

On-Site Demonstration for Replacing Broadcast Herbicides with Bonded Herbicides and Cultivation in Corn

Roy & Sue Crow

Objectives

- 1- To reduce herbicide use by applying the herbicide in a 12-inch band over the row instead of broadcasting over the entire 30" spacing.
- 2- To use mechanical cultivation to remove weeds between the rows of corn.

Abstract

Our SARE On-Farm Demonstration deals with the use of banding herbicides versus broadcasting herbicides and the effectiveness of mechanical cultivation to remove weeds between the rows of corn. By the application of these practices, we have reduced herbicide costs by 60 percent. It had no significant crop yield reduction or substantial residue weed problems.

Specific Project Results

Findings and Accomplishments

Banding Herbicide versus Broadcast Herbicide

Equipment Uses and Modifications

We attached two 200-gallon saddle tanks (Figure 1) to a John Deere 4230 tractor. These tanks held the herbicide, the insecticide, and the nitrogen that was pumped back to the John Deere 7000 conservation planter (Figure 2) by an Ace PTO-driven centrifugal pump (Figure 3). Pressure for the system, which controlled the rate of spray material, was regulated by an electrical solenoid valve and adjusted by a monitor located in the cab of the tractor. To achieve the 12" band over the row of corn, we used 110 degree fan nozzles held 8 inches over the rows. (Figure 4).

Planting Time and Populations

We planted 140 acres of corn between May 3, 2000 and May 13, 2000. The population rate on our planter was set on 26,100 on 104 acres and 28,200 on 36 acres used for corn silage. We saw excellent plant emergence and obtained near perfect stands.

Spray Material and Fertilization

At the time of the planting, a starter fertilizer was knifed into the soil, 2 inches below and beside the seed placement at a nutrient rate per acre of 12#N, 30#P, and 7.5#K. The herbicide mixture was sprayed on at a rate of 18-gallon per acre. This rate placed an additional 50#N and 6#S over the row. We used Bicep II Magnum herbicide at the rate of .8-quarts per acre instead of the 2.1-quarts per acre recommended for broadcast. We also used Warrior insecticide to protect against cut worms. The insecticide was used at a rate of .4-ounces per acre instead of the recommended 1-ounce per acre.

Assessment

Upon visual observation, we noticed that the weed control, at the six-leaf stage just before cultivation, had a good control of in-row weeds. Between the rows there was a good stand of small weeds, primarily fall panicum, lambsquarter, and pig weed, (Figure5). The addition of the banding equipment on the planter, also saved one trip across the field

to broadcast herbicide. We saw economic savings with the banding system of \$23.20 per acre. This savings was a result of 413.00 per acre of savings in Bicep, \$4.20 per acre savings on Warrior, and one trip across the field the sprayer of \$6.00 per acre.

The cost of the equipment for banding on the planter are as follows:

Saddle Tanks (used) *	\$100.00
Monitor	\$263.00
Ace PTO pump	\$600.00
Hose, Nozzles, Fittings	\$300.00
Total	\$1,263.00

* We were fortunate to find a good set of used tanks. This cost could have been upwards to 1500.00 dollars.

Cultivation

Equipment Used

We used a six-row 30" spacing Brillion cultivator equipped with S-tine shanks. Five shanks were located between each row. Two 1" teeth were located 6 inches from the row of corn. The 2- 4" teeth and the 8" sweep were located in the middle of the row. This placement maximized the movement of soil to eliminate weeds and aerate the roots.

Timing

We started a single cultivation of the corn at the six-leaf stage or 30 days after planting. We felt an earlier cultivation was not needed and weather restrictions held us to one cultivation. This was also the time when the soil had crusted and breaking it up allowed air and water to penetrate to the roots. Before cultivating, we dribbled on 100#N with our sprayer. We had planned on doing this spraying with the cultivator, but weather and tractor needs did not allow us the time to place the tanks back on the tractor. We also identified noxious weed spots (Thistle and Johnson grass) which we spot sprayed with a hand sprayer.

Assessment

The cultivation proved to remove more than 99 percent of the weeds from between the rows. Upon harvest, only a few weeds were present, but with the abundant rainfall we received this year, weed control was more than adequate. Our average per acre for grain was 195 bushels and for corn silage, 30 tons.

The spot spraying of noxious weeds was not more than usual. We did notice the weed populations were greater on the outside two rows of corn because of the added sunlight helped late emerging weeds grow without being smothered by the corn canopy.

Dissemination of Demonstration and Findings

A sign (Figure 6) was constructed on a well traveled road explaining the project (Figure 7) and allowing people to see first hand the results of the project. This report was also sent to our local extension agent, John Hall, as well as SARE.

