06752934
Planting	2017	3	TTSSCP	Check	121.92	324.90	14.46	501.83	472	1.4082539	0.09181405
Planting	2017	3	FS	Severe	30.48	324.90	14.46	509.61	463.34	1.3815991	0.14241489
Planting	2017	3	FS	Severe	60.96	324.90	14.46	531.62	490.22	1.4643334	0.12742547
Planting	2017	3	FS	Severe	91.44	324.90	14.46	496.57	471.63	1.407115	0.07676307
Planting	2017	3	FS	Severe	121.92	324.90	14.46	545.53	517.37	1.5478986	0.08667394
Planting	2017	3	FS	Check	30.48	324.90	14.46	548.51	495.78	1.4814465	0.16229819
Planting	2017	3	FS	Check	60.96	324.90	14.46	469.28	431.45	1.2834446	0.11643733
Planting	2017	3	FS	Check	91.44	324.90	14.46	478.05	447.97	1.3342917	0.09258353
Planting	2017	3	FS	Check	121.92	324.90	14.46	446.86	420.16	1.248695	0.0821802
Planting	2017	3	FS	Proper	30.48	324.90	14.46	504.78	461.73	1.3766437	0.13250402
Planting	2017	3	FS	Proper	60.96	324.90	14.46	482.16	455.41	1.3571913	0.08233409
Planting	2017	3	FS	Proper	91.44	324.90	14.46	450.52	428.52	1.2744263	0.06771402
Planting	2017	3	FS	Proper	121.92	324.90	14.46	504.09	480.48	1.4343545	0.07266945
Planting	2017	3	PM	Check	30.48	324.90	14.46	564.16	508.91	1.5218595	0.17005453

Planting	2017	3	PM	Check	60.96	324.90	14.46	518.05	475.03	1.4175799	0.13241169
Planting	2017	3	PM	Check	91.44	324.90	14.46	526.63	493.75	1.4751984	0.10120168
Planting	2017	3	PM	Check	121.92	324.90	14.46	622.15	577.59	1.7332504	0.13715167
Planting	2017	3	PM	Severe	30.48	324.90	14.46	514.01	460.85	1.3739352	0.16362169
Planting	2017	3	PM	Severe	60.96	324.90	14.46	550.64	496.35	1.483201	0.16709973
Planting	2017	3	PM	Severe	91.44	324.90	14.46	549.88	508.94	1.5219518	0.12600963
Planting	2017	3	PM	Severe	121.92	324.90	14.46	592.18	559.06	1.6762167	0.10194038
Planting	2017	3	PM	Proper	30.48	324.90	14.46	573.69	523.66	1.5672587	0.15398784
Planting	2017	3	PM	Proper	60.96	324.90	14.46	528.94	483.11	1.4424494	0.14106061
Planting	2017	3	PM	Proper	91.44	324.90	14.46	556.26	509.33	1.5231522	0.14444632
Planting	2017	3	PM	Proper	121.92	324.90	14.46	530.7	502.47	1.5020378	0.0868894
Planting	2017	3	TTSS	Check	30.48	324.90	14.46	542.81	488.36	1.4586085	0.1675922
Planting	2017	3	TTSS	Check	60.96	324.90	14.46	436.09	401.28	1.1905841	0.10714205
Planting	2017	3	TTSS	Check	91.44	324.90	14.46	479.49	448.11	1.3347226	0.09658482
Planting	2017	3	TTSS	Check	121.92	324.90	14.46	431.42	406.93	1.2079742	0.07537802
Planting	2017	3	TTSS	Proper	30.48	324.90	14.46	531.76	486.21	1.451991	0.1401988
Planting	2017	3	TTSS	Proper	60.96	324.90	14.46	455.91	429.14	1.2763346	0.08239565

Planting	2017	3	TTSS	Proper	91.44	324.90	14.46	440.58	420.72	1.2504186	0.06112729
Planting	2017	3	TTSS	Proper	121.92	324.90	14.46	468.95	444.7	1.3242269	0.07463932
Planting	2017	3	TTSS	Severe	30.48	324.90	14.46	504.87	456.46	1.3604231	0.14900162
Planting	2017	3	TTSS	Severe	60.96	324.90	14.46	502.08	462.72	1.3796908	0.12114654
Planting	2017	3	TTSS	Severe	91.44	324.90	14.46	599.85	556.42	1.668091	0.13367363
Planting	2017	3	TTSS	Severe	121.92	324.90	14.46	484.87	459.85	1.3708572	0.07700931
Planting	2017	4	FS	Severe	30.48	324.90	14.46	536.94	485.95	1.4511907	0.15694263
Planting	2017	4	FS	Severe	60.96	324.90	14.46	467.72	432.05	1.2852913	0.10978905
Planting	2017	4	FS	Severe	91.44	324.90	14.46	518.57	485.42	1.4495594	0.10203272
Planting	2017	4	FS	Severe	121.92	324.90	14.46	461.15	431.76	1.2843988	0.09045977
Planting	2017	4	FS	Check	30.48	324.90	14.46	546.83	479.12	1.4301686	0.20840528
Planting	2017	4	FS	Check	60.96	324.90	14.46	466.25	428.14	1.2732567	0.11729915
Planting	2017	4	FS	Check	91.44	324.90	14.46	501.32	468.04	1.3960653	0.10243284
Planting	2017	4	FS	Check	121.92	324.90	14.46	497.55	462.27	1.3783058	0.10858866
Planting	2017	4	FS	Proper	30.48	324.90	14.46	526.81	474.28	1.4152715	0.16168261
Planting	2017	4	FS	Proper	60.96	324.90	14.46	499.91	455.45	1.3573144	0.13684388
Planting	2017	4	FS	Proper	91.44	324.90	14.46	447.66	415.02	1.2328745	0.10046298

Planting	2017	4	FS	Proper	121.92	324.90	14.46	453.04	424.56	1.2622378	0.08765888
Planting	2017	4	SS	Check	30.48	324.90	14.46	515.14	459.5	1.36978	0.17125491
Planting	2017	4	SS	Check	60.96	324.90	14.46	492.24	453.74	1.3520512	0.11849953
Planting	2017	4	SS	Check	91.44	324.90	14.46	471.94	447.02	1.3313677	0.07670152
Planting	2017	4	SS	Check	121.92	324.90	14.46	461.59	436.05	1.297603	0.07860982
Planting	2017	4	SS	Proper	30.48	324.90	14.46	510.63	465.96	1.3896633	0.13749024
Planting	2017	4	SS	Proper	60.96	324.90	14.46	458.7	419.64	1.2470945	0.12022316
Planting	2017	4	SS	Proper	91.44	324.90	14.46	508.6	477.96	1.4265982	0.09430716
Planting	2017	4	SS	Proper	121.92	324.90	14.46	505.32	475.03	1.4175799	0.09322989
Planting	2017	4	SS	Severe	30.48	324.90	14.46	527.4	478.39	1.4279217	0.15084837
Planting	2017	4	SS	Severe	60.96	324.90	14.46	440.75	406.47	1.2065584	0.10551075
Planting	2017	4	SS	Severe	91.44	324.90	14.46	442.05	415.22	1.2334901	0.08258032
Planting	2017	4	SS	Severe	121.92	324.90	14.46	486.28	460.55	1.3730118	0.07919462
Planting	2017	4	PMMB	Severe	30.48	324.90	14.46	527	475.07	1.417703	0.15983587
Planting	2017	4	PMMB	Severe	60.96	324.90	14.46	452.57	409.86	1.2169925	0.13145754
Planting	2017	4	PMMB	Severe	91.44	324.90	14.46	505.39	459.59	1.370057	0.14096828
Planting	2017	4	PMMB	Severe	121.92	324.90	14.46	569.25	531.05	1.5900044	0.11757616

Planting	2017	4	PMMB	Proper	30.48	324.90	14.46	534.12	480.21	1.4335235	0.16593013
Planting	2017	4	PMMB	Proper	60.96	324.90	14.46	535.99	484.15	1.4456505	0.15955885
Planting	2017	4	PMMB	Proper	91.44	324.90	14.46	460.82	436.09	1.2977261	0.07611671
Planting	2017	4	PMMB	Proper	121.92	324.90	14.46	529.19	501.53	1.4991445	0.08513499
Planting	2017	4	PMMB	Check	30.48	324.90	14.46	542.77	476.02	1.420627	0.20545049
Planting	2017	4	PMMB	Check	60.96	324.90	14.46	521.68	479.79	1.4322308	0.12893365
Planting	2017	4	PMMB	Check	91.44	324.90	14.46	483.54	457.34	1.3631317	0.08064124
Planting	2017	4	PMMB	Check	121.92	324.90	14.46	509.05	481.47	1.4374017	0.08488876
Planting	2017	4	TTSS	Severe	30.48	324.90	14.46	551.95	501.5	1.4990522	0.15528056
Planting	2017	4	TTSS	Severe	60.96	324.90	14.46	482.59	438.41	1.3048669	0.13598206
Planting	2017	4	TTSS	Severe	91.44	324.90	14.46	488.89	446.87	1.330906	0.12933378
Planting	2017	4	TTSS	Severe	121.92	324.90	14.46	428.45	394.56	1.1699005	0.10431037
Planting	2017	4	TTSS	Check	30.48	324.90	14.46	531.6	474.99	1.4174568	0.17424048
Planting	2017	4	TTSS	Check	60.96	324.90	14.46	481.07	447.92	1.3341378	0.10203272
Planting	2017	4	TTSS	Check	91.44	324.90	14.46	503.35	458.88	1.3678717	0.13687466
Planting	2017	4	TTSS	Check	121.92	324.90	14.46	417.28	398.35	1.1815658	0.05826484
Planting	2017	4	TTSS	Proper	30.48	324.90	14.46	517.45	459.9	1.3710111	0.17713372

