



LEARNING CENTER 2011

at Monmouth, Illinois

DEMONSTRATION REPORT

THE EFFECT OF VOLUNTEER ROUNDUP READY® CORN ON CORN YIELD

Volunteer corn resulting from the previous year's crop due to harvest problems, poor stalk quality, or storm damage can be a challenge. Understanding the competitive effects of volunteers on corn yield can help in making control decisions. Correctly implemented management practices can also decrease the risk of volunteer corn problems.

STUDY GUIDELINES

Testing was conducted in 2011 at the Monsanto Learning Center in Monmouth, IL to evaluate the effects of volunteer Roundup Ready® corn on corn yield. One test was conducted where volunteer corn was applied using whole ears to mimic clumps from dropped ears at harvest. Another test was conducted where the whole ears were shelled and kernels were broadcast over the plot to mimic header loss from the combine at harvest. The volunteer corn came from a corn product with only the Roundup Ready herbicide tolerance trait. The seed was broadcast in the spring prior to planting and incorporated into the soil with two passes of a field cultivator. All plots were 1,000 square feet in size. The treatments consisted of 0 (no volunteer corn), 2, 5, and 10 ears applied to a particular plot either as whole ears or as shelled kernels from the ears.

A 111 day relative maturity corn product with the Roundup Ready® Corn 2, LibertyLink®, and Herculex® XTRA traits was planted to all plots on May 4, 2011 at a target population of 36,000 plants per acre. When the planted corn reached the V4 growth stage, herbicide treatments of Ignite® (intended to remove all volunteer corn from the plot) and Roundup PowerMAX® (intended not to control the volunteer corn) were applied. Each herbicide treatment was paired with a volunteer corn treatment. Plots were harvested on September 22, 2011.

RESULTS AND DISCUSSION

The shelled ear test produced 199 bu/acre with no volunteer corn in the plots. Corn yield was reduced by 1.4 to 2.5% (3 to 5 bu/acre) with 2 to 5 shelled volunteer corn ears in the plots. With 10 shelled volunteer corn ears, corn yield was reduced by 4.1% (8 bu/acre) when comparing the Ignite and Roundup PowerMAX herbicide treatments (Figure 1). Corn yields, where volunteer corn was controlled with Ignite in the 2 and 5 shelled volunteer corn ear plots, were similar to the control (no volunteer corn). However, corn yield was reduced by 4% in the Ignite treated plots with 10 shelled volunteer corn ears. This was attributed to early season competition from the volunteer corn plants prior to treatment with Ignite.

Corn yielded about 215 bu/acre in the whole ear (clump) test with no volunteer corn in the plots. Corn yield was reduced by 4.6 to 7.6% (10 to 15 bu/acre) with 2 to 5 whole ear clumps in the plots. With 10 whole ear volunteer corn clumps, corn yield was reduced by 8.4% (16 bu/acre) when comparing the Ignite and Roundup PowerMAX herbicide treatments (Figure 2). Comparing the Ignite treated plots, corn yield was reduced by about 4, 5, and 12% with 2, 5, and 10 whole ear volunteer corn clumps, respectively. This was attributed to the lack of effectiveness in herbicide application, as uniform spray coverage can be more difficult to obtain on volunteer corn clumps.

University testing has shown that corn yields can be reduced when volunteer corn populations are high. Low volunteer corn populations can initially look bad, but generally do not impact corn yield. Predictions from University testing indicated that a volunteer population of around 1,000 plants per acre would result in less than a 1% loss in corn yield (average of 1 bu/acre in the multiple University site testing conducted in 2007). High volunteer populations of 5,000 to 10,000 plants per acre (about 100 to 200 plants per 1,000 square feet) had a predicted yield loss of 3 to 6%, and a very high population of 20,000 plants per acre (about 400 plants per 1,000 square feet) had a predicted yield loss of 12%.¹ Volunteer corn populations were not recorded in this testing, but the results appear to be in line with those of the University predicted yield losses.

