Northwest Panhandle Crop Notes
August-Early September 2022

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Periodic Changes in Summer Weather Pattern

Fortunately, about a week ago, our area received as much as two inches of rainfall in places and there has been a cooling trend since. Reversing back to late July, our area received up to three inches of rain in multiple shower events that took place over a couple of days with the passing of a favorable weather system. Several days of cooler weather following the rain in July was beneficial for crop production and made each drop of water go further. However, much of our area continues to experience significant levels of drought as indicated in updated Water Weekly maps https://waterdatafortexas.org/drought/twdb-reports. Observed rainfall amounts throughout the warm growing season have been about half of the long-term average. Though our area has realized a shortage of rain since the beginning of the current, warm season, the growth and development of crops has been amazing in irrigated, even in non-irrigated fields. A timely rain or two during September would help mature summer crops and restore needed soil moisture for soon to be planted small grain crops.

Plate 1. Adult moth trapping site in southern Moore county.

Adult Moth Trapping for Corn

Data has been reported from 11 weekly moth counts starting mid-June of the current corn growing season. This information helps growers, consultants, and others to keep abreast of moth flights, egg lay potential and likelihood of reaching economic thresholds of worm pressure from four, tracked species. These include the Western Bean Cutworm, Southwestern Corn Borer, Corn Ear Worm and Fall Army Worm. 16 bucket traps were installed and monitored in 2022 at two locations in Moore county and two locations in Sherman county (Plates 1, 2 & 3). Based on acres of corn planted in Moore and Sherman counties, these efforts represent a potential impact value of near $772,000.


Plates 2 & 3. Adult moth trapping sites for corn in northwestern and southern Sherman county, left to right respectively.

Are Growth and Development of Corn Tillage Dependent?

Not necessarily. To the extent that tillage helps to lower weed pressure and demand on limited nutrient and water resources, it may be beneficial but in a lot of cases there are other management options available in the shorter term such as the use of herbicides. A large portion of the answer to this question was given in a previous discussion about the relationship of tillage to soil health. Generally, reduced tillage can be equated to greater soil carbon storage over time and less of an adverse impact on soil physical properties which are the building blocks of better soil health.

Management practices have been identified that promote greater stability of nutrient cycling, increase the infiltration of water, improve water holding capacity of soils, reduce the detrimental effects of erosion, and ultimately improve crop yields over time. Long term, these types of beneficial functions become integral to the sustainability of agricultural production in the northwest Texas Panhandle. With that in mind, an idea spurred discussion in the fall of 2021 followed by a considerable amount of planning and progressed with efforts on-farm to implement a replicated, applied, research study in spring of 2022. Main objective of the new study was to compare in-season agronomics, production outcomes, and economic aspects of three tillage treatments supporting pivot irrigated, continuous corn production. Treatments were established in late April which included conventional versus strip-tillage (Plate 4) and no-till versus strip-till (Plate 5). The field and study area were planted on May 12th to corn hybrid Pioneer 1828. Row spacing is 30 inches and dimension of individual plots is 48 rows across and 150 feet long. Rows of all plots was oriented in a north-south direction.

Plate 4. Adjacent strip- (left hand) and conventional-till (right hand) treatments in a pivot irrigated field in Dallam county.

Plate 5. Adjacent no-till (left side) and strip-till (right side) treatments in a pivot irrigated field in Dallam county.

Tillage is a management tool and represents varying degrees of soil disturbance as seen above that can affect changes in soil physical, chemical, and biological properties over time. Available soil moisture is a management variable affected by changes in soil properties, directly affects plant growth and may change based on differences in tillage used. Thanks to Dr. David Parker,

Associate Professor at WTAMU and Extension Water Engineering Specialist, funding was acquired, and arrangements made to purchase 12 AquaSpy soil moisture sensors, making it possible to install one sensor in each of the plots represented in this tillage study. Eric Burton and Assistants with Better Harvest provided guidelines and installed AquaSpy soil moisture sensors on May 31st at the V3 leaf stage (Plate 6) with daily reporting available via satellite connection soon after.

Plate 6. Installed soil moisture sensors within tillage plots of pivot irrigated field planted to corn in Dallam county.

In the Northwest Panhandle, drought conditions have persisted at severe (D2) to extreme (D3) conditions since the time of planting according to classification of the U.S. Drought Monitor. Yet timely irrigation events and about half of average rainfall have contributed to development of a healthy corn crop (Plate 7) with an impressive yield potential from the standpoint of grain (Plate 8). Stand counts collected at the V6 stage did not indicate there were differences in the population of plants between each of the three treatments. Leaf tissue samples have been collected from each of the plots at varying stages of growth during the season with nutrient analyses performed after. These results will be available for comparison among the tillage treatments. Though there presently may not be obvious visual differences in stature of plants and canopy color between tillage treatments, comparisons of the amount of grain yield, bushel weights and percent moisture will be the final determinants in how this crop performed under these growing conditions and management which includes level of tillage. While we are interested in the agronomic efficiency of these tillage treatment comparisons, perhaps more importantly we want to find out about the economic efficiency. Our aim is to assess how dollars spent on input costs stack against dollars for grain when we compare these three tillage treatments.

