

# **FERTILIZER SOURCE, PLACEMENT, AND INSECTICIDE INTERACTIONS**

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## **Introduction**

There is a multitude of good research that has been conducted on starter fertilizer source and placement. Some data swings toward the value of starter fertilizer, other data finds no significant value. To correctly examine the true benefits of starter fertilizer, a fair amount of importance should be placed on the type of soil that crop is being planted into and the date of planting. This would afford someone the ability to more accurately assist with conclusions as to the value of starter fertilizer. There are many producers who will concur that at least some starter fertilizer is valuable when planting under cool early season conditions, however, as producers have increased their acreage and increased the size of their equipment in an effort to cover more acres per day, they have often done so at the expense of starter fertilizer attachments (partly due to reducing the cost of that equipment and partly due to reducing the time needed to get planter rolling in the field).

I plant often quite early, into zero or minimum tillage conditions and into soils that are either heavy black clay loams or lighter texture sandy loams. For my operation the advantages of starter fertilizer are obvious (I have even proven this effectively on my silt loam soils). I value the effect of starter fertilizer, but admit that I feel that I could speed up my planting progress if I did not have to fill my starter tanks so frequently. To accomplish this I have started to look at the use of a pop-up or in-furrow placed fertilizer. Instead of applying 20 gallons per acre of liquid fertilizer, my hope was to apply somewhere between 2-5 gallons per acre, reducing fill time and overall fertilizer costs per acre. I began testing this in earnest in 1998 when I installed a Regent insecticide application system on my planter. I tested different volumes of water with the Regent as well as different carriers, both water and fertilizer based. All this testing was performed in large scale, farm based plots in order to more accurately observe any treatment effects. Further developments have evolved toward the use of Regent and Capture and more specialized fertilizers like RiseR and Awaken. Additionally, with all the additional interest in seed-applied insecticides, I incorporated that technology into my comparisons. My purpose for this work was not to single out a winning commercial product from one company, but rather to determine the success or failure of this type of management and how I could integrate a successful program into my cropping systems.

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## **Objectives**

My first question was to determine whether a pop-up or in-furrow, seed placed fertilizer could perform like a 2 x 2 placed fertilizer. My second objective was to determine whether a liquid insecticide could be added to the program and be applied with the pop-up fertilizer in-furrow. My third objective was to incorporate seed-applied insecticides as a way to add additional crop protection performance.

## Materials and Methods

Field observations of the performance of pop-up fertilizer and liquid in-furrow placed insecticides field corn seed were initiated in 1998 and 1999, using Regent 4SC (**fipronil**, BASF) in Whitewater, WI. Studies were expanded to include the insecticides Capture (**bifenthrin**, FMC) in 2003, Gaucho (**imidacloprid**, Gustafson) in 2001 and 2002, Cruiser (**thiamethoxam**, Syngenta) in 2002 and Poncho (**clothianidin**, Gustafson) in 2002 and 2003 in several corn-soybean crop rotation scenarios. Fertilizer sources included 10-34-0, 7-21-7, and Awaken and RiseR (UAP). Locations were chosen due to different soil textures, historical climate and yield potential. Location 1, high yield potential - Plano silt loam; location 2, average yield potential - Kidder sandy loam; and location 3, average to high yield potential -Milford clay loam. Crop rotation scenarios included corn on previous soybean, and corn on corn. Insecticides utilized at low (C-Sb) and high (C-C) rates were Cruiser at 0.25 and 1.25 mg/kernel; Gaucho at 0.16 mg/kernel; Prescribe at 1.34 mg/kernel; and Poncho at 0.25 and 1.25 mg/kernel; Regent 4SC at 2.1 and 4.2 oz/acre LIF; and Capture 2EC at 5.2 oz/a and Force 3G (**tefluthrin**, Syngenta) at 2.5 and 5.0 lbs/acre T-band.

**Corn** — Corn plots were all conservation tilled (fall chisel, and spring field cultivator). Corn plots were planted into large-on-farm sized plots (15 feet x 1250 feet, approximately 0.43 acres), randomized and replicated four times, with a John Deere 6 row Model 7200 no-till Max Emerge II vacuum planter at 32,000 seeds/acre on 30" row spacings at a 2" depth. Planting date varied from April 25 to May 15. Corn hybrids ranged from Pioneer Hi-Bred 34G81/82; DSR 1005BT, 1412BT from Dairyland Seed Co.; DK 537 and 567, from Dekalb Seed Division, Monsanto; 2488A, 2510B, 6510B from Jung Seed Genetics; and N45-T5 and N45-A6 from Syngenta.

All seed contained Maxim XL, (**fludioxinil**, Syngenta) fungicide seed treatment as a base treatment. All corn on soybean plots were fertilized to optimum fertility levels using standard WI fertility recommendations (160 units N - 40 lb N credit due to previous soybean crop). All corn on corn plots were fertilized using standard WI fertility recommendations (160 units N). Nitrogen was applied as 28%N - UAN.

Plots were kept weed-free using a combination of pre and post emergent herbicides. All plots received 2.5 pt/acre Harness (**acetochlor**, Monsanto) + 1.0 lb/acre Atrazine (**atrazine**, generic) applied with liquid N as 28%N - UAN prior to planting. All plots received post emergent applications of either 6 oz Distinct (**dicamba** + **diflufenzopyr**, BASF), 3 oz Callisto (**mesotrione**, Syngenta) or 4.0 oz Hornet WDG (**flumetsulam** + **clopyralid**, Dow) at V6 (Ritchie, et al., 1989). Data collected included grain yield, grain moisture, test weight, V4 plant vigor, V4 stand density,

harvest stand density, and corn rootworm larvae feeding evaluation based on Iowa State Ratings (1-3 injury scale) criteria on July 25<sup>th</sup> each year. Plots were harvested from October to November using an Case-IH 2188 combine (Case Corp.) and AgLeader PF3000 yield monitor (AgLeader Technology) with GPS. A Parker Model 150 weigh wagon (Parker Industries) was used for individual plot weights and yield monitor calibration.

### **Results and Discussion**

{To be discussed at 2004 Wisconsin Fertilizer, Aglime and Pest Management Conference}

### **Conclusions**

{To be discussed at 2004 Wisconsin Fertilizer, Aglime and Pest Management Conference}

### **Literature Cited**

Additional information may be obtained from the following:

Maloney, T.S. 1998-2003. On-farm research studies. Unpublished reports.

Ritchie, S.W., J.J. Hanway and G.O. Benson. 1989. How a corn plant develops.  
Iowa State University. Ames. Iowa. Special Report no. 48.