Planting	2017	4	TTSS	Proper	60.96	324.90	14.46	465.62	425.61	1.2654696	0.12314718
Planting	2017	4	TTSS	Proper	91.44	324.90	14.46	507.72	464.49	1.3851387	0.13305805
Planting	2017	4	TTSS	Proper	121.92	324.90	14.46	368.09	339.23	0.9995997	0.08882848
Planting	2017	4	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2017	4	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2017	4	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2017	4	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2017	4	FALLOW	Fallow	30.48	324.90	14.46	415.49	380.88	1.1277947	0.10652646
Planting	2017	4	FALLOW	Fallow	60.96	324.90	14.46	410.64	379.17	1.1225315	0.09686183
Planting	2017	4	FALLOW	Fallow	91.44	324.90	14.46	385.6	359.28	1.0613118	0.08101059
Planting	2017	4	FALLOW	Fallow	121.92	324.90	14.46	347.96	324.87	0.955401	0.07106894
Planting	2017	4	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2017	4	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0

Planting	2017	4	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2017	4	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2017	4	PM	Proper	30.48	324.90	14.46	540.18	489.86	1.4632253	0.15488043
Planting	2017	4	PM	Proper	60.96	324.90	14.46	500.14	451.14	1.3440486	0.15081759
Planting	2017	4	PM	Proper	91.44	324.90	14.46	432.25	393.11	1.1654375	0.1204694
Planting	2017	4	PM	Proper	121.92	324.90	14.46	330.29	302.39	0.8862095	0.08587369
Planting	2017	4	PM	Severe	30.48	324.90	14.46	528.78	473.26	1.412132	0.17088556
Planting	2017	4	PM	Severe	60.96	324.90	14.46	502.17	463.71	1.382738	0.11837642
Planting	2017	4	PM	Severe	91.44	324.90	14.46	428.75	400.19	1.1872291	0.08790511
Planting	2017	4	PM	Severe	121.92	324.90	14.46	486.38	469	1.3990201	0.05349408
Planting	2017	4	PM	Check	30.48	324.90	14.46	493.99	446.59	1.3300442	0.14589293
Planting	2017	4	PM	Check	60.96	324.90	14.46	529.55	490.85	1.4662725	0.11911512
Planting	2017	4	PM	Check	91.44	324.90	14.46	440.02	409.32	1.2153305	0.09449184
Planting	2017	4	PM	Check	121.92	324.90	14.46	450.48	427.15	1.2702096	0.07180764
Planting	2017	4	MB	Severe	30.48	324.90	14.46	530.07	487.02	1.4544841	0.13250402
Planting	2017	4	MB	Severe	60.96	324.90	14.46	521.58	482.93	1.4418954	0.11896122

Planting	2017	4	MB	Severe	91.44	324.90	14.46	512.71	480.02	1.4329387	0.10061688
Planting	2017	4	MB	Severe	121.92	324.90	14.46	512.58	489.08	1.4608246	0.07233088
Planting	2017	4	MB	Check	30.48	324.90	14.46	541.61	497.08	1.4854478	0.13705933
Planting	2017	4	MB	Check	60.96	324.90	14.46	495.63	460.16	1.3718114	0.10917347
Planting	2017	4	MB	Check	91.44	324.90	14.46	501.09	471.65	1.4071766	0.09061367
Planting	2017	4	MB	Check	121.92	324.90	14.46	407.63	384.38	1.1385674	0.07156141
Planting	2017	4	MB	Proper	30.48	324.90	14.46	542.02	501.44	1.4988675	0.12490159
Planting	2017	4	MB	Proper	60.96	324.90	14.46	551.71	506.01	1.5129336	0.14066049
Planting	2017	4	MB	Proper	91.44	324.90	14.46	562.66	521.38	1.560241	0.12705612
Planting	2017	4	MB	Proper	121.92	324.90	14.46	518.58	496.76	1.4844629	0.06716
Planting	2017	4	TTSSCP	Check	30.48	324.90	14.46	542.76	502.82	1.503115	0.12293172
Planting	2017	4	TTSSCP	Check	60.96	324.90	14.46	505.73	470.08	1.4023443	0.10972749
Planting	2017	4	TTSSCP	Check	91.44	324.90	14.46	505.95	471.49	1.4066841	0.10606478
Planting	2017	4	TTSSCP	Check	121.92	324.90	14.46	506.99	481.32	1.43694	0.07900995
Planting	2017	4	TTSSCP	Proper	30.48	324.90	14.46	519.07	480.43	1.4342006	0.11893044
Planting	2017	4	TTSSCP	Proper	60.96	324.90	14.46	494.11	459.82	1.3707649	0.10554153
Planting	2017	4	TTSSCP	Proper	91.44	324.90	14.46	551.67	510.81	1.5277075	0.1257634

Planting	2017	4	TTSSCP	Proper	121.92	324.90	14.46	562.3	536.8	1.6077024	0.0784867
Planting	2017	4	TTSSCP	Severe	30.48	324.90	14.46	527.82	491.33	1.4677499	0.11231294
Planting	2017	4	TTSSCP	Severe	60.96	324.90	14.46	549.95	508.72	1.5212747	0.12690223
Planting	2017	4	TTSSCP	Severe	91.44	324.90	14.46	560.65	519.39	1.554116	0.12699457
Planting	2017	4	TTSSCP	Severe	121.92	324.90	14.46	561	526.58	1.5762462	0.10594166
Planting	2017	4	CP	Check	30.48	324.90	14.46	496.66	461.62	1.3763051	0.10784997
Planting	2017	4	CP	Check	60.96	324.90	14.46	425.51	399.57	1.1853208	0.07984098
Planting	2017	4	CP	Check	91.44	324.90	14.46	428.9	409.02	1.2144071	0.06118885
Planting	2017	4	CP	Check	121.92	324.90	14.46	501.65	476.58	1.4223507	0.0771632
Planting	2017	4	CP	Severe	30.48	324.90	14.46	502.06	477.21	1.4242898	0.07648606
Planting	2017	4	CP	Severe	60.96	324.90	14.46			-0.0445197	0
Planting	2017	4	CP	Severe	91.44	324.90	14.46	429.2	402.24	1.1935389	0.08298045
Planting	2017	4	CP	Severe	121.92	324.90	14.46	513.85	492.35	1.4708893	0.06617506
Planting	2017	4	CP	Proper	30.48	324.90	14.46	522.93	491	1.4667341	0.09827767
Planting	2017	4	CP	Proper	60.96	324.90	14.46	461.07	426.96	1.2696248	0.10498751
Planting	2017	4	CP	Proper	91.44	324.90	14.46	484.2	464.24	1.3843693	0.06143508

Planting	2017	4	CP	Proper	121.92	324.90	14.46			-0.0445197	0
14WAP	2017	1	PM		30.48	324.90	14.46	535.87	463.91	1.3833536	0.2214864
14WAP	2017	1	PM		60.96	324.90	14.46	519.96	445.97	1.3281359	0.22773456
14WAP	2017	1	PM		91.44	324.90	14.46	507.14	448.39	1.3355844	0.18082721
14WAP	2017	1	PM		121.92	324.90	14.46	351.98	319.05	0.9374875	0.10135558
14WAP	2017	1	PMMB		30.48	324.90	14.46			-0.0445197	0
14WAP	2017	1	PMMB		60.96	324.90	14.46	495.89	441.34	1.3138851	0.16789999
14WAP	2017	1	PMMB		91.44	324.90	14.46	579.13	532.02	1.59299	0.14500034
14WAP	2017	1	PMMB		121.92	324.90	14.46	430.5	411.17	1.2210246	0.059496
14WAP	2017	1	FS		30.48	324.90	14.46	516.5	443.04	1.3191176	0.22610327
14WAP	2017	1	FS		60.96	324.90	14.46	527.54	462.23	1.3781827	0.2010183
14WAP	2017	1	FS		91.44	324.90	14.46	493.61	448.15	1.3348457	0.13992179
14WAP	2017	1	FS		121.92	324.90	14.46	357.36	333.54	0.9820864	0.07331582
14WAP	2017	1	TTSS		30.48	324.90	14.46	537.75	460.58	1.3731041	0.23752231
14WAP	2017	1	TTSS		60.96	324.90	14.46	540.3	468.53	1.3975735	0.2209016
14WAP	2017	1	TTSS		91.44	324.90	14.46	495.95	455.57	1.3576838	0.124286

14WAP	2017	1	TTSS		121.92	324.90	14.46	491.13	475.62	1.4193959	0.04773838
14WAP	2017	1	FALLOW		30.48	324.90	14.46	531.41	453.37	1.3509124	0.24020009
14WAP	2017	1	FALLOW		60.96	324.90	14.46	520.48	464.74	1.3859082	0.1715627
14WAP	2017	1	FALLOW		91.44	324.90	14.46	446.11	409.37	1.2154843	0.11308241
14WAP	2017	1	FALLOW		121.92	324.90	14.46	408.87	389.22	1.1534645	0.06048093
14WAP	2017	1	SS		30.48	324.90	14.46	581.36	495.18	1.4795998	0.26525428
14WAP	2017	1	SS		60.96	324.90	14.46	530.11	464.85	1.3862468	0.20086441
14WAP	2017	1	SS		91.44	324.90	14.46	494.23	457.29	1.3629778	0.11369799
14WAP	2017	1	SS		121.92	324.90	14.46	515.53	492.38	1.4709817	0.07125362
14WAP	2017	1	CP		30.48	324.90	14.46	552.98	471.91	1.4079768	0.24952616
14WAP	2017	1	CP		60.96	324.90	14.46	585.11	507.01	1.5160115	0.24038477
14WAP	2017	1	CP		91.44	324.90	14.46	470.8	422.74	1.256636	0.14792435
14WAP	2017	1	CP		121.92	324.90	14.46	322.08	301.3	0.8828546	0.06395897
14WAP	2017	1	MB		30.48	324.90	14.46	555.11	475.22	1.4181647	0.24589423
14WAP	2017	1	MB		60.96	324.90	14.46	636.21	544.14	1.6302943	0.28338317
14WAP	2017	1	MB		91.44	324.90	14.46	574.3	501.71	1.4996986	0.22342549
14WAP	2017	1	MB		121.92	324.90	14.46	569.97	521.46	1.5604873	0.14930941

