

## **Summary for 2005: Use of Integrated Pest Management to Improve Arkansas Corn and Grain Sorghum Production**

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### **Objectives:**

Brief summary of current results

#### **1. To determine the impact of insects on conventional and Bt field corn. (Ross, McLeod)**

Conventional and Bt lines were documented for corn borer damage at the Cotton Branch Station (CBS) and three additional locations (Table 1). Damage from first generation southwestern corn borer (SWCB) was very low in non-Bt lines. Subsequent corn borer damage at harvest was the lowest in the past 7 years of sampling. This may have been related to the dry spring and the lack of succulent host plants. Regardless of the low damage from corn borers, the Bt lines averaged 10.4 Bu/A more than their parent lines. No significant damage was observed in Bt lines during 2005 - an indication that corn borers have not developed resistance to BT field corn.

#### **2. To develop management systems for early season insects and nematodes, and determine the economic benefits of in-furrow insecticides/nematicides. (McLeod, Kirkpatrick)**

One soil insecticide test was completed at the CBS. Most insect populations were low and significant differences in pest numbers were not detected among the treatments. However, in a separate test, corn seed treated with Cruiser significantly reduced the number of corn leaf aphids attacking seedling corn in a reduced tillage system. Soil samples obtained across Arkansas have now been analyzed for nematodes at the Hope Research and Extension Center. Nematodes collected from Arkansas corn fields include lance, lesion, spiral and stunt.

#### **3. To establish the benefits of foliar insecticides applied for corn borer management during mid-season. (McLeod)**

Small plots located at the CBS and three large fields were sprayed (Intrepid and Capture) in early July for corn borers. All tested insecticides significantly reduced stalk and shank tunneling. Although insecticides did not significantly increase yields in large fields, lodging and number of overwintering corn borer larvae were reduced (Table 2). One insecticide, Warrior, increased yield in small plots (Table 3).

#### **4. To establish information on the biology and management of overwintering corn borers in Arkansas field corn.(McLeod)**

The third year of the study of impact of cultivation on overwintering corn borers was completed this past spring. No significant differences in initial SWCB mortality were detected among the types of cultivation (mowing, discing, stale seed bed). This is due to the protected area in which SWCB overwinter, i.e., the bottom inch of the root mass. Each type of cultivation significantly reduced the number of overwintering European corn borers which overwinter higher up in the stalk. Also, each cultivation method increased the impact of the harmful effects of winter when compared to no stalk destruction. White grub populations were much higher in plots with no stalk destruction.

#### **5. To develop management systems for insects attacking grain sorghum in Arkansas (McLeod, Ross)**

Grain sorghum fields at Des Arc and Marianna were monitored for insect pests. Chinch bugs were detected in low numbers in several fields but impact on grain sorghum was minor.

Additional insect pests (corn earworm, fall armyworm, and sorghum webworm) were observed in numbers below economic thresholds during the 2005 season. Sorghum midge numbers were high at Marianna during 2005 but were successfully reduced with several pyrethroid insecticides, esp. Capture.

**6. To establish information on the basic biology of the principal insect pests of grain sorghum in Arkansas.(McLeod)**

Grain sorghum fields at Des Arc and Marianna were sampled on a weekly basis for insects. Damaging insects in order of greatest importance included sorghum midge, sorghum webworm, corn earworm, fall armyworm, and stink bugs.

Table 1. Evaluation of field corn cultivars for resistance to insects, Marianna, Arkansas, 2005

Cultivar	% of plants with corn borer damage	% of plants with more than 2 internodes damaged	% of internodes damaged	% shank damage	ear damage rating *	yield bu/A
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**Early planting (April)**

1. Pioneer 33N56	17.5 b	0.0 a	1.8 bc	15.0 a	1.8 abc	144.0 b
2. Pioneer 32R25	30.0 ab	5.0 a	4.5 a	15.0 a	1.1 d	172.5 ab
3. Pioneer 31B13 Bt	0.0 c	0.0 a	0.0 c	0.0 b	1.3 cd	182.0 ab
4. Pioneer 31N27	27.5 ab	2.5 a	4.3 a	5.0 ab	1.2 cd	164.2 ab
5. Pioneer 31N28 Bt	0.0 c	0.0 a	0.0 c	0.0 b	1.1 d	188.6 a
6. Pioneer 31G98	40.0 a	5.0 a	4.7 a	15.0 a	2.0 ab	170.8 ab
7. Pioneer 31G96 Bt	0.0 c	0.0 a	0.0 c	0.0 b	1.5 bcd	188.9 a
8. DeKalb 697	25.0 b	0.0 a	3.5 a	7.5 ab	1.9 ab	159.0 ab
9. DeKalbC69-70 Bt	2.5 c	0.0 a	0.2 c	0.0 b	2.1 a	176.0 ab

