Cotton Comments

OSU Southwest Oklahoma Research and Extension Center
Altus, OK

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Crop Situation Update

The June 2012 USDA-NASS report indicated that Oklahoma cotton acreage is around 330,000 acres, which is down about 20% from last year's 415,000 acres. This crop continues to make progress in areas where adequate moisture has been available. The 22% of capacity status of Lake Lugert is very concerning in southwestern Oklahoma as we head into the high water demand phase of the crop. No release of irrigation water is going to occur this year in the District. Most producers have initiated irrigation where groundwater is available. Altus has already encountered 24 days of 100 degrees or greater - 1 in April, 9 in May, 11 in June; and 3 days in July (through July 6). The good news is that winds have not been as bad as last year. We have some forecasted chances of rainfall over the coming weekend and into next week. For those who have not initiated irrigation, it is now time to start. The dryland crop will need some rainfall soon in order to stay on track. The no-till will cotton in many areas should hold up longer than conventional till because of better initial profile moisture. The later planted dryland in some areas may have a chance if good subsoil moisture is present to carry crop until a rainfall event which must come soon. IPM Extension Assistant Jerry Goodson has been on the road over the last several weeks performing scouting and observations on crop progress. As mentioned in a previous newsletter, nodes above white flower (NAWF) at first bloom is an indicator of crop yield potential. As we will have more fields hitting the bloom stage over the next couple of weeks, this will provide considerable value with respect to crop potential. This week's summary of surveyed counties and fields is below.