Site Information

The farm is located in Kent County on Maryland's Eastern Shore between Galena and Kennedyville. There are 350 tillable acres of primarily Mattapeake Silt Loam soil on a 0-2 percent slope. The crops of corn, soybeans, alfalfa, wheat, barley, pasture, and grass hay are rotated extensively.

Potential Contributions and Practical Applications

Our results compared favorably with those of the Cornell project from 1993-94. We found that banding herbicides followed by one-pass with the cultivator had no measurable affect on corn production levels. By reducing the amounts of herbicides and even insecticides, not only are there economic savings but less chance of chemical leaching to ground water or exposure to surface water. Also because of time and labor constraints, the use of banding and cultivating together may be attractive to farmers looking for ways to increase profitability.

For next year, we will concentrate on spot spraying a little more and do double cultivation along field edges to remove late emerging weeds. As federal regulations on pesticide use become stricter, we feel this project demonstrates a way to reduce the amounts used on the fields.

FIGURE 1



FIGURE 2



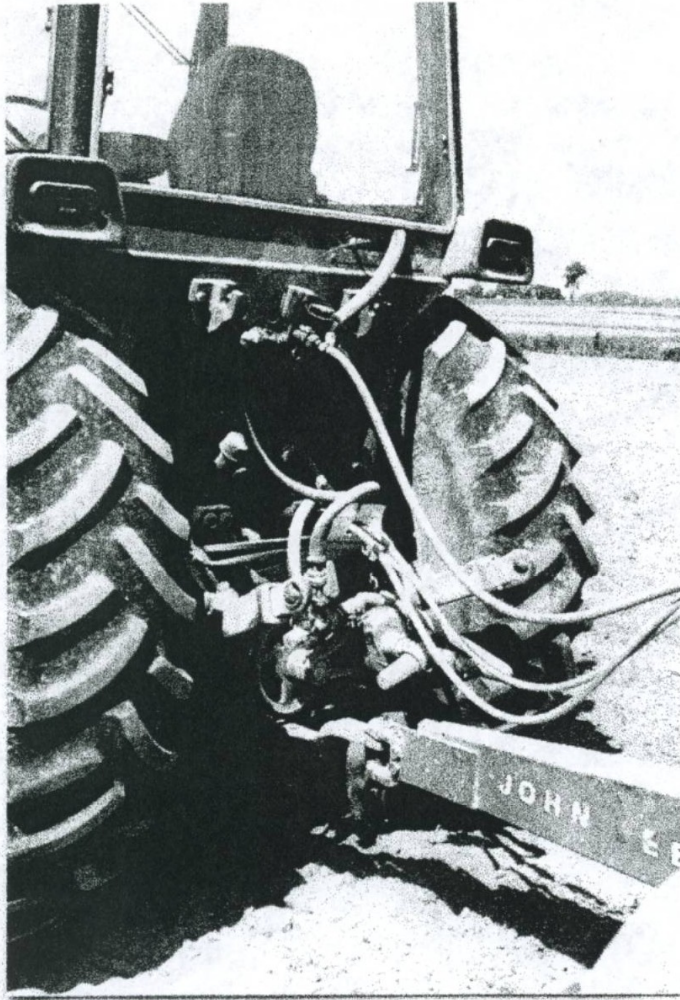


FIGURE 3

FIGURE 4



FIGURE 5



FIGURE 6



Figure 7

This is an On-Farm Demonstration supported by a grant from S.A.R.E. (Sustainable Agriculture Research and Education). We are replacing broadcast herbicides with reduced rate banded herbicides and cultivation. The objective of this project is to reduce herbicide usage thus reducing cost while controlling weeds in our corn fields. Early cultivation will remove weeds from between the rows until the corn grows tall enough to shade out any weed growth.

Our tractor is rigged with 2-200 gallon saddle tanks. The material is pumped with a PTO driven Ace pump controlled by an electrical solenoid valve. The spray nozzles are 110° fan nozzles held 8” over the rows to achieve a 12” band of spray.

Our herbicide program uses Bicep Magnum II at a broadcast rate of 2 qt/ac. We used .8qts/acc. on a 12” band along with 18 gallon of 25-0-0-3 fertilizer.

The fields were cultivated at 30 days after planting when the corn was about 1 foot tall. Most weeds present were small and in the center of the rows. We did spot spray for thistle and Johnsongrass.

We saved 1 trip across the field by applying the herbicides at planting, which also reduced the chance of not getting the corn sprayed before we had rain

For more information call Roy Crow at 410-648-5687.