**Middle planting (May)**

1. Pioneer 33N56	32.5 ab	15.0 a	7.0 a	12.5 ab	1.5 c	140.9 d
2. Pioneer 32R25	47.5 a	7.5 ab	6.7 a	15.0 ab	1.8 bc	174.2 ab
3. Pioneer 31B13 Bt	0.0 c	0.0 b	0.0 b	0.0 c	2.0 abc	186.0 a
4. Pioneer 31N27	37.5 ab	2.5 b	5.7 a	17.5 a	1.9 abc	166.5 abc
5. Pioneer 31N28 Bt	2.5 c	0.0 b	0.2 b	0.0 c	1.6 c	170.5 abc
6. Pioneer 31G98	47.5 a	7.5 ab	6.3 a	15.0 ab	1.6 c	151.5 cd
7. Pioneer 31G96 Bt	5.0 c	0.0 b	0.3 b	0.0 c	2.2 ab	159.3 bcd
8. DeKalb 697	22.5 b	2.5 b	2.7 b	5.0 bc	2.4 ab	177.4 ab
9. DeKalbC69-70 Bt	0.0 c	0.0 b	0.0 b	0.0 c	2.4 a	167.9 abc

\* Damage ratings are 0 (none) to 5 (extensive).

Column means within a planting followed by the same letter are not significantly different (P=0.05, LSD).

Table 2. Evaluation of foliar insecticides for corn borer management in commercial field corn, 2005

Treatment and rate	% of plants with corn borer damage	% of plants with more than 2 internodes damaged	% of internodes damaged	% shank damage	ear damage rating *	yield bu/A
<b>Piggott</b>						
1. Intrepid 2 SC 8 fl oz pr/A	25.0 a	0.0 a	2.7 a	3.3 a	1.5 a	195.1 a
2. Untreated	38.3 a	1.7 a	4.0 a	8.3 a	1.4 a	191.3 a
<b>Forrest City</b>						
1. Capture 2EC 6.4 fl oz pr/A	25.0 a	8.3 a	4.7 a	5.0 a	2.3 a	163.4 a
2. Untreated	35.0 a	6.7 a	5.8 a	13.3 a	2.4 a	165.8 a
<b>Clarendon</b>						
1. Intrepid 2 SC 8 fl oz pr/A	20.0 a	3.3 a	3.4 a	8.3 a	0.7 a	179.5 a
2. Untreated	25.0 a	6.7 a	4.2 a	10.0 a	0.9 a	171.0 a

\* Damage ratings are 0 (none) to 5 (extensive).

Column means within a planting followed by the same letter are not significantly different (P=0.05, LSD).

Table 3. Evaluation of foliar insecticides for corn borer management in May planted field corn, Marianna, Arkansas, 2005

Treatment and rate lb ai/A	% of plants with corn borer damage	% of plants with more than 2 internodes damaged	% of internodes damaged	% shank damage	ear damage rating *	yield** bu/A
1. Intrepid 2 SC 0.063	20.0 b	2.5 a	2.3 b	7.5 ab	1.6 b	169.9 ab
2. Intrepid 2 SC 0.125	15.0 bc	0.0 a	1.5 bc	5.0 ab	2.3 a	163.3 ab
3. Capture 2 EC 0.05	2.5 c	0.0 a	0.2 c	2.5 b	2.4 a	155.8 b
4. Warrior CS (1) 0.03	5.0 cb	0.0 a	0.5 bc	0.0 b	2.2 a	188.3 a
5. Untreated	40.0 a	5.5 a	5.5 a	12.5 a	2.3 a	148.4 b

\* Damage ratings are 0 (none) to 5 (extensive).

Column means within a planting followed by the same letter are not significantly different (P=0.05, LSD).