IPM Field Surveys - Week of July 2

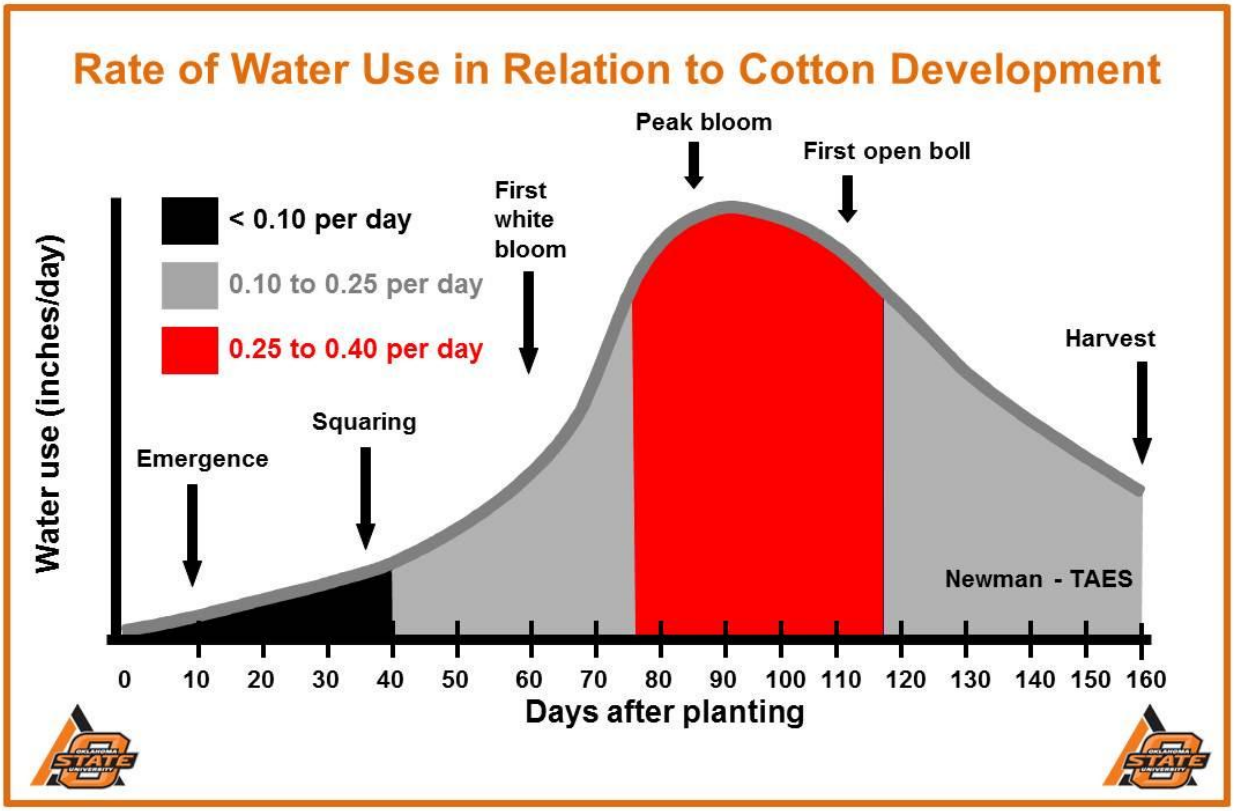
Location	Plant stage	Insects	Comments
Beckham Irrigated RACE - Gamble	Prebloom	No pests detected Few Beneficials	Growth rate Good
Caddo Irrigated RACE - Holsted	Prebloom	No pests detected Few Beneficials	Growth rate Good
Caddo Irrigated Twinlink (Station)	PreBloom	No pests detected Few Beneficials	Growth rate Good
Custer Irrigated RACE - Schantz	Prebloom	No pests detected Few Beneficials	Growth rate Good
Grady Dryland (Station, Weed Test)	Sprayed for Cotton Fleahoppers 48 Hour REI observed		
Caddo Irrigated OVT (Station)	Prebloom	No pests detected Few Beneficials	Growth rate Good
Greer Dryland CRSP - Graumann	Squaring	No pests detected Few Beneficials	Growth rate Good
Greer Irrigated CRSP - Thronbrough	Squaring	No pests detected Few Beneficials	Growth rate Good
Harmon Irrigated RACE - Cox	8 NAWF	No pests detected Few Beneficials	Growth rate Excellent
Harmon Dryland RACE - Cummins	2nd true leaf	< 1 Thrips per plant	Growth rate is Good
Harmon Irrigated CAP - Horton	8 NAWF	No pests detected Few Beneficials	Growth rate Excellent
Jackson Conventional (Station)	Prebloom	No pests detected Few Beneficials	Growth rate Average
Jackson Irrigated CRSP - Felty	Prebloom	No pests detected Few Beneficials	Growth rate Average
Jackson OVT (Station)	Prebloom	No pests detected Few Beneficials	Growth rate Average
Jackson Irrigated RACE - Winsett	Prebloom	No pests detected Few Beneficials	Growth rate Average
Jackson Dryland CRSP - Winsett	Prebloom	No pests detected Few Beneficials	Growth rate Good
Jackson Weed Test (Station)	Squaring	No pests detected Few Beneficials	Growth rate Average
Jackson Irrigated WOSC Tests	8 NAWF	No pests detected Few Beneficials	Growth rate Good
Tillman Dryland RACE - Fisher	7th true leaf	No pests detected Few Beneficials	Growth rate Excellent
Tillman Irrigated CRSP - McCullough	7 NAWF	No pests detected Few Beneficials	Growth rate Average
Tillman Dryland No Til (Station)	Prebloom	No pests detected Few Beneficials	Growth rate Good
Tillman Dryland OVT (Station)	Prebloom	No pests detected Few Beneficials	Growth rate Average
Washita Dryland RACE - Davis	Prebloom	No pests detected Few Beneficials	Growth rate Average

RACE – Replicated Agronomic Cotton Evaluation Trial (Oklahoma Cooperative Extension)
CRSP – County Replicated Small Plot Trial (Oklahoma Cooperative Extension)
CAP – Cotton Agronomic Plot (Bayer CropScience)
OVT – Official Variety Trial (Oklahoma Agricultural Experiment Station, Altus, Tipton, Fort Cobb)
WOSC – Western Oklahoma State College

Overall, there has been a very good start in many areas. What this means for crop watchers is that the Lugert-Altus Irrigation District is in dire straits without rainfall soon, a large percentage of irrigated cotton in other areas is off to good to excellent start, and most dryland has emerged. As we unfortunately discovered during the Great Drought of 2011, a substantial portion of our groundwater-based irrigation is only supplemental to rainfall.