14WAP	2017	1	TTSSCP		30.48	324.90	14.46	557.51	484.27	1.4460198	0.22542613
14WAP	2017	1	TTSSCP		60.96	324.90	14.46	567.49	494.07	1.4761833	0.22598015
14WAP	2017	1	TTSSCP		91.44	324.90	14.46	563.53	504.36	1.507855	0.18211993
14WAP	2017	1	TTSSCP		121.92	324.90	14.46	474.65	435.9	1.2971413	0.11926901
14WAP	2017	2	FALLOW		30.48	324.90	14.46	611.8	520.71	1.5581788	0.28036682
14WAP	2017	2	FALLOW		60.96	324.90	14.46	504.47	446.13	1.3286283	0.17956527
14WAP	2017	2	FALLOW		91.44	324.90	14.46	407.96	386.75	1.145862	0.06528247
14WAP	2017	2	FALLOW		121.92	324.90	14.46	519.9	490.68	1.4657492	0.08993653
14WAP	2017	2	TTSSCP		30.48	324.90	14.46	616.33	522.6	1.5639961	0.2884925
14WAP	2017	2	TTSSCP		60.96	324.90	14.46	526.88	465.86	1.3893555	0.18781407
14WAP	2017	2	TTSSCP		91.44	324.90	14.46	635.4	604.49	1.8160461	0.0951382
14WAP	2017	2	TTSSCP		121.92	324.90	14.46	320.29	308.63	0.9054157	0.03588843
14WAP	2017	2	PMMB		30.48	324.90	14.46	592.09	505.47	1.5112715	0.26660856
14WAP	2017	2	PMMB		60.96	324.90	14.46	523.12	453.61	1.3516511	0.21394552
14WAP	2017	2	PMMB		91.44	324.90	14.46	471.24	440.72	1.3119768	0.09393781
14WAP	2017	2	PMMB		121.92	324.90	14.46	647.02	628.45	1.8897929	0.05715679
14WAP	2017	2	PM		30.48	324.90	14.46	583.85	506.4	1.514134	0.23838413

14WAP	2017	2	PM		60.96	324.90	14.46	363.1	325.36	0.9569091	0.11616032
14WAP	2017	2	PM		91.44	324.90	14.46	485.07	457.58	1.3638704	0.08461175
14WAP	2017	2	PM		121.92	324.90	14.46	521.48	495.29	1.4799384	0.08061046
14WAP	2017	2	SS		30.48	324.90	14.46	570.17	488.77	1.4598704	0.25054187
14WAP	2017	2	SS		60.96	324.90	14.46	492.87	435.38	1.2955408	0.17694904
14WAP	2017	2	SS		91.44	324.90	14.46	426.72	399.37	1.1847052	0.08418084
14WAP	2017	2	SS		121.92	324.90	14.46	473.18	447.68	1.3333991	0.0784867
14WAP	2017	2	CP		30.48	324.90	14.46	586.65	500.83	1.49699	0.26414623
14WAP	2017	2	CP		60.96	324.90	14.46	358.04	314.78	0.9243448	0.13315039
14WAP	2017	2	CP		91.44	324.90	14.46	466.61	418.52	1.2436472	0.14801669
14WAP	2017	2	CP		121.92	324.90	14.46	526.11	478.91	1.4295222	0.14527735
14WAP	2017	2	TTSS		30.48	324.90	14.46	578.07	497.85	1.4878178	0.24690994
14WAP	2017	2	TTSS		60.96	324.90	14.46	495.14	445.34	1.3261968	0.15327992
14WAP	2017	2	TTSS		91.44	324.90	14.46	368.29	348.78	1.0289938	0.06005002
14WAP	2017	2	TTSS		121.92	324.90	14.46	261.62	252.04	0.7312368	0.02948638
14WAP	2017	2	FS		30.48	324.90	14.46	584.64	496.44	1.483478	0.27147166
14WAP	2017	2	FS		60.96	324.90	14.46	608.49	518.73	1.5520846	0.2762732

14WAP	2017	2	FS		91.44	324.90	14.46	567.09	495.81	1.4815389	0.21939342
14WAP	2017	2	FS		121.92	324.90	14.46	529.83	500.81	1.4969284	0.08932095
14WAP	2017	2	MB		30.48	324.90	14.46	584.69	505.07	1.5100403	0.24506319
14WAP	2017	2	MB		60.96	324.90	14.46	583.71	499.53	1.4929887	0.25909846
14WAP	2017	2	MB		91.44	324.90	14.46	546.15	484.65	1.4471894	0.18929146
14WAP	2017	2	MB		121.92	324.90	14.46	552.66	519.8	1.5553779	0.10114012
14WAP	2017	3	SS		30.48	324.90	14.46	587.76	503.11	1.5040076	0.26054508
14WAP	2017	3	SS		60.96	324.90	14.46	500.7	453.78	1.3521743	0.14441554
14WAP	2017	3	SS		91.44	324.90	14.46	470.27	420.22	1.2488797	0.15404939
14WAP	2017	3	SS		121.92	324.90	14.46	461.09	421.47	1.2527271	0.12194679
14WAP	2017	3	MB		30.48	324.90	14.46	594.69	502.96	1.5035459	0.28233668
14WAP	2017	3	MB		60.96	324.90	14.46	656.67	569.46	1.708227	0.26842453
14WAP	2017	3	MB		91.44	324.90	14.46	358.28	324.36	0.9538312	0.10440271
14WAP	2017	3	MB		121.92	324.90	14.46	468.64	428.8	1.2752881	0.12262393
14WAP	2017	3	CP		30.48	324.90	14.46	560.35	475.68	1.4195806	0.26060664
14WAP	2017	3	CP		60.96	324.90	14.46	530.09	455.96	1.3588842	0.22816547
14WAP	2017	3	CP		91.44	324.90	14.46	483.24	445.84	1.3277357	0.11511383

14WAP	2017	3	CP		121.92	324.90	14.46	529.07	506.62	1.5148111	0.06909908
14WAP	2017	3	PMMB		30.48	324.90	14.46	577.59	493.53	1.4745213	0.25872911
14WAP	2017	3	PMMB		60.96	324.90	14.46	490.03	426.98	1.2696863	0.19406222
14WAP	2017	3	PMMB		91.44	324.90	14.46	473.92	421.48	1.2527578	0.1614056
14WAP	2017	3	PMMB		121.92	324.90	14.46	606.35	554.95	1.6635665	0.15820457
14WAP	2017	3	FALLOW		30.48	324.90	14.46	586.5	498.59	1.4900955	0.27057907
14WAP	2017	3	FALLOW		60.96	324.90	14.46	501.67	440.22	1.3104379	0.18913757
14WAP	2017	3	FALLOW		91.44	324.90	14.46	472.36	437.89	1.3032663	0.10609556
14WAP	2017	3	FALLOW		121.92	324.90	14.46	504.06	485.12	1.448636	0.05829561
14WAP	2017	3	TTSSCP		30.48	324.90	14.46	406.4	341.34	1.0060941	0.20024882
14WAP	2017	3	TTSSCP		60.96	324.90	14.46	506.46	426.38	1.2678396	0.24647903
14WAP	2017	3	TTSSCP		91.44	324.90	14.46	548.73	471.49	1.4066841	0.23773777
14WAP	2017	3	TTSSCP		121.92	324.90	14.46	292.73	263.61	0.7668482	0.08962874
14WAP	2017	3	FS		30.48	324.90	14.46	578.46	492.47	1.4712587	0.26466948
14WAP	2017	3	FS		60.96	324.90	14.46	559.66	489.88	1.4632869	0.21477656
14WAP	2017	3	FS		91.44	324.90	14.46	548.35	493.04	1.4730131	0.1702392
14WAP	2017	3	FS		121.92	324.90	14.46	498.89	455.66	1.3579608	0.13305805

14WAP	2017	3	PM		30.48	324.90	14.46	589.88	501.29	1.4984058	0.27267204
14WAP	2017	3	PM		60.96	324.90	14.46	644.33	546.16	1.6365117	0.30215842
14WAP	2017	3	PM		91.44	324.90	14.46	543.59	459.93	1.3711035	0.25749795
14WAP	2017	3	PM		121.92	324.90	14.46	819.56	719.12	2.168867	0.30914528
14WAP	2017	3	TTSS		30.48	324.90	14.46	500.22	428.8	1.2752881	0.21982433
14WAP	2017	3	TTSS		60.96	324.90	14.46	437.01	380.93	1.1279486	0.17260919
14WAP	2017	3	TTSS		91.44	324.90	14.46	454.3	405.5	1.2035728	0.15020201
14WAP	2017	3	TTSS		121.92	324.90	14.46	563.87	515.48	1.5420814	0.14894006
14WAP	2017	4	FS		30.48	324.90	14.46	579.59	497.21	1.485848	0.25355822
14WAP	2017	4	FS		60.96	324.90	14.46	537.94	465.57	1.3884629	0.22274835
14WAP	2017	4	FS		91.44	324.90	14.46	453.45	415.42	1.2341057	0.11705292
14WAP	2017	4	FS		121.92	324.90	14.46	524.17	481.61	1.4378326	0.13099585
14WAP	2017	4	SS		30.48	324.90	14.46	614.64	527.74	1.5798166	0.26747038
14WAP	2017	4	SS		60.96	324.90	14.46	559.09	512.51	1.53294	0.14336905
14WAP	2017	4	SS		91.44	324.90	14.46	494.37	469.99	1.4020673	0.07503945
14WAP	2017	4	SS		121.92	324.90	14.46	475.75	452.57	1.3484501	0.07134595
14WAP	2017	4	PMMB		30.48	324.90	14.46	608.79	513.98	1.5374645	0.29181665

14WAP	2017	4	PMMB		60.96	324.90	14.46	553.06	485.45	1.4496517	0.20809749
14WAP	2017	4	PMMB		91.44	324.90	14.46	432.6	407.71	1.210375	0.07660918
14WAP	2017	4	PMMB		121.92	324.90	14.46	510.45	485.31	1.4492208	0.07737866
14WAP	2017	4	TTSS		30.48	324.90	14.46	479.95	409.77	1.2167155	0.21600772
14WAP	2017	4	TTSS		60.96	324.90	14.46	488.92	433.1	1.2885232	0.17180893
14WAP	2017	4	TTSS		91.44	324.90	14.46	463.97	415.55	1.2345058	0.1490324
14WAP	2017	4	TTSS		121.92	324.90	14.46	487.28	443.83	1.3215491	0.13373519
14WAP	2017	4	FALLOW		30.48	324.90	14.46	505.05	425.21	1.2642384	0.24574033
14WAP	2017	4	FALLOW		60.96	324.90	14.46	549.7	475.19	1.4180724	0.22933507
14WAP	2017	4	FALLOW		91.44	324.90	14.46	509.11	452.36	1.3478037	0.17467139
14WAP	2017	4	FALLOW		121.92	324.90	14.46	554.69	506.62	1.5148111	0.14795513
14WAP	2017	4	PM		30.48	324.90	14.46	587.29	502.17	1.5011144	0.2619917
14WAP	2017	4	PM		60.96	324.90	14.46	562.86	490.76	1.4659954	0.22191731
14WAP	2017	4	PM		91.44	324.90	14.46	489.61	438.59	1.3054209	0.15703497
14WAP	2017	4	PM		121.92	324.90	14.46	498.78	458.02	1.3652247	0.12545561
14WAP	2017	4	MB		30.48	324.90	14.46	590.07	504.1	1.5070548	0.26460792
14WAP	2017	4	MB		60.96	324.90	14.46	635.72	548.47	1.6436216	0.26854765

