

## ANNUAL RESEARCH SUMMARY

**TITLE:** Corn Production Systems in Arkansas

**INVESTIGATORS:** C. R. Shumway  
COA/ASU, UA/AES

J. H. Muir  
COA/ASU, UA/AES

### OBJECTIVES:

1. Evaluate a number of production practices to improve the efficiency of corn production in Arkansas. These will include the evaluation of starter fertilizers, soil insecticides, crop rotations, and hybrid response to aflatoxin contamination.
2. Economically evaluate these production practices as an input and produce a recommendation for growers.

### In-Furrow Insecticide

Several soil insects attack corn. They feed on the germinating seed, roots or underground stems. Once serious damage has occurred, the only alternative is to replant the crop. In-furrow applied insecticides may be an effective insurance against such damage.

A study was conducted on the Arkansas State University campus in 1999 and 2000 and at the Pine Tree Experiment Station in 2001 to determine the effect of in-furrow insecticide on corn stand and grain yield. The insecticides Furadan, Thimet, Counter, Lorsban and Force were compared with an untreated control. There was a benefit from some insecticides at ASU. In-furrow insecticides had no effect on corn grain yield at Pine Tree (Table 1). Both hybrids responded the same to insecticides.

**Table 1. Influence of in-furrow insecticide on corn grain yield. Pine Tree Experiment Station, Colt, Arkansas. 2001.**

<b>Insecticide</b>	<b>Yield</b>
	<b>bu/acre</b>
<b>Furadan</b>	<b>125</b>
<b>Force</b>	<b>121</b>
<b>Counter</b>	<b>117</b>
<b>Lorsban</b>	<b>117</b>
<b>Control</b>	<b>106</b>
<b>Thimet</b>	<b>100</b>
<b>LSD<sub>(0.05)</sub></b>	<b>24</b>

### **Starter Fertilizer**

**The early spring planting dates required for optimum corn production in Arkansas often expose corn seedlings to lower than optimum soil temperatures. The low soil temperatures may result in slow root growth and phosphorus deficiency even though soil test levels of available phosphorus are considered adequate. Placing small amounts of starter fertilizer (usually N + P) with or near the seed has increased early-season corn plant height and grain yield and decreased the number of days to silking of corn in northeast Louisiana.**

**A study was conducted on the Arkansas State University campus in 1999 and 2000 to determine the response of corn to starter N and P fertilizer. Nitrogen at 5 lb/acre and phosphorus at 8 lb/acre alone and together were applied with the seed in 1999. Nitrogen at 15.5 lb/acre and phosphorus at 25 lb/acre alone and together were applied approximately 2 inches to the side and 2 inches below the seed in 2000. The study was continued at the Pine Tree Experiment Station in 2001 using nitrogen at 15 lb/acre and phosphorus at 13 lb/acre.**

**There were significant responses to starter N and P alone in 2001 in a study involving both starter fertilizer and in-furrow insecticides (Table 2). There was no effect of the insecticide in this trial. The response to starter fertilizer was the same for all varieties.**

**The results were very similar in another trial involving only starter fertilizer (Table 3).**

**Three years' data indicate that starter fertilizer for corn increases yield and may be a worthwhile practice.**

**Table 2. Effect of starter fertilizer on corn grain yield in a starter fertilizer and in-furrow insecticide study, Pine Tree Experiment Station, Colt, Arkansas. 2001.**

---

<u>Starter Fertilizer</u>	<u>Yield</u>
	<u>bu/acre</u>
N	182.3
P	180.0
NP	178.5
Control	169.0
LSD <sub>(0.05)</sub>	11.4

---

**Table 3. Influence of starter fertilizer on corn yield. Pine Tree Experiment Station, Colt, Arkansas.**

---

<u>Starter Fertilizer</u>	<u>Yield</u>
	-----bu/acre-----
P	110.9
N	114.2
NP	105.5
Control	91.7
LSD <sub>(0.05)</sub>	16.3

---

## **Aflatoxin Study**

**Field trials in 2001 indicated very minimal aflatoxin contamination. The few samples that indicated elevated levels of aflatoxin indicated no distinct pattern in respect to hybrid. This was similar to results in previous years. The use of controlled environments and inoculation of the plant with spores of *Aspergillus flavus* during several developmental stages may allow a determination of conditions which produce a higher disease incidence. Studies are continuing in the greenhouse under stress conditions including low water availability and low nitrogen conditions. This may allow for a determination of genetic variation between various hybrids. Once a determination is made on the effect of environment, larger scale field studies will be reinitiated with management of environmental stress and pest management as primary factors.**