Crop Water Use Patterns

Seasonal water use for adequately watered cotton is probably about 24 inches in southwestern Oklahoma. Figure 1 illustrates the typical seasonal water use pattern for cotton produced in the Texas High Plains region, and this should be reasonably similar in our area.



From planting to square initiation (a period of about 40 days) evapotranspiration (ET) is generally less than 0.1 inches per day. Plant water requirements are low due to the limited leaf area. Most of the water used is extracted from the top foot of soil. The bulk of the water loss during this period is due to evaporation.

Water use (ET) increases to 0.1 to 0.3 inches per day during the square to early bloom stage (40 to 75 days after planting). At this stage leaf canopy and roots develop rapidly, and transpiration exceeds evaporation. Moisture extraction occurs mainly from the top 2 feet of soil although the taproot and some feeder roots extend to deeper depths if unimpeded.

From early bloom to the opening of the first bolls (usually 75 to 120 days after planting), ET values of 0.25 to 0.35 inches per day are common. At this stage, plants have attained their maximum leaf canopies and root densities. Moisture may be extracted from deeper in the entire soil profile, if available. ET values may exceed 0.4 inch per day during the peak bloom period. During the extreme stress of the summer of 2011, some days had crop ET values that approached 0.55 inches per day.

Following the opening of the first bolls until crop termination, ET generally declines from about 0.25 inches per day to as little as 0.1 inch per day. Actual water use will vary with the condition of the plant, soil moisture status and general growing conditions. If regrowth occurs during periods of ample moisture and warm temperatures, ET levels can increase dramatically, thereby rapidly depleting soil moisture reserves which otherwise could be utilized by subsequent crops.

Stress Sensitive Periods

Fruit production, retention and shedding are closely related to availability of soil moisture. Production is optimized with an available moisture status that allows uninterrupted development of fruiting positions while avoiding excessive vegetative development on the one hand, or fruit shedding on the other. In the past, it has been a common practice to allow cotton to "stress" before applying the first irrigation in order to slow vegetative growth, force root system expansion and enhance early fruit development. However, research has shown that even moderate stress prior to the first irrigation may impede the development of fruiting sites and can ultimately reduce yields. High moisture stress during the peak flowering period can have a pronounced negative effect on yield. However, stress either early or late in the blooming period also result in significant yield reductions. Severe moisture stress should be avoided throughout the crop development period. Early irrigations may be justified to maintain adequate but not excessive vegetative growth. Late season water stress may be acceptable or even desirable because it hastens cut-out and results in shedding of fruit that would not normally mature and potentially contribute to low micronaire if a cooler than normal fall is encountered.

Irrigation Issues

Many producers with groundwater resources (center pivot, furrow or drip) have initiated irrigation. Crop evapotranspiration (combined losses of water due to evaporation and crop transpiration) models can generally do a good job of predicting crop water use. The Mesonet provides a good tool that can be useful to estimate crop ET. It can be found on the AgWeather page. First go to: http://agweather.mesonet.org/
Then select Crop on the top menu. Then select Cotton on the left side menu. Another menu will pop up on the left side, then select Irrigation Planner. This will take you to a page where you can select the Mesonet site nearest your location. You can also input the planting date for the field. Then click on Get Cotton Data. A page with a table will be generated. This table will provide a quick estimate of daily crop ET, accumulated ET, rainfall, accumulated rainfall, and the water balance. The modeled crop ET for each

day is listed in one column, then Accumulated Evaportranspiration total in inches will be listed in another.