14WAP	2017	4	MB		91.44	324.90	14.46	443.45	395.83	1.1738094	0.14657007
14WAP	2017	4	MB		121.92	324.90	14.46	732.9	698.61	2.105739	0.10554153
14WAP	2017	4	TTSSCP		30.48	324.90	14.46	568.35	515.19	1.5411888	0.16362169
14WAP	2017	4	TTSSCP		60.96	324.90	14.46	434.99	399.09	1.1838434	0.11049697
14WAP	2017	4	TTSSCP		91.44	324.90	14.46	506.9	476.93	1.4234279	0.09224496
14WAP	2017	4	TTSSCP		121.92	324.90	14.46	675.4	644.46	1.9390702	0.09523053
14WAP	2017	4	CP		30.48	324.90	14.46	408.53	355.23	1.0488463	0.1640526
14WAP	2017	4	CP		60.96	324.90	14.46	461.74	411.34	1.2215478	0.15512666
14WAP	2017	4	CP		91.44	324.90	14.46	496.49	456.03	1.3590996	0.12453224
14WAP	2017	4	CP		121.92	324.90	14.46	504.91	472.95	1.4111779	0.09837
Planting	2018	1	PM	Proper	30.48	324.90	14.46	509.97	456.96	1.3619621	0.16316001
Planting	2018	1	PM	Proper	60.96	324.90	14.46	476.11	437.85	1.3031432	0.11776084
Planting	2018	1	PM	Proper	91.44	324.90	14.46	491.15	462.38	1.3786444	0.08855147
Planting	2018	1	PM	Proper	121.92	324.90	14.46	500.15	472.57	1.4100083	0.08488876
Planting	2018	1	PM	Severe	30.48	324.90	14.46	556.11	495.15	1.4795075	0.18762939
Planting	2018	1	PM	Severe	60.96	324.90	14.46	462.6	420.41	1.2494645	0.12985702
Planting	2018	1	PM	Severe	91.44	324.90	14.46	494.54	460.06	1.3715036	0.10612634

Planting	2018	1	PM	Severe	121.92	324.90	14.46	557.86	514.73	1.5397729	0.13275026
Planting	2018	1	PM	Check	30.48	324.90	14.46	488.4	439.87	1.3093606	0.14937097
Planting	2018	1	PM	Check	60.96	324.90	14.46	424.34	394.64	1.1701467	0.09141393
Planting	2018	1	PM	Check	91.44	324.90	14.46	423.82	399.31	1.1845206	0.07543957
Planting	2018	1	PM	Check	121.92	324.90	14.46	283.03	269.52	0.7850386	0.04158256
Planting	2018	1	PMMB	Proper	30.48	324.90	14.46	491.18	444.43	1.3233959	0.14389229
Planting	2018	1	PMMB	Proper	60.96	324.90	14.46	463.77	436.24	1.2981878	0.08473486
Planting	2018	1	PMMB	Proper	91.44	324.90	14.46	440.46	419.9	1.2478947	0.06328183
Planting	2018	1	PMMB	Proper	121.92	324.90	14.46	546.16	523.17	1.5657505	0.07076115
Planting	2018	1	PMMB	Check	30.48	324.90	14.46	501.94	444.27	1.3229034	0.17750307
Planting	2018	1	PMMB	Check	60.96	324.90	14.46	446.02	419.75	1.2474331	0.0808567
Planting	2018	1	PMMB	Check	91.44	324.90	14.46	489.75	462.7	1.3796293	0.08325746
Planting	2018	1	PMMB	Check	121.92	324.90	14.46	543.07	512.13	1.5317704	0.09523053
Planting	2018	1	PMMB	Severe	30.48	324.90	14.46	486.03	438.96	1.3065597	0.14487722
Planting	2018	1	PMMB	Severe	60.96	324.90	14.46	487.73	431.28	1.2829214	0.17374802
Planting	2018	1	PMMB	Severe	91.44	324.90	14.46	466.5	417.87	1.2416466	0.14967876
Planting	2018	1	PMMB	Severe	121.92	324.90	14.46	508.8	466.05	1.3899403	0.13158065

Planting	2018	1	FS	Severe	30.48	324.90	14.46	519.27	470.31	1.4030522	0.15069447
Planting	2018	1	FS	Severe	60.96	324.90	14.46	457.38	411.83	1.223056	0.1401988
Planting	2018	1	FS	Severe	91.44	324.90	14.46	473.19	438.42	1.3048976	0.10701893
Planting	2018	1	FS	Severe	121.92	324.90	14.46	498.29	462.76	1.379814	0.10935814
Planting	2018	1	FS	Check	30.48	324.90	14.46	535.96	492.85	1.4724283	0.1326887
Planting	2018	1	FS	Check	60.96	324.90	14.46	437.93	404.43	1.2002795	0.10310998
Planting	2018	1	FS	Check	91.44	324.90	14.46	470.38	451.11	1.3439563	0.05931133
Planting	2018	1	FS	Check	121.92	324.90	14.46	584.76	544.19	1.6304482	0.12487081
Planting	2018	1	FS	Proper	30.48	324.90	14.46	521.62	469.76	1.4013593	0.15962041
Planting	2018	1	FS	Proper	60.96	324.90	14.46	426.97	402.07	1.1930156	0.07663996
Planting	2018	1	FS	Proper	91.44	324.90	14.46	490.6	468.68	1.3980352	0.06746779
Planting	2018	1	FS	Proper	121.92	324.90	14.46	487.75	467.43	1.3941878	0.06254313
Planting	2018	1	TTSS	Proper	30.48	324.90	14.46	465.32	430.37	1.2801205	0.10757295
Planting	2018	1	TTSS	Proper	60.96	324.90	14.46	490.08	456.87	1.3616851	0.10221739
Planting	2018	1	TTSS	Proper	91.44	324.90	14.46	461.29	435.26	1.2951714	0.080118
Planting	2018	1	TTSS	Proper	121.92	324.90	14.46	548.85	528	1.5806168	0.06417442
Planting	2018	1	TTSS	Severe	30.48	324.90	14.46	536.93	490.36	1.4647643	0.14333827

Planting	2018	1	TTSS	Severe	60.96	324.90	14.46	489.58	455.51	1.3574991	0.10486439
Planting	2018	1	TTSS	Severe	91.44	324.90	14.46	457.51	432.79	1.287569	0.07608593
Planting	2018	1	TTSS	Severe	121.92	324.90	14.46	581.41	557.28	1.670738	0.07426997
Planting	2018	1	TTSS	Check	30.48	324.90	14.46	490.29	447.95	1.3342301	0.13031871
Planting	2018	1	TTSS	Check	60.96	324.90	14.46	499.79	468.29	1.3968348	0.09695416
Planting	2018	1	TTSS	Check	91.44	324.90	14.46	485.14	461.96	1.3773516	0.07134595
Planting	2018	1	TTSS	Check	121.92	324.90	14.46	397.69	382.11	1.1315805	0.04795384
Planting	2018	1	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2018	1	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2018	1	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2018	1	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2018	1	FALLOW	Fallow	30.48	324.90	14.46	494.19	452.12	1.347065	0.12948767
Planting	2018	1	FALLOW	Fallow	60.96	324.90	14.46	451.04	422.26	1.2551586	0.08858225
Planting	2018	1	FALLOW	Fallow	91.44	324.90	14.46	501.82	479.78	1.4322	0.06783714
Planting	2018	1	FALLOW	Fallow	121.92	324.90	14.46	633.08	606.68	1.8227868	0.08125682

Planting	2018	1	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2018	1	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2018	1	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2018	1	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2018	1	SS	Proper	30.48	324.90	14.46	542.86	491.07	1.4669496	0.15940496
Planting	2018	1	SS	Proper	60.96	324.90	14.46	432.27	400.85	1.1892606	0.09670793
Planting	2018	1	SS	Proper	91.44	324.90	14.46	494.23	470	1.402098	0.07457776
Planting	2018	1	SS	Proper	121.92	324.90	14.46	527.52	500.82	1.4969592	0.0821802
Planting	2018	1	SS	Severe	30.48	324.90	14.46	522.51	474.54	1.4160717	0.14764734
Planting	2018	1	SS	Severe	60.96	324.90	14.46	487.12	449.75	1.3397704	0.1150215
Planting	2018	1	SS	Severe	91.44	324.90	14.46	487.69	462.96	1.3804295	0.07611671
Planting	2018	1	SS	Severe	121.92	324.90	14.46	533.78	492.05	1.4699659	0.12844118
Planting	2018	1	SS	Check	30.48	324.90	14.46	527.11	475.36	1.4185956	0.15928184
Planting	2018	1	SS	Check	60.96	324.90	14.46	463.03	434.56	1.2930169	0.0876281
Planting	2018	1	SS	Check	91.44	324.90	14.46	493.51	470	1.402098	0.07236166