Plate 7. Edge of irrigated corn field hosting tillage study in Dallam county.

Plate 8. Milk stage ear corn from irrigated field hosting tillage study in Dallam county.

In a drought year like what has been underway, irrigation on corn and perhaps, other crops may have to be terminated early due to water shortages. There is simply not enough capacity for wells to keep up. Depending on stage of crop growth it is worthwhile having an alternative plan that can be implemented quickly. Plate 9 below illustrates what appears to be early termination of a corn crop due to a shortage of irrigation water. One option is to harvest the crop biomass,

converting it into silage (Plate 10). In these situations, harvest timing is key to ensure a higher tonnage and highest possible quality of silage. I am hearing that there is a growing market demand for forage in the area and effects of drought like we presently have are further elevating that level of demand.

Plate 9. Corn field with irrigation terminated early in Moore county.

Plate 10. Irrigated corn field harvested for silage in Moore county.

Water for Growth and Development of Cotton

As pointed out in the previous blog notes, an adequate supply of upper profile soil moisture is important at planting time to ensure that the germination process starts and continues without interruption. The uptake of water by seeds is crucial for enzyme function, beginning of cell division and emergence of seedlings as new growth of roots and shoots occurs. Water and temperature are the primary drivers of cotton growth starting at the cotyledon stage and beyond https://agrilife.org/texasrowcrops/2016/05/06/considerations-for-cotton-planting-and-early-season-growth/. Cotton doesn't require a big supply of water for growth early in the season; however, the demand for water ramps up as plants add mainstem nodes and develop vegetatively. Plant demand for soil moisture reserves through the early true leaf stages gradually increases up to the pinhead square or beginning reproductive stage of growth. According to Dr. Jourdan Bell, cotton is frequently referred to as a drought-tolerant crop with water use peaking at approximately 0.28 inches per day soon after the onset of flowering and continuing in the 0.25-0.28 inch range for about 40 days (https://agrilifetoday.tamu.edu/2020/02/24/cotton-key-player-in-water-conservation-in-northern-high-plains/). The variety maturity class of cotton planted is an important consideration for timing of crop water needs and total amount of water required for the season.

Plate 11. RACE plots within a dryland field planted to cotton in Moore county.

A robust soil moisture reserve at planting time means more water is available for drawdown through germination, seedling emergence and well into the growing season. We need to have as much water banked in the soil profile as possible to cover evaporative losses from the soil surface plus water loss from leaves due to transpiration, together known as evapotranspiration (ET) that is associated with a growing crop. For more background and explanation on this topic, you'll enjoy reading through L934 Agricultural Crop Water Use (ksu.edu) .

A mechanism known as transpiration or loss of water vapor from leaves permits these tissues to be cooled adequately and the photosynthetic machinery of leaves protected which produce sugars for export. Transpiration is also integral to the upward movement of nutrients from the roots to meet maintenance and growth requirements of all the above ground tissues. Do these processes get underway early? Indeed, they do and ramp up as plants grow and develop vegetatively. Via the following link is another informative source and series of articles about water for growth and development of cotton (https://www.cottoninc.com/cotton-production/ag-resources/irrigation-management/).

Having enough soil profile moisture coming from rainfall and/or irrigation is paramount. Just read an update on Texas Farm Bureau's Ag Daily that of the 7.1 million acres planted to cotton in Texas, only about half, around 2.2 million acres will be harvested. The numbers are frightening yet reemphasize the impact that water has on cotton production in our area, around the state, and in other states. Any management options we can feasibly do that improve our ability to conserve additional moisture in the soil profile during the offseason and in season will be highly valuable whether irrigated or dryland production.

There are several questions a person could ask related to the particulars of irrigation management toward the end of the cotton growing season such as when the last application of water should be made and how much. Additionally, what might the water requirements for cotton be once the last effective flowering dates of a crop have been reached? A recent AgriLife Extension publication sheds light on relationships of the last effective flowering dates with yield and fiber quality based on data collected near Etter in Moore county (Microsoft Word - Last Effective Cotton Flowering Date in the Texas Panhandle Aug2022 (tamu.edu)). It is well known from the literature that maintaining, filling, and maturing retained bolls post flowering requires a proper water balance. This process entails a significant amount of water in the plant being diverted to bolls for fiber development as well as manufacture of proteins and carbohydrates to fill newly formed seeds. Continuing to monitor soil moisture status based on data from soil moisture sensors, irrigation scheduling or other reliable approach during this phase of the season is of paramount importance as a management tool. On another hand, too much water applied late in the season could encourage excess vegetative growth at the expense of maturing bolls, more difficult crop preparation for harvest, and possibly delay harvest timing.

This wraps up my August-early September blog on matters related to our current growing season that's beginning to wind down, sooner than later perhaps, depending on crop species being discussed. Our on-farm, research journey continues to explore the relationship or lack of a relationship of irrigated corn growth, development, productivity, and ultimately economic return on investment to level of tillage. Effectively managing the soil moisture status for optimum growth, development and productivity of cotton is understandably more intense in an irrigated versus a dryland situation. Although the principles of water input are the same in either system, additional emphasis on measuring or tracking soil moisture status season long is hugely important for cotton grown with supplemental irrigation water.