For most producers, the sometimes difficult decision of “when to initiate irrigation” will not have to be made this year. For those fields with adequate irrigation capacity and efficient delivery systems (pivots, sub-surface drip), the Irrigation Planner can be of great value to determine how much water to apply, especially if the high winds cease and the crop gets some size. It should be noted that the pumping capacity and efficiency of a particular system needs to be considered.

Irrigation systems vary in terms of application efficiency and can be negatively impacted by adverse environmental conditions. High temperatures and high winds can reduce application efficiencies for all systems with the exception of well managed sub-surface drip. Center pivot spray irrigation with short drops under high wind conditions will have lower efficiency than a system with longer drops which deliver water closer to the crop canopy. When determining how much irrigation water to apply, several factors must be considered. One is irrigation capacity. Higher capacity irrigation wells allow producers to apply more water in less time. Some “catch up” is possible if the system “gets behind.” With lower irrigation capacity, it will be necessary to keep the system applying water to meet crop requirement. This requires knowledge of the irrigation system capacity, nozzle package and groundspeed travel of the pivot. These are vitally important in order to fine tune irrigation application rates to meet crop ET demand without over or under applying water. Crop ET demand (which can be reasonably estimated by the Mesonet site described above) will increase substantially once the squaring stage is reached and will continue through late boll set then will diminish once open bolls appear. Another factor is irrigation system type. Application efficiency information provided by Jim Bordovsky, Research Engineer with Texas AgriLife Research at Halfway indicates that flood/furrow typically ranges from 40-80%, center pivot sprinkler/spray ranges from 65-90%, center pivot low energy precision application (LEPA) ranges from 85-95%, and sub-surface drip ranges from 85-99%. An important consideration is water quality. High salinity water can affect crop performance, if it is the sole source of water input for the crop. This can vary with seasonal rainfall, therefore it is difficult to determine the potential effects.

If using a spray system make sure to use nozzle applicators that generate large droplet sizes. This should reduce evaporation losses during application. Apply as high a quantity as possible without generating unacceptable runoff. Apply at least 1 inch per application in order to get even a "minimum" amount of water into the soil. This amount can be applied using a system with slightly less than 3 gpm per acre. Temperatures of 100 degrees, high winds, and low relative humidity can result in ET values of up to 0.5 inch/day. For a handout concerning ET replacement for varying 120-acre center pivot pumping capacities and delivery efficiencies, click here Irrigation Capacities and ET Replacement and Efficiencies. Cotton growth and development indicates that a mainstem node should develop on the plant every 3 days and with excellent conditions (good plant health, water) perhaps every 2.7 days. The critical issue here is how well rooted the plants are and whether roots are into good soil moisture.

Mesonet Irrigation Planner Update

The Mesonet provides useful irrigation requirement information and can be used to fine tune irrigation management. For Altus with a May 15 planting date, total cotton ET has been 3.11 inches, no recent rainfall has occurred, and daily ET has been just under 0.3 inches/day. Water balance for the last 14 days is below.

Last Irrigation Date	Evapotranspiration (inch)	Accumulated Evapotranspiration (inch)	Rainfall (inch)	Accumulated Rainfall (inch)	Water Balance (inch)
7/5/2012	0.27	0.27	0	0	-0.27
7/4/2012	0.28	0.55	0	0	-0.55
7/3/2012	0.27	0.82	0	0	-0.82
7/2/2012	0.23	1.05	0	0	-1.05
7/1/2012	0.22	1.27	0	0	-1.27
6/30/2012	0.24	1.51	0	0	-1.51
6/29/2012	0.25	1.77	0	0	-1.77
6/28/2012	0.25	2.01	0	0	-2.01
6/27/2012	0.22	2.24	0	0	-2.24
6/26/2012	0.19	2.43	0	0	-2.43
6/25/2012	0.17	2.6	0	0	-2.6
6/24/2012	0.18	2.78	0	0	-2.78
6/23/2012	0.2	2.98	0	0	-2.98
6/22/2012	0.14	3.11	0	0	-3.11

For Hollis with a May 15 planting date, total cotton ET has been 3.03 inches, no recent rainfall has occurred, and daily ET has been about 0.3 inches/day. Water balance for the last 14 days is below.