Planting	2018	1	SS	Check	121.92	324.90	14.46	491.39	456.55	1.3607001	0.10723438
Planting	2018	1	CP	Check	30.48	324.90	14.46	470.84	431.17	1.2825828	0.12210069
Planting	2018	1	CP	Check	60.96	324.90	14.46	524.03	487.09	1.4546995	0.11369799
Planting	2018	1	CP	Check	91.44	324.90	14.46	499.56	479.23	1.4305071	0.06257391
Planting	2018	1	CP	Check	121.92	324.90	14.46	645.53	615.29	1.8492876	0.093076
Planting	2018	1	CP	Severe	30.48	324.90	14.46	535.32	496.04	1.4822468	0.1209003
Planting	2018	1	CP	Severe	60.96	324.90	14.46	480.67	448.91	1.3371849	0.09775442
Planting	2018	1	CP	Severe	91.44	324.90	14.46	505.68	483.2	1.4427264	0.06919142
Planting	2018	1	CP	Severe	121.92	324.90	14.46	536.3	511.65	1.530293	0.07587048
Planting	2018	1	CP	Proper	30.48	324.90	14.46	505.55	463.42	1.3818454	0.12967235
Planting	2018	1	CP	Proper	60.96	324.90	14.46	459.84	428.76	1.275165	0.09566144
Planting	2018	1	CP	Proper	91.44	324.90	14.46	501.31	478.39	1.4279217	0.0705457
Planting	2018	1	CP	Proper	121.92	324.90	14.46	630.61	604.4	1.8157691	0.08067202
Planting	2018	1	MB	Severe	30.48	324.90	14.46	486.49	445.97	1.3281359	0.12471691
Planting	2018	1	MB	Severe	60.96	324.90	14.46	485.13	445.49	1.3266585	0.12200835
Planting	2018	1	MB	Severe	91.44	324.90	14.46	530.07	488.62	1.4594087	0.12757937
Planting	2018	1	MB	Severe	121.92	324.90	14.46	487.49	458.39	1.3663635	0.08956718

Planting	2018	1	MB	Check	30.48	324.90	14.46	533.52	477.64	1.4256133	0.17199361
Planting	2018	1	MB	Check	60.96	324.90	14.46	538.68	499.72	1.4935735	0.11991537
Planting	2018	1	MB	Check	91.44	324.90	14.46	477.7	441.76	1.3151779	0.11062008
Planting	2018	1	MB	Check	121.92	324.90	14.46	622.21	587.83	1.7647682	0.10581855
Planting	2018	1	MB	Proper	30.48	324.90	14.46	519.91	478.89	1.4294606	0.12625587
Planting	2018	1	MB	Proper	60.96	324.90	14.46	535.24	491.39	1.4679345	0.13496635
Planting	2018	1	MB	Proper	91.44	324.90	14.46	520.97	492.62	1.4717204	0.08725875
Planting	2018	1	MB	Proper	121.92	324.90	14.46	622.04	600.31	1.8031805	0.06688298
Planting	2018	1	TTSSCP	Proper	30.48	324.90	14.46	539.49	493.36	1.473998	0.14198399
Planting	2018	1	TTSSCP	Proper	60.96	324.90	14.46	459.66	434.57	1.2930477	0.07722476
Planting	2018	1	TTSSCP	Proper	91.44	324.90	14.46	478.09	455.54	1.3575915	0.06940687
Planting	2018	1	TTSSCP	Proper	121.92	324.90	14.46	487.31	471.15	1.4056376	0.04973903
Planting	2018	1	TTSSCP	Check	30.48	324.90	14.46	516.02	471.01	1.4052067	0.13853673
Planting	2018	1	TTSSCP	Check	60.96	324.90	14.46	485.51	455.54	1.3575915	0.09224496
Planting	2018	1	TTSSCP	Check	91.44	324.90	14.46	524.9	477.82	1.4261673	0.144908
Planting	2018	1	TTSSCP	Check	121.92	324.90	14.46	672.27	636.68	1.9151241	0.10954282
Planting	2018	1	TTSSCP	Severe	30.48	324.90	14.46	485.61	443.87	1.3216722	0.12847196

Planting	2018	1	TTSSCP	Severe	60.96	324.90	14.46	500.44	468.73	1.3981891	0.09760053
Planting	2018	1	TTSSCP	Severe	91.44	324.90	14.46	529.66	488.64	1.4594703	0.12625587
Planting	2018	1	TTSSCP	Severe	121.92	324.90	14.46	607.08	572.31	1.716999	0.10701893
Planting	2018	2	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2018	2	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2018	2	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2018	2	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2018	2	FALLOW	Fallow	30.48	324.90	14.46	513.79	461.65	1.3763975	0.16048223
Planting	2018	2	FALLOW	Fallow	60.96	324.90	14.46	483.36	447.16	1.3317986	0.11142034
Planting	2018	2	FALLOW	Fallow	91.44	324.90	14.46	399.45	377.91	1.1186533	0.06629818
Planting	2018	2	FALLOW	Fallow	121.92	324.90	14.46	678.87	644.45	1.9390394	0.10594166
Planting	2018	2	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2018	2	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0

Planting	2018	2	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2018	2	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2018	2	TTSSCP	Check	30.48	324.90	14.46	515.34	455.29	1.356822	0.18482849
Planting	2018	2	TTSSCP	Check	60.96	324.90	14.46	473.33	427.46	1.2711637	0.14118373
Planting	2018	2	TTSSCP	Check	91.44	324.90	14.46	448.81	422.15	1.25482	0.08205708
Planting	2018	2	TTSSCP	Check	121.92	324.90	14.46	602.9	560.72	1.681326	0.12982624
Planting	2018	2	TTSSCP	Severe	30.48	324.90	14.46	527.08	473.32	1.4123167	0.16546844
Planting	2018	2	TTSSCP	Severe	60.96	324.90	14.46	480.92	443.38	1.3201641	0.11554474
Planting	2018	2	TTSSCP	Severe	91.44	324.90	14.46	494.99	473.13	1.4117319	0.06728311
Planting	2018	2	TTSSCP	Severe	121.92	324.90	14.46	572.01	546.57	1.6377736	0.07830203
Planting	2018	2	TTSSCP	Proper	30.48	324.90	14.46	554.13	493.3	1.4738133	0.18722926
Planting	2018	2	TTSSCP	Proper	60.96	324.90	14.46	461.78	432.76	1.2874767	0.08932095
Planting	2018	2	TTSSCP	Proper	91.44	324.90	14.46	467.17	443.76	1.3213337	0.07205387
Planting	2018	2	TTSSCP	Proper	121.92	324.90	14.46	535.92	507.92	1.5188124	0.08618148
Planting	2018	2	PMMB	Severe	30.48	324.90	14.46	499.28	457.7	1.3642397	0.1279795
Planting	2018	2	PMMB	Severe	60.96	324.90	14.46	419.5	387.67	1.1486937	0.09796987

Planting	2018	2	PMMB	Severe	91.44	324.90	14.46	504.28	473.98	1.4143481	0.09326067
Planting	2018	2	PMMB	Severe	121.92	324.90	14.46	580.45	549.73	1.6474998	0.09455339
Planting	2018	2	PMMB	Proper	30.48	324.90	14.46	523.09	473.19	1.4119166	0.15358771
Planting	2018	2	PMMB	Proper	60.96	324.90	14.46	489.3	447.96	1.3342609	0.1272408
Planting	2018	2	PMMB	Proper	91.44	324.90	14.46	487.67	462.96	1.3804295	0.07605516
Planting	2018	2	PMMB	Proper	121.92	324.90	14.46	584.93	560.5	1.6806489	0.07519334
Planting	2018	2	PMMB	Check	30.48	324.90	14.46	527.51	473.67	1.413394	0.16571467
Planting	2018	2	PMMB	Check	60.96	324.90	14.46	492.18	456.74	1.3612849	0.10908113
Planting	2018	2	PMMB	Check	91.44	324.90	14.46	497.19	467.77	1.3952343	0.09055211
Planting	2018	2	PMMB	Check	121.92	324.90	14.46	538.23	516.15	1.5441436	0.06796025
Planting	2018	2	PM	Severe	30.48	324.90	14.46	540.3	491.25	1.4675036	0.15097148
Planting	2018	2	PM	Severe	60.96	324.90	14.46	467.96	430.32	1.2799666	0.11585253
Planting	2018	2	PM	Severe	91.44	324.90	14.46	446.75	415.71	1.2349983	0.09553833
Planting	2018	2	PM	Severe	121.92	324.90	14.46	470.82	443.67	1.3210567	0.08356526
Planting	2018	2	PM	Proper	30.48	324.90	14.46	524.9	480.87	1.4355549	0.13552038
Planting	2018	2	PM	Proper	60.96	324.90	14.46	453.9	421.92	1.2541121	0.09843156
Planting	2018	2	PM	Proper	91.44	324.90	14.46	459.81	434.49	1.2928014	0.07793268

Planting	2018	2	PM	Proper	121.92	324.90	14.46	468.31	426.06	1.2668547	0.1300417
Planting	2018	2	PM	Check	30.48	324.90	14.46	471.48	436.98	1.3004654	0.10618789
Planting	2018	2	PM	Check	60.96	324.90	14.46	479.61	451.6	1.3454645	0.08621226
Planting	2018	2	PM	Check	91.44	324.90	14.46	486.36	460.91	1.3741198	0.07833281
Planting	2018	2	PM	Check	121.92	324.90	14.46	486.66	462.76	1.379814	0.07356205
Planting	2018	2	SS	Severe	30.48	324.90	14.46	528.08	481.38	1.4371246	0.1437384
Planting	2018	2	SS	Severe	60.96	324.90	14.46	443.56	419.01	1.2451554	0.07556269
Planting	2018	2	SS	Severe	91.44	324.90	14.46	523.33	501.86	1.5001602	0.06608273
Planting	2018	2	SS	Severe	121.92	324.90	14.46	440.83	425.55	1.2652849	0.04703046
Planting	2018	2	SS	Proper	30.48	324.90	14.46	535.5	490.07	1.4638717	0.13982945
Planting	2018	2	SS	Proper	60.96	324.90	14.46	452.01	425.59	1.265408	0.08131838
Planting	2018	2	SS	Proper	91.44	324.90	14.46	474.67	449.45	1.338847	0.07762489
Planting	2018	2	SS	Proper	121.92	324.90	14.46	508.31	481.88	1.4386636	0.08134916
Planting	2018	2	SS	Check	30.48	324.90	14.46	488.25	444.39	1.3232728	0.13499713
Planting	2018	2	SS	Check	60.96	324.90	14.46	510.12	480.19	1.4334619	0.09212185
Planting	2018	2	SS	Check	91.44	324.90	14.46	462.72	444.02	1.3221339	0.05755692
Planting	2018	2	SS	Check	121.92	324.90	14.46	554.02	529.09	1.5839717	0.0767323

