

PERFORMANCE OF TRANSGENETIC SOYBEANS – NORTHERN US E.S. Oplinger, M.J. Martinka, K.A. Schmitz ^{1/}

Introduction:

The availability and use of transgenic soybean varieties has rapidly increased in the northern US states in the past two years. Most if not all of this increase can be attributed to the development of herbicide tolerant varieties, especially those tolerant to glyphosate herbicide (Roundup). Soybean growers in the northern US states first had access to “Roundup Ready” (RR) varieties on a limited basis in 1996. Nationwide approximately one million acres were planted to these transgenic varieties in 1996, increasing to 9 million acres in 1997 and over 25 million acres in 1998. Therefore, if performance is to be measured by grower’s acceptance then RR soybean varieties have certainly performed well. Additionally, the use of these varieties has solved some major weed problems for some growers.

1998 Results:

Performance testing of RR soybean varieties by universities in official performance trials did not begin until 1997, figure 1. Trials were conducted in Wisconsin as well as Michigan, Minnesota, Nebraska, Indiana, Ohio, and New York, as well as in many southern states. For most cases the number of RR varieties was limited and test were separate from the conventional variety tests.

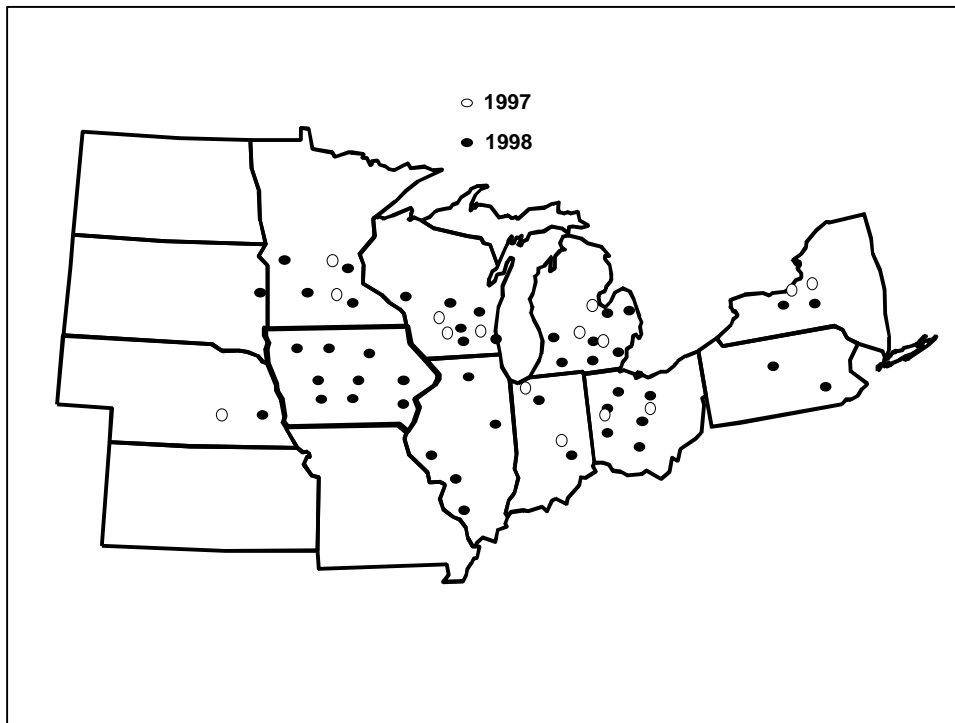


Figure 1. Location of soybean variety performance tests comparing Roundup Ready and conventional herbicide tolerant varieties in the Northern US state in 1997 and 1998.

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By 1998 most all states in the northern US that raise soybeans conducted one or more yield trials comparing performance of conventional (CN) herbicide tolerant varieties to Roundup Ready herbicide tolerant varieties. For all cases the RR varieties received Roundup herbicide to control weeds and the CN varieties had a variety of conventional herbicides applied for weed control. Table 1 summarizes the trial mean yield, top five varieties yield, and the highest yielding variety from 40 performance tests conducted across 8 states in 1998. A total of 5172 CN variety comparisons were made compared to 3067 RR comparisons. When trial means are compared RR varieties ranged from 86% to 113% of the average yield of CN varieties. The five trials where the average yield of RR varieties exceed the average yield of the CN varieties were either in Illinois or southern Michigan. Averaged across all regions and locations RR varieties yielded 96% or 4% less than the CN varieties.

Since an unequal number of varieties are being compared in the trial means, the yield of the top five RR varieties from each test was compared to the top five CN varieties at each location. In these 200 comparisons RR varieties ranged from 82% of the yield of CN varieties in Central Michigan to 111% in the Perry, IL trial, table 1. When averaged across all locations the top five RR varieties yielded 5% less than the top five CN varieties.

When the top yielding varieties are compared the RR yields ranged from 76% to 109% of the CN yields and averaged 94%, table 1.

Summary:

Average yields of RR varieties ranged from 14% less to 13% more than CN varieties in 40 performance tests conducted by universities in 1998, figure 2. When averaged across all tests RR varieties were 4% lower in yield than CN varieties. It is anticipated that soybean growers will continue to increase acres planted to RR varieties and will sacrifice maximum yield for ease of weed control.

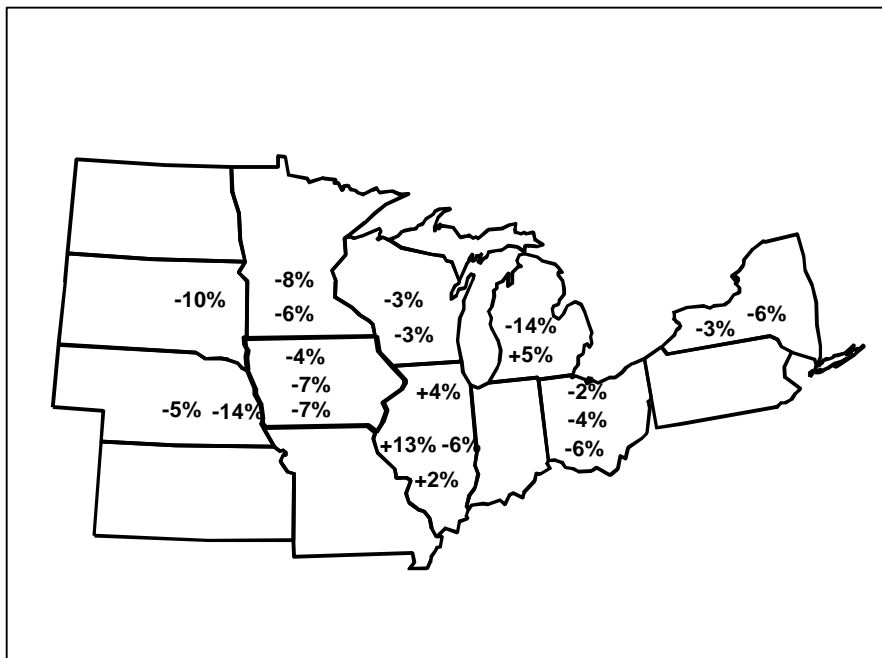


Figure 2. Relative yield performance of Roundup Ready Soybean varieties compared to conventional varieties in the northern US in 1998 tests.

Acknowledgements

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