Last Irrigation Date	Evapotranspiration (inch)	Accumulated Evapotranspiration (inch)	Rainfall (inch)	Accumulated Rainfall (inch)	Water Balance (inch)
7/5/2012	0.27	0.27	0	0	-0.27
7/4/2012	0.3	0.57	0	0	-0.57
7/3/2012	0.28	0.85	0	0	-0.85
7/2/2012	0.24	1.09	0	0	-1.09
7/1/2012	0.22	1.31	0	0	-1.31
6/30/2012	0.23	1.55	0	0	-1.55
6/29/2012	0.23	1.78	0	0	-1.78
6/28/2012	0.23	2.02	0	0	-2.02
6/27/2012	0.2	2.22	0	0	-2.22
6/26/2012	0.18	2.4	0	0	-2.4
6/25/2012	0.15	2.55	0	0	-2.55
6/24/2012	0.17	2.71	0	0	-2.71
6/23/2012	0.19	2.9	0	0	-2.9
6/22/2012	0.14	3.04	0	0	-3.04

For Tipton with a May 15 planting date, total cotton ET has been 3.43 inches, no recent rainfall has occurred, and daily ET has been above 0.3 inches/day. Water balance for the last 14 days is below.

Last Irrigation Date	Evapotranspiration (inch)	Accumulated Evapotranspiration (inch)	Rainfall (inch)	Accumulated Rainfall (inch)	Water Balance (inch)
7/5/2012	0.3	0.3	0	0	-0.3
7/4/2012	0.32	0.62	0	0	-0.62
7/3/2012	0.32	0.94	0	0	-0.94
7/2/2012	0.26	1.2	0	0	-1.2
7/1/2012	0.23	1.43	0	0	-1.43
6/30/2012	0.26	1.7	0	0	-1.7
6/29/2012	0.28	1.97	0	0	-1.97
6/28/2012	0.28	2.25	0	0	-2.25
6/27/2012	0.25	2.5	0	0	-2.5
6/26/2012	0.2	2.7	0	0	-2.7
6/25/2012	0.19	2.89	0	0	-2.89
6/24/2012	0.19	3.08	0	0	-3.08
6/23/2012	0.2	3.28	0	0	-3.28
6/22/2012	0.15	3.43	0	0	-3.43

For Fort Cobb with a May 15 planting date, total cotton ET has been 2.71 inches, no recent rainfall has occurred, and daily ET has been about 0.25 inches/day. Water balance for the last 14 days is below.

Last Irrigation Date	Evapotranspiration (inch)	Accumulated Evapotranspiration (inch)	Rainfall (inch)	Accumulated Rainfall (inch)	Water Balance (inch)
7/5/2012	0.24	0.24	0	0	-0.24
7/4/2012	0.24	0.48	0	0	-0.48
7/3/2012	0.24	0.72	0	0	-0.72
7/2/2012	0.19	0.91	0	0	-0.91
7/1/2012	0.19	1.1	0	0	-1.1
6/30/2012	0.2	1.31	0	0	-1.31
6/29/2012	0.23	1.53	0	0	-1.53
6/28/2012	0.22	1.76	0	0	-1.76
6/27/2012	0.2	1.96	0	0	-1.96
6/26/2012	0.18	2.13	0	0	-2.13
6/25/2012	0.15	2.28	0	0	-2.28
6/24/2012	0.16	2.44	0	0	-2.44
6/23/2012	0.17	2.61	0	0	-2.61
6/22/2012	0.1	2.71	0	0	-2.71

Insect Update

Light infestations of thrips on small cotton and some fleahopper pressure continue. We are progressing from early season to mid-season pests. As soon as bolls appear, monitoring of fruit feeding pest should occur. Few beneficial arthropods have been seen in IPM program fields. This is due to generally low populations of insect pests.

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