

**Project Summary for Texas Corn Producers Board – 2013
December 26, 2013**

Project Title: Evaluating Corn Yield and Insect Abundance in Fields with Modified Planting, Enhanced Water Use, Reduced Tillage and Without Crop Rotation

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Briefly, to determine the impacts of the drought, evaluate corn water use efficiency for different plant spacing and row configurations, effects of insecticides spray programs and to evaluate the corn yield effects to different levels water stress, two field seasons on grain corn have being evaluated on the Lower Rio Grande Valley in 2013. Due to drought conditions in 2012 and 2013, the irrigation districts in the Lower Rio Grande Valley allocated only one to three irrigations to each farmer for season. In addition, in 2012 some insects were presented on abundant numbers during the drought, hence we evaluated insecticide treatments and their impact of the drought on the insect populations on corn field. These studies were planned to prepare and provide effective tools to farmers preventing against these type of events.

The corn variety Anzu seed 30B20C 60 M treated with Poncho was planted on March 26, 2013 and harvested on 5 August 2013 and the second planting was completed on September 25, both events with a planting population of 52,000 plants per acre. The first season (reported 21-Sep-2013) was completed between March and August 2013 and the second planting in the fall is currently being evaluated.

Two objectives have been partially completed to this date: (1) *to study pest population differences under modified planting and insecticide use* and (2) *to compare water irrigation expenditures* between March to August 2013 at the Weslaco Agril\Life Center, where field corn was planted and a replicate study is being conducted (Fig 1). There were to irrigation regimes

The insecticide treatments (Objective 1) consisted of foliar applications of several insecticide programs as shown on Tables 1 and 2 for the first and second season, respectively.

Table 1. Mode, name, and rate of application of pesticides used to control caterpillars in field corn in 2013. Season 1 (March to August 2013) (*)

Mode of application	Insecticide and rate	Treatment 1	Treatment 2	Treatment 3	Treat.4 Control
Foliar	Insecticides	Oberon	Onager	Prevathon	-
(10 May)	Rates	(<i>Spiromesifen</i>) 6 fl oz	(<i>Hexythiazox</i>) 10 fl oz	(<i>Rynaxypyr</i>) 20 fl oz	-
Drench	Insecticides	A1671B (nn)	Coragen	Venom	-
(04 June)	Rates	7 fl oz	(<i>Rynaxypyr</i>) 5 fl oz	(<i>dinotefuram</i>) 6 fl oz	-

Table 2. Mode, name, and rate of application of pesticides used to control caterpillars in field corn in 2013. Season 2 (September 2013 to January 2014) (*)

Mode of application	Insecticide and rate	Treatment 1	Treatment 2	Treatment 3	Treat.4 Control
Foliar	Insecticides	Oberon (<i>Spiromesifen</i>)	Onager (<i>Hexythiazox</i>)	Prevathon (<i>Rynaxypyr</i>)	-
(28 Oct)	Rates	6 fl oz	10 fl oz	20 fl oz	-
(05 Nov)	Rates	6 fl oz	10 fl oz	20 fl oz	-
Foliar	Insecticides	Onager (<i>Hexythiazox</i>)	Lannate (<i>methomyl</i>)	-	-
(15 Nov)	Rates	7 fl oz	5 fl oz		

(*) Note: All the insecticide treatments will be compared with a water control and in addition, for all spray applications the adjuvant DynAmic was used at 0.25% v/v.

In each of the planting systems (single row and double row) two distinct water irrigation regimes (Objective 2) were conducted, the treatments were: 1) single corn row planted in 30 in furrows, irrigated three times; 2) Double corn planted in 60 in furrows, irrigated three times; 3) single corn row in 30 in furrows, irrigated two times; and 4) Double corn planted in 60 in furrows, irrigated two times.

We will estimate corn evapotranspiration using the Penman Monteith equation. We will determined the water use efficiency for the four treatments.

In addition to the unexpected rains events in the region the irrigation regimes included one and three flood irrigations for the each of the single and double row planting systems until the completion of the study.

Preliminary Results

First Season (March-August 2013)

