

Developing Planting Date Guidelines for Corn and Grain Sorghum

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Introduction: Arkansas corn and grain sorghum producers like to plant early because of many reasons including perceived higher yields, less impacts from insects and foliar diseases, earlier harvest, and reduced irrigations needs. However weather events during the last few years has delayed planting in many areas or forced producers to make decisions about replanting both corn or grain sorghum.



Flooded Corn



Hail Damaged Corn



Freeze Damaged Corn

In 2007, widespread replanting of corn and grain sorghum took place because of the Easter freeze. Excellent weather after that event led to record setting yields, showing producers that later planted corn or grain sorghum can yield as well as very early planted crops if weather conditions are favorable during the growing season. With newer insect resistance technology in corn and increased irrigation in the state, it was apparent that more information was needed on corn and grain sorghum planting dates.

Objectives: Determine optimum planting date for corn and grain sorghum so that a yield response curve for planting date can be developed. Evaluate impact of corn Bt technology when planting later than desired.

Methods: Irrigated corn planting date studies were conducted at Rohwer, Marianna, and Keiser from 2008-2011. In the corn studies, each year at least 8 hybrids of varying maturity (110-120 day) were planted at each location, with at least one hybrid being non-bt. Hybrids chosen were popular adapted hybrids being grown in Arkansas. Planting dates ranged from Mid-March (as early as ground conditions allowed) to as late as July 1 on an approximate 2-3 week planting interval. At Keiser, plantings were delayed because of wet soils conditions most years.

Irrigated grain sorghum planting date studies were conducted at Marianna from 2008-2011 and included 4 popular grain sorghum hybrids. Planting dates ranged from early April to early July on an approximate 3 week planting interval.

Results: Bt corn yields expressed in % of maximum yield for each location are shown below (Figures 1-3). Yields at each of the three locations were generally maximized over a wide range of planting dates from Mid-March to as late as Mid-May, depending on year. In 2010 and 2011 with warm dry summers, yields tended to be maximized by March plantings, however early plantings in 2009 resulted in lower yields due to very cool wet weather that hampered early season growth and grain yields were maximized by later plantings. In 2009, cool June and July temperatures were likely the reason for high yields in corn planted as late as mid-May.

Figure 1. Effect of Planting Date on Irrigated Bt Corn Yield at Marianna 2008-2011