Planting	2018	2	CP	Check	30.48	324.90	14.46	544.76	502.22	1.5012683	0.13093429
Planting	2018	2	CP	Check	60.96	324.90	14.46	429	401.45	1.1911073	0.08479642
Planting	2018	2	CP	Check	91.44	324.90	14.46	435.38	411.36	1.2216094	0.0739314
Planting	2018	2	CP	Check	121.92	324.90	14.46	472.78	451.18	1.3441718	0.06648286
Planting	2018	2	CP	Proper	30.48	324.90	14.46	560.81	511.77	1.5306623	0.15094071
Planting	2018	2	CP	Proper	60.96	324.90	14.46	442.91	414.88	1.2324436	0.08627382
Planting	2018	2	CP	Proper	91.44	324.90	14.46	459.75	438.15	1.3040666	0.06648286
Planting	2018	2	CP	Proper	121.92	324.90	14.46	490.66	467.23	1.3935722	0.07211543
Planting	2018	2	CP	Severe	30.48	324.90	14.46	513.78	472.73	1.4105007	0.1263482
Planting	2018	2	CP	Severe	60.96	324.90	14.46	424.25	400.7	1.1887989	0.07248478
Planting	2018	2	CP	Severe	91.44	324.90	14.46	499.04	475.43	1.4188111	0.07266945
Planting	2018	2	CP	Severe	121.92	324.90	14.46	491.82	469.31	1.3999743	0.06928375
Planting	2018	2	TTSS	Proper	30.48	324.90	14.46	499.1	454.39	1.3540519	0.13761336
Planting	2018	2	TTSS	Proper	60.96	324.90	14.46	474.05	442.25	1.316686	0.09787754
Planting	2018	2	TTSS	Proper	91.44	324.90	14.46	439.52	414.04	1.2298582	0.07842515
Planting	2018	2	TTSS	Proper	121.92	324.90	14.46	556.42	535.27	1.6029932	0.0650978
Planting	2018	2	TTSS	Check	30.48	324.90	14.46	512.39	468.55	1.3976351	0.13493557

Planting	2018	2	TTSS	Check	60.96	324.90	14.46	452.16	425.97	1.2665777	0.08061046
Planting	2018	2	TTSS	Check	91.44	324.90	14.46	433.49	414.69	1.2318588	0.05786471
Planting	2018	2	TTSS	Check	121.92	324.90	14.46	369.89	355.24	1.0488771	0.04509138
Planting	2018	2	TTSS	Severe	30.48	324.90	14.46	533.91	483.17	1.4426341	0.15617315
Planting	2018	2	TTSS	Severe	60.96	324.90	14.46	461.05	428.28	1.2736876	0.10086311
Planting	2018	2	TTSS	Severe	91.44	324.90	14.46	459.73	434.73	1.2935401	0.07694775
Planting	2018	2	TTSS	Severe	121.92	324.90	14.46	453.48	427.81	1.272241	0.07900995
Planting	2018	2	FS	Proper	30.48	324.90	14.46	552.29	511.69	1.5304161	0.12496315
Planting	2018	2	FS	Proper	60.96	324.90	14.46	506.79	476.35	1.4216428	0.09369158
Planting	2018	2	FS	Proper	91.44	324.90	14.46	494.94	451.89	1.3463571	0.13250402
Planting	2018	2	FS	Proper	121.92	324.90	14.46			-0.0445197	0
Planting	2018	2	FS	Severe	30.48	324.90	14.46	513.49	470.24	1.4028367	0.13311961
Planting	2018	2	FS	Severe	60.96	324.90	14.46	527.01	493.83	1.4754446	0.10212505
Planting	2018	2	FS	Severe	91.44	324.90	14.46	519.01	483.71	1.4442962	0.10865022
Planting	2018	2	FS	Severe	121.92	324.90	14.46			-0.0445197	0
Planting	2018	2	FS	Check	30.48	324.90	14.46	511.54	467.7	1.3950188	0.13493557

Planting	2018	2	FS	Check	60.96	324.90	14.46	500.22	471.45	1.406561	0.08855147
Planting	2018	2	FS	Check	91.44	324.90	14.46	499.32	474.86	1.4170567	0.07528568
Planting	2018	2	FS	Check	121.92	324.90	14.46	548.79	541.06	1.6208143	0.02379224
Planting	2018	2	MB	Severe	30.48	324.90	14.46	517.39	471.76	1.4075152	0.14044503
Planting	2018	2	MB	Severe	60.96	324.90	14.46	451.75	425.65	1.2655927	0.08033345
Planting	2018	2	MB	Severe	91.44	324.90	14.46	472.13	448.09	1.334661	0.07399296
Planting	2018	2	MB	Severe	121.92	324.90	14.46	415.54	394.3	1.1691002	0.06537481
Planting	2018	2	MB	Check	30.48	324.90	14.46	518.49	474.06	1.4145943	0.13675154
Planting	2018	2	MB	Check	60.96	324.90	14.46	527.16	493.79	1.4753215	0.10270986
Planting	2018	2	MB	Check	91.44	324.90	14.46	531.45	502.44	1.5019454	0.08929017
Planting	2018	2	MB	Check	121.92	324.90	14.46			-0.0445197	0
Planting	2018	2	MB	Proper	30.48	324.90	14.46	515.35	477.82	1.4261673	0.11551396
Planting	2018	2	MB	Proper	60.96	324.90	14.46	483.53	452.5	1.3482346	0.09550755
Planting	2018	2	MB	Proper	91.44	324.90	14.46	493.79	461.5	1.3759358	0.09938571
Planting	2018	2	MB	Proper	121.92	324.90	14.46			-0.0445197	0
Planting	2018	3	SS	Check	30.48	324.90	14.46	551.21	495.05	1.4791997	0.17285542

Planting	2018	3	SS	Check	60.96	324.90	14.46	471.48	438.61	1.3054824	0.1011709
Planting	2018	3	SS	Check	91.44	324.90	14.46	468.63	441.49	1.3143468	0.08353448
Planting	2018	3	SS	Check	121.92	324.90	14.46	507.78	479.59	1.4316152	0.08676628
Planting	2018	3	SS	Proper	30.48	324.90	14.46	508.66	460.68	1.3734119	0.14767812
Planting	2018	3	SS	Proper	60.96	324.90	14.46	488.15	452.98	1.349712	0.10825009
Planting	2018	3	SS	Proper	91.44	324.90	14.46	491.58	466.03	1.3898787	0.0786406
Planting	2018	3	SS	Proper	121.92	324.90	14.46	503.79	460.63	1.373258	0.13284259
Planting	2018	3	SS	Severe	30.48	324.90	14.46	529.34	478.83	1.429276	0.15546523
Planting	2018	3	SS	Severe	60.96	324.90	14.46	454.53	418.8	1.244509	0.10997372
Planting	2018	3	SS	Severe	91.44	324.90	14.46	512.49	480.61	1.4347547	0.09812377
Planting	2018	3	SS	Severe	121.92	324.90	14.46	581.16	548.98	1.6451914	0.09904714
Planting	2018	3	MB	Proper	30.48	324.90	14.46	537.12	487.6	1.4562692	0.1524181
Planting	2018	3	MB	Proper	60.96	324.90	14.46	460.51	427.19	1.2703327	0.10255596
Planting	2018	3	MB	Proper	91.44	324.90	14.46	482.59	456.89	1.3617466	0.07910229
Planting	2018	3	MB	Proper	121.92	324.90	14.46	484.24	455.73	1.3581763	0.08775121
Planting	2018	3	MB	Severe	30.48	324.90	14.46	535.57	484.23	1.4458967	0.1580199
Planting	2018	3	MB	Severe	60.96	324.90	14.46	479.23	447.06	1.3314908	0.09901636

Planting	2018	3	MB	Severe	91.44	324.90	14.46	480.43	455.83	1.358484	0.07571659
Planting	2018	3	MB	Severe	121.92	324.90	14.46	523.6	491.55	1.468427	0.09864701
Planting	2018	3	MB	Check	30.48	324.90	14.46	532.96	475.92	1.4203193	0.17556399
Planting	2018	3	MB	Check	60.96	324.90	14.46	454.34	420.24	1.2489412	0.10495673
Planting	2018	3	MB	Check	91.44	324.90	14.46	487.45	463.95	1.3834767	0.07233088
Planting	2018	3	MB	Check	121.92	324.90	14.46	474.09	449.9	1.340232	0.07445464
Planting	2018	3	CP	Severe	30.48	324.90	14.46	523.95	481.67	1.4380172	0.13013403
Planting	2018	3	CP	Severe	60.96	324.90	14.46	471.53	438.29	1.3044975	0.10230973
Planting	2018	3	CP	Severe	91.44	324.90	14.46	498.14	473.92	1.4141634	0.07454698
Planting	2018	3	CP	Severe	121.92	324.90	14.46	563.73	545.52	1.6345418	0.05604874
Planting	2018	3	CP	Proper	30.48	324.90	14.46	539.02	487.68	1.4565155	0.1580199
Planting	2018	3	CP	Proper	60.96	324.90	14.46	488.92	451.3	1.3445411	0.11579097
Planting	2018	3	CP	Proper	91.44	324.90	14.46	462.11	440.31	1.3107149	0.06709844
Planting	2018	3	CP	Proper	121.92	324.90	14.46	503.57	480.97	1.4358627	0.06956077
Planting	2018	3	CP	Check	30.48	324.90	14.46	528.92	472.08	1.4085001	0.1749484
Planting	2018	3	CP	Check	60.96	324.90	14.46	506.08	465.89	1.3894478	0.1237012
Planting	2018	3	CP	Check	91.44	324.90	14.46	531.47	484.83	1.4477434	0.14355372