Greater corn yield loss was observed with the clumped volunteer corn (whole ear) than with the shelled corn in this testing. This could be attributed to better control of the shelled corn volunteers than whole ear volunteers with Ignite herbicide. Good spray coverage can be difficult to obtain on corn volunteer clumps. However, testing has shown that volunteer corn plants in ear clumps can be less competitive with the corn crop than the same number of evenly dispersed volunteers.² The distribution and

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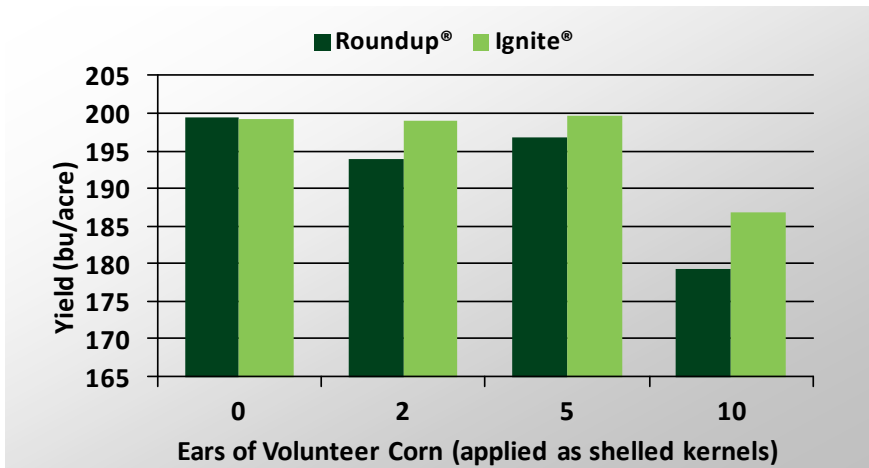
density of volunteer corn plants can be highly variable in a corn field. In both of these tests, treatments with 10 ears showed a large yield decrease from the other treatments. The 10 ear treatments resulted in high volunteer corn populations that provided early season competition with the corn crop.

Management practices can help to minimize the losses from volunteer corn competition in corn.³ Selecting corn products with insect protection traits, good standability, stalk strength, and ear retention characteristics can help to keep volunteer corn from becoming a problem in field corn. A timely corn harvest with proper combine settings and adjustments helps to reduce corn ear and kernel losses in the field. Finally, herbicide options are available to control volunteer corn if it becomes a problem.

REFERENCES

- ¹*Agronomic Spotlight. 2010. Volunteer corn in corn fields. Monsanto Technology Development.*
- ²*Stahl, L. et al. 2007. Effect of glyphosate-resistant volunteer corn on glyphosate-resistant corn. University of Minnesota, North Central Weed Science Society Proceedings 62:48.*
- ³*Agronomic Spotlight. 2010. Volunteer corn control: Pre-plant, replant and in-crop. Monsanto Technology Development.*

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No Volunteer Corn

Figure 1. Effect of Roundup Ready volunteer corn (shelled) on corn yield - 2011 Monmouth, IL.



2 Ears Shelled



5 Ears Shelled



10 Ears Shelled

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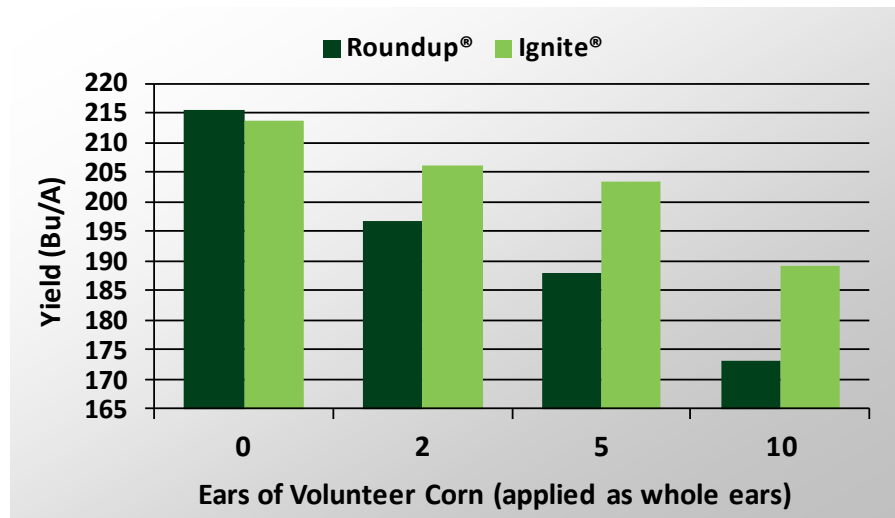
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No Volunteer Corn

Figure 2. Effect of Roundup Ready volunteer corn (in clumps) on corn yield - 2011 Monmouth, IL.



2 Ear Clumps



5 Ear Clumps



10 Ear Clumps

The information discussed in this report is from a single site, non-replicated, one-year demonstration. This information piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.

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