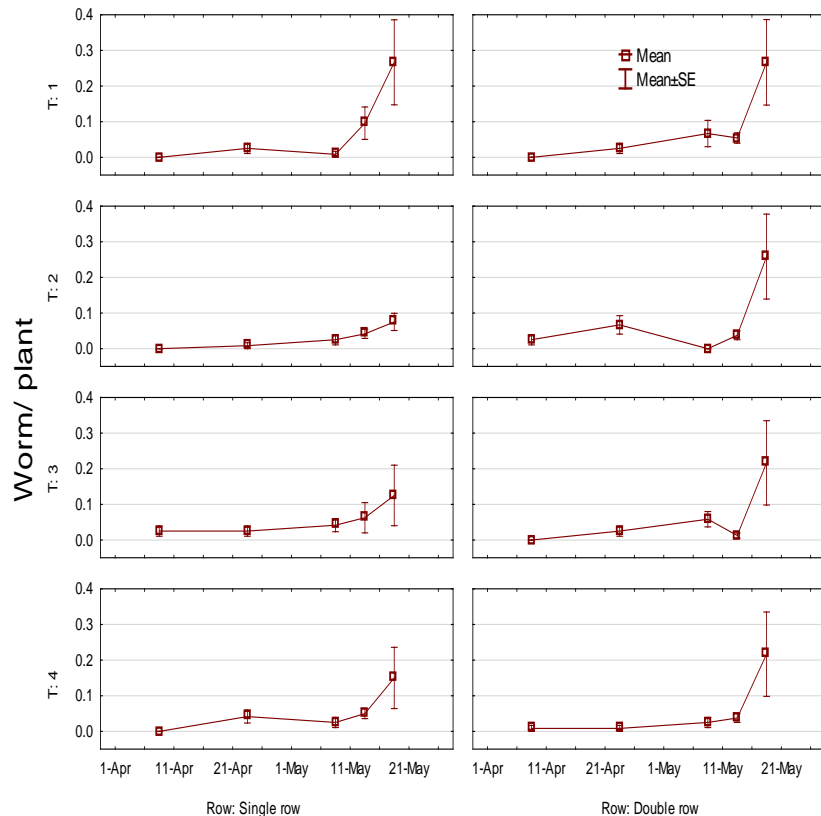


Figure 1. Populations of caterpillars on single rows and double rows field corn planting systems and under 4 different insecticide treatments

During the growing season arthropod pest problems were in low numbers and it seemed that the drought during 2013 caused this low number of pests. The effects of the insecticide spray cannot be observed during the growing period (Fig. 1). Only armyworms (*Spodoptera* spp.) caterpillars were present in noticeable numbers during the growing season although they did not reach to damaging levels. While corn earworms (*Heliothis zea*) were most abundant later on the season (Fig 2).

Oberon and A1671B had higher yield compared with the rest of treatments in either the double or single row (Figs. 2a and 2b) planting systems but independently of the single or triple irrigation regimes.

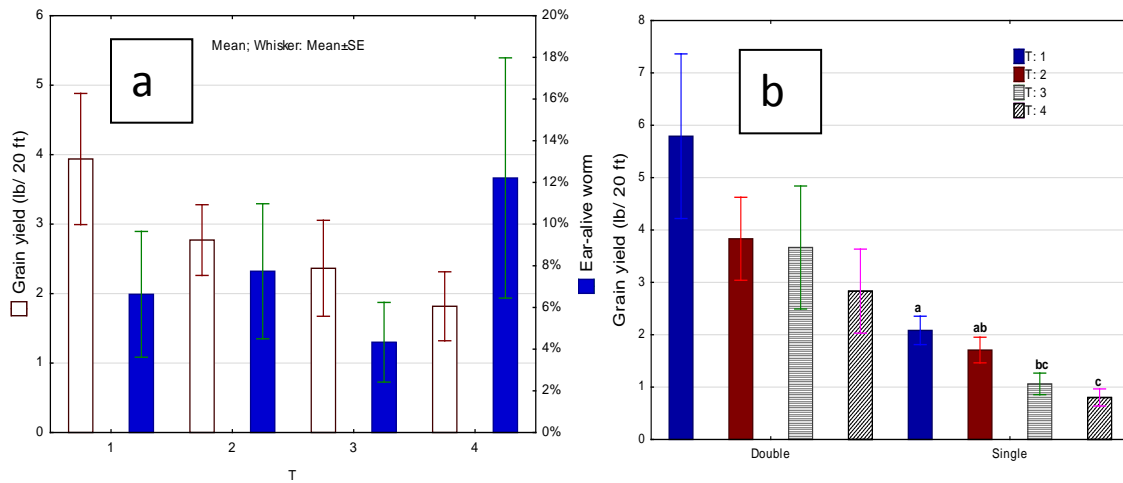


Figure 2. (a) Corn yield and percentages of ears infested with corn ear worms under the different insecticide regimes; and (b) Yields in the four insecticide treatments in single and double rows field corn planting systems

Rains that occurred on June and July complicated the evaluations of the single and triple irrigation systems. In this study due to the presence of rain significant differences were not found in the single or triple irrigation (Fig 3a). However, the double planting system seems to have an impact on yield using either single or triple irrigation (Fig. 3b).