Planting	2018	3	CP	Check	121.92	324.90	14.46	504.2	475.14	1.4179185	0.08944406
Planting	2018	3	PMMB	Severe	30.48	324.90	14.46	531.4	488.28	1.4583622	0.13271948
Planting	2018	3	PMMB	Severe	60.96	324.90	14.46	466.68	440.57	1.3115151	0.08036423
Planting	2018	3	PMMB	Severe	91.44	324.90	14.46	491.1	467.34	1.3939108	0.07313114
Planting	2018	3	PMMB	Severe	121.92	324.90	14.46	495.45	472.89	1.4109932	0.06943765
Planting	2018	3	PMMB	Check	30.48	324.90	14.46	550.49	497.41	1.4864635	0.16337546
Planting	2018	3	PMMB	Check	60.96	324.90	14.46	497.08	466.83	1.3923411	0.09310678
Planting	2018	3	PMMB	Check	91.44	324.90	14.46	472.29	448.49	1.3358922	0.07325426
Planting	2018	3	PMMB	Check	121.92	324.90	14.46	522.45	494.54	1.4776299	0.08590447
Planting	2018	3	PMMB	Proper	30.48	324.90	14.46	526.34	476.4	1.4217967	0.15371082
Planting	2018	3	PMMB	Proper	60.96	324.90	14.46	455.86	421.92	1.2541121	0.10446426
Planting	2018	3	PMMB	Proper	91.44	324.90	14.46	483.67	455.24	1.3566681	0.08750498
Planting	2018	3	PMMB	Proper	121.92	324.90	14.46	546.66	516.75	1.5459903	0.09206029
Planting	2018	3	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2018	3	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2018	3	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0

Planting	2018	3	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2018	3	FALLOW	Fallow	30.48	324.90	14.46	524.45	473.91	1.4141327	0.15555757
Planting	2018	3	FALLOW	Fallow	60.96	324.90	14.46	480.93	447.95	1.3342301	0.10150947
Planting	2018	3	FALLOW	Fallow	91.44	324.90	14.46	478.81	455.58	1.3577146	0.07149985
Planting	2018	3	FALLOW	Fallow	121.92	324.90	14.46	510.19	480.5	1.4344161	0.09138315
Planting	2018	3	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2018	3	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2018	3	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2018	3	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2018	3	TTSSCP	Severe	30.48	324.90	14.46	544.71	491.69	1.4688579	0.16319079
Planting	2018	3	TTSSCP	Severe	60.96	324.90	14.46	437.32	411.4	1.2217325	0.07977943
Planting	2018	3	TTSSCP	Severe	91.44	324.90	14.46	449.63	421.7	1.253435	0.08596603
Planting	2018	3	TTSSCP	Severe	121.92	324.90	14.46	409.09	385.9	1.1432458	0.07137673
Planting	2018	3	TTSSCP	Proper	30.48	324.90	14.46	531.17	478.42	1.428014	0.16235975
Planting	2018	3	TTSSCP	Proper	60.96	324.90	14.46	456.42	423.81	1.2599294	0.10037064

Planting	2018	3	TTSSCP	Proper	91.44	324.90	14.46	486.8	456.97	1.3619929	0.09181405
Planting	2018	3	TTSSCP	Proper	121.92	324.90	14.46	500.2	471.72	1.407392	0.08765888
Planting	2018	3	TTSSCP	Check	30.48	324.90	14.46	517.07	470.45	1.4034831	0.14349216
Planting	2018	3	TTSSCP	Check	60.96	324.90	14.46	460.38	432.82	1.2876613	0.0848272
Planting	2018	3	TTSSCP	Check	91.44	324.90	14.46	409.03	387.09	1.1469085	0.06752934
Planting	2018	3	TTSSCP	Check	121.92	324.90	14.46	501.83	472	1.4082539	0.09181405
Planting	2018	3	FS	Severe	30.48	324.90	14.46	509.61	463.34	1.3815991	0.14241489
Planting	2018	3	FS	Severe	60.96	324.90	14.46	531.62	490.22	1.4643334	0.12742547
Planting	2018	3	FS	Severe	91.44	324.90	14.46	496.57	471.63	1.407115	0.07676307
Planting	2018	3	FS	Severe	121.92	324.90	14.46	545.53	517.37	1.5478986	0.08667394
Planting	2018	3	FS	Check	30.48	324.90	14.46	548.51	495.78	1.4814465	0.16229819
Planting	2018	3	FS	Check	60.96	324.90	14.46	469.28	431.45	1.2834446	0.11643733
Planting	2018	3	FS	Check	91.44	324.90	14.46	478.05	447.97	1.3342917	0.09258353
Planting	2018	3	FS	Check	121.92	324.90	14.46	446.86	420.16	1.248695	0.0821802
Planting	2018	3	FS	Proper	30.48	324.90	14.46	504.78	461.73	1.3766437	0.13250402
Planting	2018	3	FS	Proper	60.96	324.90	14.46	482.16	455.41	1.3571913	0.08233409
Planting	2018	3	FS	Proper	91.44	324.90	14.46	450.52	428.52	1.2744263	0.06771402

Planting	2018	3	FS	Proper	121.92	324.90	14.46	504.09	480.48	1.4343545	0.07266945
Planting	2018	3	PM	Check	30.48	324.90	14.46	564.16	508.91	1.5218595	0.17005453
Planting	2018	3	PM	Check	60.96	324.90	14.46	518.05	475.03	1.4175799	0.13241169
Planting	2018	3	PM	Check	91.44	324.90	14.46	526.63	493.75	1.4751984	0.10120168
Planting	2018	3	PM	Check	121.92	324.90	14.46	622.15	577.59	1.7332504	0.13715167
Planting	2018	3	PM	Severe	30.48	324.90	14.46	514.01	460.85	1.3739352	0.16362169
Planting	2018	3	PM	Severe	60.96	324.90	14.46	550.64	496.35	1.483201	0.16709973
Planting	2018	3	PM	Severe	91.44	324.90	14.46	549.88	508.94	1.5219518	0.12600963
Planting	2018	3	PM	Severe	121.92	324.90	14.46	592.18	559.06	1.6762167	0.10194038
Planting	2018	3	PM	Proper	30.48	324.90	14.46	573.69	523.66	1.5672587	0.15398784
Planting	2018	3	PM	Proper	60.96	324.90	14.46	528.94	483.11	1.4424494	0.14106061
Planting	2018	3	PM	Proper	91.44	324.90	14.46	556.26	509.33	1.5231522	0.14444632
Planting	2018	3	PM	Proper	121.92	324.90	14.46	530.7	502.47	1.5020378	0.0868894
Planting	2018	3	TTSS	Check	30.48	324.90	14.46	542.81	488.36	1.4586085	0.1675922
Planting	2018	3	TTSS	Check	60.96	324.90	14.46	436.09	401.28	1.1905841	0.10714205
Planting	2018	3	TTSS	Check	91.44	324.90	14.46	479.49	448.11	1.3347226	0.09658482
Planting	2018	3	TTSS	Check	121.92	324.90	14.46	431.42	406.93	1.2079742	0.07537802

Planting	2018	3	TTSS	Proper	30.48	324.90	14.46	531.76	486.21	1.451991	0.1401988
Planting	2018	3	TTSS	Proper	60.96	324.90	14.46	455.91	429.14	1.2763346	0.08239565
Planting	2018	3	TTSS	Proper	91.44	324.90	14.46	440.58	420.72	1.2504186	0.06112729
Planting	2018	3	TTSS	Proper	121.92	324.90	14.46	468.95	444.7	1.3242269	0.07463932
Planting	2018	3	TTSS	Severe	30.48	324.90	14.46	504.87	456.46	1.3604231	0.14900162
Planting	2018	3	TTSS	Severe	60.96	324.90	14.46	502.08	462.72	1.3796908	0.12114654
Planting	2018	3	TTSS	Severe	91.44	324.90	14.46	599.85	556.42	1.668091	0.13367363
Planting	2018	3	TTSS	Severe	121.92	324.90	14.46	484.87	459.85	1.3708572	0.07700931
Planting	2018	4	FS	Severe	30.48	324.90	14.46	536.94	485.95	1.4511907	0.15694263
Planting	2018	4	FS	Severe	60.96	324.90	14.46	467.72	432.05	1.2852913	0.10978905
Planting	2018	4	FS	Severe	91.44	324.90	14.46	518.57	485.42	1.4495594	0.10203272
Planting	2018	4	FS	Severe	121.92	324.90	14.46	461.15	431.76	1.2843988	0.09045977
Planting	2018	4	FS	Check	30.48	324.90	14.46	546.83	479.12	1.4301686	0.20840528
Planting	2018	4	FS	Check	60.96	324.90	14.46	466.25	428.14	1.2732567	0.11729915
Planting	2018	4	FS	Check	91.44	324.90	14.46	501.32	468.04	1.3960653	0.10243284
Planting	2018	4	FS	Check	121.92	324.90	14.46	497.55	462.27	1.3783058	0.10858866
Planting	2018	4	FS	Proper	30.48	324.90	14.46	526.81	474.28	1.4152715	0.16168261

Planting	2018	4	FS	Proper	60.96	324.90	14.46	499.91	455.45	1.3573144	0.13684388
Planting	2018	4	FS	Proper	91.44	324.90	14.46	447.66	415.02	1.2328745	0.10046298
Planting	2018	4	FS	Proper	121.92	324.90	14.46	453.04	424.56	1.2622378	0.08765888
Planting	2018	4	SS	Check	30.48	324.90	14.46	515.14	459.5	1.36978	0.17125491
Planting	2018	4	SS	Check	60.96	324.90	14.46	492.24	453.74	1.3520512	0.11849953
Planting	2018	4	SS	Check	91.44	324.90	14.46	471.94	447.02	1.3313677	0.07670152
Planting	2018	4	SS	Check	121.92	324.90	14.46	461.59	436.05	1.297603	0.07860982
Planting	2018	4	SS	Proper	30.48	324.90	14.46	510.63	465.96	1.3896633	0.13749024
Planting	2018	4	SS	Proper	60.96	324.90	14.46	458.7	419.64	1.2470945	0.12022316
Planting	2018	4	SS	Proper	91.44	324.90	14.46	508.6	477.96	1.4265982	0.09430716
Planting	2018	4	SS	Proper	121.92	324.90	14.46	505.32	475.03	1.4175799	0.09322989
Planting	2018	4	SS	Severe	30.48	324.90	14.46	527.4	478.39	1.4279217	0.15084837
Planting	2018	4	SS	Severe	60.96	324.90	14.46	440.75	406.47	1.2065584	0.10551075
Planting	2018	4	SS	Severe	91.44	324.90	14.46	442.05	415.22	1.2334901	0.08258032
Planting	2018	4	SS	Severe	121.92	324.90	14.46	486.28	460.55	1.3730118	0.07919462
Planting	2018	4	PMMB	Severe	30.48	324.90	14.46	527	475.07	1.417703	0.15983587
Planting	2018	4	PMMB	Severe	60.96	324.90	14.46	452.57	409.86	1.2169925	0.13145754