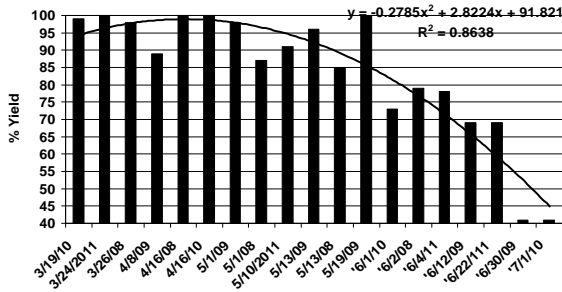


Figure 2. Effect of Planting Date on Irrigated Bt Corn Yield at Rohwer 2008-2011

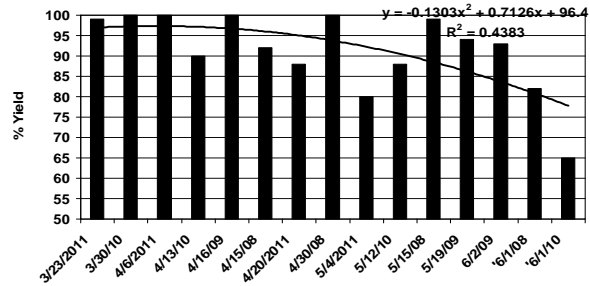


Figure 3. Effect of Planting Date on Irrigated Bt Corn Yield at Keiser 2008-2010

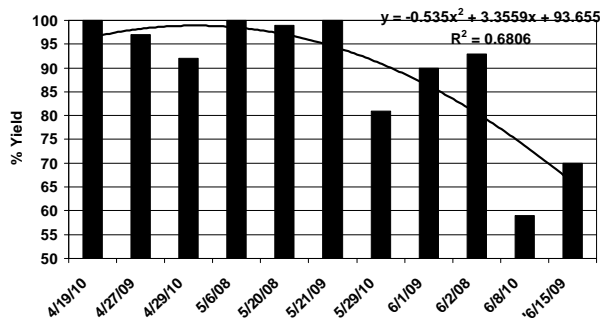
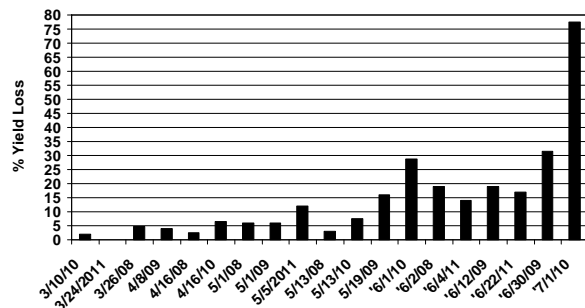


Figure 4. % Yield Loss From Planting Non Bt Irrigated Corn at Marianna 2008-2011



At Keiser, fewer plantings were able to be planted because of wet soil conditions during March and April, but yields tended to follow the same trend as Marianna and Rohwer. At Keiser, Bt corn yields of 90% or more of maximum yield were realized from Mid-April to Mid-May.

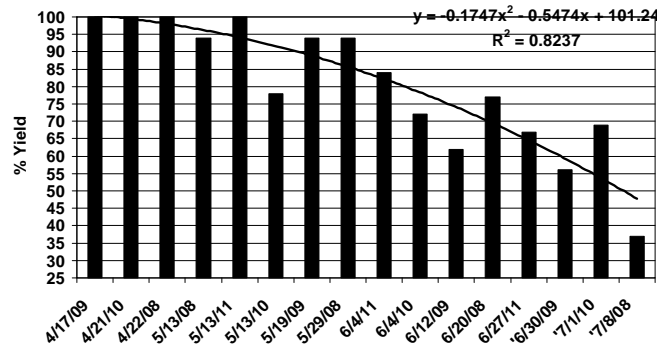
At Marianna, Southwestern and European corn borer pressure was high. Each year at least one hybrid was compared with and without Herculex insect protection to evaluate impacts of corn borers on yield. In early plantings, bt protection provided 5% or less yield benefit compared to the same hybrid without bt (Figure 4). However from Mid-April and later plantings, yield loss exceeded 5% and reach as high as 78% with a July 1 planting, indicating a great need for corn to have some form of Bt protection if being planted Mid-April or after if corn borers are present.

Grain sorghum results showing % of maximum yield from 2008-2011 are shown in Figure 5. Greatest yields came from April and early May plantings, with one exception on May 13th 2010 where heavy rainfall after planting slowed emergence, although stands were still good, grain sorghum planted then did not yield well, indicating that early season growth is important for maximum yields. Yields of 85% of maximum yield were maintained until late May, indicating that replanted grain sorghum with irrigation can still yield well.

Insect management proved to be the most difficult task with late plantings. In early plantings (April), generally one or no insecticide applications were needed for sorghum midge control or corn earworm control. Grain sorghum planted in May generally required two insecticide applications, one for sorghum

midge and one for corn earworms, and June plantings on average required 3 insecticide applications for sorghum midge or corn earworm head feeding.

Figure 5. Effect of Planting Date on Irrigated Grain Sorghum Yield at Marianna 2008-2011



Summary: The optimum planting date for corn and grain sorghum varied each year due to weather conditions, however a wide planting date window for each crop was capable of producing maximum yields. Wet cool weather in April that impacted corn growth tended to decrease yield compared to later plantings if weather conditions were favorable later in the season. In years when good growing conditions were encountered in March and April, corn yields were generally better than later plantings. With later plantings, warm June-July temperatures likely reduced yields compared to earlier plantings. When evaluating input costs, especially irrigation, corn plantings in March or April are likely to be the most profitable planting dates.

Grain sorghum yields were greatest from April plantings; however yields of 85% of maximum were maintained over a wide planting date range, even as late as late May. Much like corn, good yields can be realized from later plantings, but from a profitability standpoint, April plantings are likely to produce the highest yields with the least amount of input costs (especially irrigation and insecticide applications).