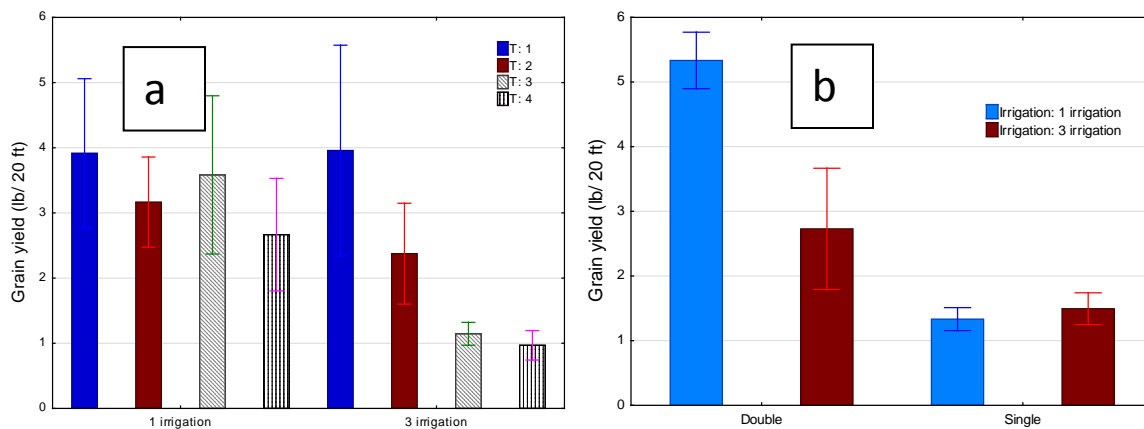


Figure 3. (a) Corn yield in the four insecticide treatments under single or triple irrigations, and (b) corn yield in single or double rows planting under single or triple irrigations.

Second season (September 2013 to January 2014)

In the second season two foliar sprays of rynaxypyr controlled effectively the populations of caterpillars (most of them fall army worm), a third spray was not necessary compared with rest of the treatments either as a double or single row planting or with two or four irrigations. Yield data will analyzed later in January 2014

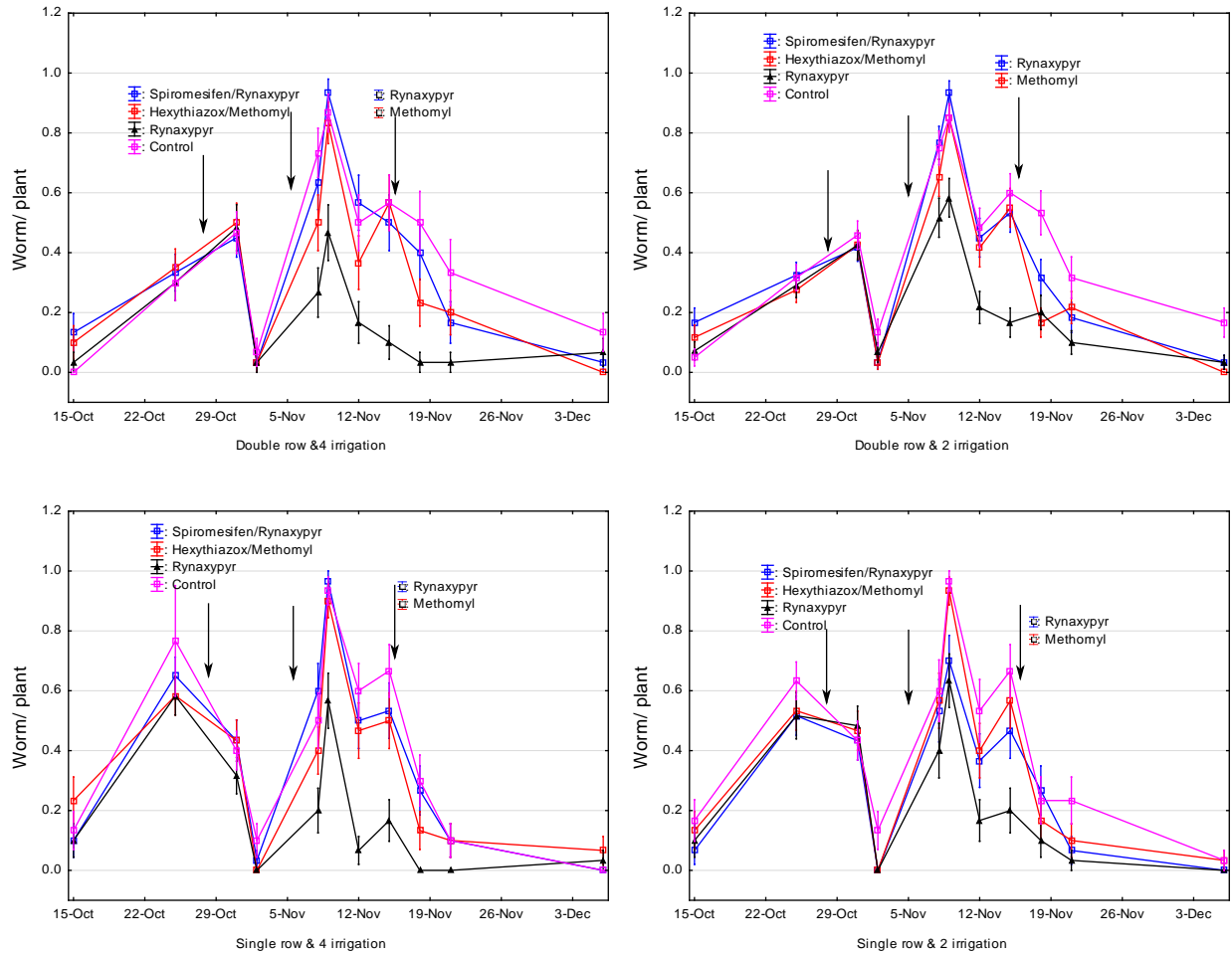


Figure 4. Populations of caterpillars on single rows and double rows field corn planting with two or four irrigation regimes and under 4 different insecticide treatments (see Table 2)