Improvement of Insect Management Programsfor Arkansas Field Corn

Investigators: Paul McLeod

Cooperators: C. Kennedy (CBES); selected corn producers and County Extension Agents

Crop: Corn **Status:** 3nd year

Objective 1. To determine the effects of new BT field corn lines on corn borers, corn earworm and fall armyworm.

Table 1. Yearly means for field corn cultivar resistance to corn borer, Marianna, AR

Year	% Plants with corn borer damage	% Plants with more than 2 internodes damaged	% Internodes damaged	% Shank damage	Ear damage rating *	Yield bu/A
2009 non-BT	84.2 a	63.3 a	36.7 a	79.8 a	3.1 a	142.4 a
2009 BT	10.0 b	0.0 b	0.5 b	0.5 b	1.9 b	173.2 b
2010 non-BT	58.3 a	41.7 a	33.0 a	23.7 a	3.4 a	139.3 a
2010 BT	2.5 b	0.0 b	0.3 b	0.5 b	1.8 b	171.3 b
2011 non-BT	16.7 a	6.7 a	14.3 a	3.3 a	3.2 a	149.6 a
2011 BT	0.0 b	0.0 a	0.0 b	0.0 a	1.6 b	171.4 b

* Damage ratings are 0 (none) to 5 (extensive). Column means within a year followed by the same letter are not significantly different (P=0.05, LSD).

Conclusions:

1. There appears to be a trend for decline of corn borer population level in eastern Arkansas. This has been reported in other states with extensive use of BT field corn.

2. There is currently no indication of resistance development in Arkansas corn borer populations to BT.

3. Yield increases in BT lines are likely more related to moderate control of corn earworm than to control of corn borers.

4. Field corn containing BT (Viptera) developed for corn earworm and fall armyworm control are highly effectively against all three insects in Arkansas and will likely increase corn yield.

Objective 2. To improve insect management systems for conventional field corn in Arkansas.

Table 2. Evaluation of foliar insecticides for corn borer management in field corn at Marianna, 2009-2011.

Insecticide	Year tested	Significant reduction in corn borer tunneling	Significant reduction in shank damage	Significant yield increase
Belt 4SC	2010	yes	yes	no
Capture 2 EC	2009, 2010	yes	yes	no
Coragen SC	2009, 2010, 2011	yes	yes	no
Hero 1.24	2009, 2010	yes	yes	no
Intrepid 2 SC	2009, 2010, 2011	yes	yes	no
Radiant	2010	yes	yes	no

Conclusions:

1. Tested insecticides were effective in reducing corn borer damage to stalks and shanks but did not increase yields. Stalk lodging can be reduced by insecticide application.

2. Insecticide spray timing is critical (late June/early July) as corn borers rabidly enter the plant.

3. Systemic insecticides like Coragen may provide improved corn borer control.

4. All tested insecticides significantly reduced fall armyworm damage but yields were not increased.

Table 3. Insect occurrence on conventional field corn in Arkansas, 2009/2011

Location	year surveyed			SWCB	ECB	CEW	FAW	chinch bug
	09	10	11					
Altheimer		X	X	X	X	X	X	
Clarendon		X	X	X	X	X	X	
Eudora		X	X			X	X	
Fayetteville		X	X		X	X	X	
Holly Grove	X			X	X	X	X	
Kibler		X	X			X	X	X
Marianna	X	X	X	X	X	X	X	
Monett, MO		X				X	X	
Morrilton	X	X	X		X	X	X	X
Piggott	X	X	X	X	X	X	X	

SWCB - southwest corn borer; ECB - European corn borer; CEW - corn earworm; FAW- fall armyworm

Conclusions:

1. SWCB occurs in eastern Arkansas from about Pine Bluff to Piggott.

2. ECB occurs in most of Arkansas but has not been detected in extreme southeast or southwest Arkansas.

3. Chinch bug is generally found in the Arkansas River Valley west of Morrilton and in extreme southwest Arkansas.

4. CEW continues to be present throughout the state and negatively impacts field corn production by reducing the number and quality of kernels per ear and likely increases the potential for aflatoxin.

5. FAW occurs throughout the state.

Impact of corn borer on field corn kernel size conclusions:

1. There appears to be little correlation between the amount of tunneling from corn borer and kernel weight or number of kernels per ear.

2. Yield reductions from corn borer in Arkansas are likely due to ear breakage and dropping prior to harvest and lodging of stalks.

3. By planting prior to about 15 April, Arkansas corn producers can greatly reduce the impact of corn borers.

Objective 3 - To establish information needed for updates to the insect chapter in the "Corn Production Handbook" published in 2003 by the University of Arkansas and the Arkansas Corn and Grain Sorghum Board. Each of the above mentioned studies has provided information needed to update the insect chapter in the "Corn Production Handbook". The insect chapter will be ready for the next printing.