Planting	2018	4	PMMB	Severe	91.44	324.90	14.46	505.39	459.59	1.370057	0.14096828
Planting	2018	4	PMMB	Severe	121.92	324.90	14.46	569.25	531.05	1.5900044	0.11757616
Planting	2018	4	PMMB	Proper	30.48	324.90	14.46	534.12	480.21	1.4335235	0.16593013
Planting	2018	4	PMMB	Proper	60.96	324.90	14.46	535.99	484.15	1.4456505	0.15955885
Planting	2018	4	PMMB	Proper	91.44	324.90	14.46	460.82	436.09	1.2977261	0.07611671
Planting	2018	4	PMMB	Proper	121.92	324.90	14.46	529.19	501.53	1.4991445	0.08513499
Planting	2018	4	PMMB	Check	30.48	324.90	14.46	542.77	476.02	1.420627	0.20545049
Planting	2018	4	PMMB	Check	60.96	324.90	14.46	521.68	479.79	1.4322308	0.12893365
Planting	2018	4	PMMB	Check	91.44	324.90	14.46	483.54	457.34	1.3631317	0.08064124
Planting	2018	4	PMMB	Check	121.92	324.90	14.46	509.05	481.47	1.4374017	0.08488876
Planting	2018	4	TTSS	Severe	30.48	324.90	14.46	551.95	501.5	1.4990522	0.15528056
Planting	2018	4	TTSS	Severe	60.96	324.90	14.46	482.59	438.41	1.3048669	0.13598206
Planting	2018	4	TTSS	Severe	91.44	324.90	14.46	488.89	446.87	1.330906	0.12933378
Planting	2018	4	TTSS	Severe	121.92	324.90	14.46	428.45	394.56	1.1699005	0.10431037
Planting	2018	4	TTSS	Check	30.48	324.90	14.46	531.6	474.99	1.4174568	0.17424048
Planting	2018	4	TTSS	Check	60.96	324.90	14.46	481.07	447.92	1.3341378	0.10203272
Planting	2018	4	TTSS	Check	91.44	324.90	14.46	503.35	458.88	1.3678717	0.13687466

Planting	2018	4	TTSS	Check	121.92	324.90	14.46	417.28	398.35	1.1815658	0.05826484
Planting	2018	4	TTSS	Proper	30.48	324.90	14.46	517.45	459.9	1.3710111	0.17713372
Planting	2018	4	TTSS	Proper	60.96	324.90	14.46	465.62	425.61	1.2654696	0.12314718
Planting	2018	4	TTSS	Proper	91.44	324.90	14.46	507.72	464.49	1.3851387	0.13305805
Planting	2018	4	TTSS	Proper	121.92	324.90	14.46	368.09	339.23	0.9995997	0.08882848
Planting	2018	4	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0
Planting	2018	4	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2018	4	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2018	4	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2018	4	FALLOW	Fallow	30.48	324.90	14.46	415.49	380.88	1.1277947	0.10652646
Planting	2018	4	FALLOW	Fallow	60.96	324.90	14.46	410.64	379.17	1.1225315	0.09686183
Planting	2018	4	FALLOW	Fallow	91.44	324.90	14.46	385.6	359.28	1.0613118	0.08101059
Planting	2018	4	FALLOW	Fallow	121.92	324.90	14.46	347.96	324.87	0.955401	0.07106894
Planting	2018	4	FALLOW	Fallow	30.48	324.90	14.46			-0.0445197	0

Planting	2018	4	FALLOW	Fallow	60.96	324.90	14.46			-0.0445197	0
Planting	2018	4	FALLOW	Fallow	91.44	324.90	14.46			-0.0445197	0
Planting	2018	4	FALLOW	Fallow	121.92	324.90	14.46			-0.0445197	0
Planting	2018	4	PM	Proper	30.48	324.90	14.46	540.18	489.86	1.4632253	0.15488043
Planting	2018	4	PM	Proper	60.96	324.90	14.46	500.14	451.14	1.3440486	0.15081759
Planting	2018	4	PM	Proper	91.44	324.90	14.46	432.25	393.11	1.1654375	0.1204694
Planting	2018	4	PM	Proper	121.92	324.90	14.46	330.29	302.39	0.8862095	0.08587369
Planting	2018	4	PM	Severe	30.48	324.90	14.46	528.78	473.26	1.412132	0.17088556
Planting	2018	4	PM	Severe	60.96	324.90	14.46	502.17	463.71	1.382738	0.11837642
Planting	2018	4	PM	Severe	91.44	324.90	14.46	428.75	400.19	1.1872291	0.08790511
Planting	2018	4	PM	Severe	121.92	324.90	14.46	486.38	469	1.3990201	0.05349408
Planting	2018	4	PM	Check	30.48	324.90	14.46	493.99	446.59	1.3300442	0.14589293
Planting	2018	4	PM	Check	60.96	324.90	14.46	529.55	490.85	1.4662725	0.11911512
Planting	2018	4	PM	Check	91.44	324.90	14.46	440.02	409.32	1.2153305	0.09449184
Planting	2018	4	PM	Check	121.92	324.90	14.46	450.48	427.15	1.2702096	0.07180764
Planting	2018	4	MB	Severe	30.48	324.90	14.46	530.07	487.02	1.4544841	0.13250402

Planting	2018	4	MB	Severe	60.96	324.90	14.46	521.58	482.93	1.4418954	0.11896122
Planting	2018	4	MB	Severe	91.44	324.90	14.46	512.71	480.02	1.4329387	0.10061688
Planting	2018	4	MB	Severe	121.92	324.90	14.46	512.58	489.08	1.4608246	0.07233088
Planting	2018	4	MB	Check	30.48	324.90	14.46	541.61	497.08	1.4854478	0.13705933
Planting	2018	4	MB	Check	60.96	324.90	14.46	495.63	460.16	1.3718114	0.10917347
Planting	2018	4	MB	Check	91.44	324.90	14.46	501.09	471.65	1.4071766	0.09061367
Planting	2018	4	MB	Check	121.92	324.90	14.46	407.63	384.38	1.1385674	0.07156141
Planting	2018	4	MB	Proper	30.48	324.90	14.46	542.02	501.44	1.4988675	0.12490159
Planting	2018	4	MB	Proper	60.96	324.90	14.46	551.71	506.01	1.5129336	0.14066049
Planting	2018	4	MB	Proper	91.44	324.90	14.46	562.66	521.38	1.560241	0.12705612
Planting	2018	4	MB	Proper	121.92	324.90	14.46	518.58	496.76	1.4844629	0.06716
Planting	2018	4	TTSSCP	Check	30.48	324.90	14.46	542.76	502.82	1.503115	0.12293172
Planting	2018	4	TTSSCP	Check	60.96	324.90	14.46	505.73	470.08	1.4023443	0.10972749
Planting	2018	4	TTSSCP	Check	91.44	324.90	14.46	505.95	471.49	1.4066841	0.10606478
Planting	2018	4	TTSSCP	Check	121.92	324.90	14.46	506.99	481.32	1.43694	0.07900995
Planting	2018	4	TTSSCP	Proper	30.48	324.90	14.46	519.07	480.43	1.4342006	0.11893044
Planting	2018	4	TTSSCP	Proper	60.96	324.90	14.46	494.11	459.82	1.3707649	0.10554153

Planting	2018	4	TTSSCP	Proper	91.44	324.90	14.46	551.67	510.81	1.5277075	0.1257634
Planting	2018	4	TTSSCP	Proper	121.92	324.90	14.46	562.3	536.8	1.6077024	0.0784867
Planting	2018	4	TTSSCP	Severe	30.48	324.90	14.46	527.82	491.33	1.4677499	0.11231294
Planting	2018	4	TTSSCP	Severe	60.96	324.90	14.46	549.95	508.72	1.5212747	0.12690223
Planting	2018	4	TTSSCP	Severe	91.44	324.90	14.46	560.65	519.39	1.554116	0.12699457
Planting	2018	4	TTSSCP	Severe	121.92	324.90	14.46	561	526.58	1.5762462	0.10594166
Planting	2018	4	CP	Check	30.48	324.90	14.46	496.66	461.62	1.3763051	0.10784997
Planting	2018	4	CP	Check	60.96	324.90	14.46	425.51	399.57	1.1853208	0.07984098
Planting	2018	4	CP	Check	91.44	324.90	14.46	428.9	409.02	1.2144071	0.06118885
Planting	2018	4	CP	Check	121.92	324.90	14.46	501.65	476.58	1.4223507	0.0771632
Planting	2018	4	CP	Severe	30.48	324.90	14.46	502.06	477.21	1.4242898	0.07648606
Planting	2018	4	CP	Severe	60.96	324.90	14.46			-0.0445197	0
Planting	2018	4	CP	Severe	91.44	324.90	14.46	429.2	402.24	1.1935389	0.08298045
Planting	2018	4	CP	Severe	121.92	324.90	14.46	513.85	492.35	1.4708893	0.06617506
Planting	2018	4	CP	Proper	30.48	324.90	14.46	522.93	491	1.4667341	0.09827767
Planting	2018	4	CP	Proper	60.96	324.90	14.46	461.07	426.96	1.2696248	0.10498751
Planting	2018	4	CP	Proper	91.44	324.90	14.46	484.2	464.24	1.3843693	0.06143508

Planting	2018	4	CP	Proper	121.92	324.90	14.46			-0.0445197	0

VITA

KYLE MARTIN HORN

Candidate for the Degree of

Master of Science

Thesis: INTRODUCING GRAZABLE COVER CROP TO WHEAT SYSTEMS IN OKLAHOMA

Major Field: Plant and Soil Sciences

Biographical:

Education:
Completed the requirements for the Master of Science in Plant and Soil Sciences at Oklahoma State University, Stillwater, Oklahoma in May, 2019.

Completed the requirements for the Bachelor of Science in your Plant and Soil Sciences at Oklahoma State University, Stillwater, Oklahoma in May, 2016.

Experience:
Graduate Research Assistant 2016-2018

Professional Memberships:
American Society of Agronomy, Crop Science Society of American, Soil Science Society of American