Impact Statement 2014: Cornell Breeds First Alfalfa Variety With Resistance to Alfalfa Snout Beetle

Investigator/Project Leader: Donald R. Viands

Project Type: Research, extension

University Objective:

CALS Academic Priorities: Land Grant

Project Category: Enhance Economic Opportunities for Agricultural Producers; Protect and Enhance Natural Resource Base and Environment

Title: Cornell Breeds First Alfalfa Variety With Resistance to Alfalfa Snout Beetle

Impact Summary: Cornell plant breeders and entomologists have developed the first alfalfa variety with at least a moderate level of resistance to alfalfa snout beetle (ASB). This insect devastates alfalfa stands in Northern NY. In combination with nematodes that kill ASB, this variety should provide some control against this insect, thus enabling alfalfa to be productive and providing economic stability for growers.

Issue: Alfalfa snout beetle (ASB), Otiorhynchus ligustica, is the most destructive insect pest of alfalfa in Northern New York (NNY), and is continuing to spread. Alfalfa snout beetle is currently infesting nine NNY counties and has invaded Canada across the St. Lawrence River. Otherwise, there is no other known infestation of this insect in North America.

This pest causes severe yield and stand losses on alfalfa by larval feeding on alfalfa roots. New infestations are often mistaken for winter injury since the majority of plants die after the last harvest and before spring growth.

Response: Cornell entomologists have developed an indoor procedure for applying ASB to alfalfa plants so that plants can be evaluated for selection of resistance in the Cornell breeding program. Multiple cycles of selection under controlled conditions have been accomplished in several alfalfa populations.

In a field trial established in 2011, total yields in one alfalfa population across two production years were 10.07 dry T/A for Cycle 0, 10.23 for Cycle 4, and 10.52 for Cycle 7. Root damage scores (1 [no larval feeding damage] to 5) at the end of the 2013 season showed a progression of decreased damage with selection: mean score was 3.67 for Cycle 0, 3.48 for Cycle 4, and 3.19 for Cycle 7. A greenhouse experiment where ASB eggs
were applied to the soil showed similar results: the selected populations had less root damage and higher root and stem mass than did the original, unselected populations.

**Impact:** Our initial field and greenhouse experiments indicate that progress is being accomplished from selection for alfalfa resistance to ASB. Enough progress has been made to attract interest by the seed industry, resulting in release of our first variety Seedway 9558 SBR. Seed was available to a small number of growers in NNY during spring 2013. Much more seed is available for spring 2014 planting. This level of resistance, in combination with the nematodes that have been released by Dr. Elson Shields’ research project, should provide some control against this insect. Seedway 9558 SBR should have at least moderate levels of resistance. We believe, however, that even higher levels of resistance are achievable and would provide more effective control in the long term.

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**Collaborators:**; Chuck Burnett—Idaho seed producer; Seedway, Inc.; Allied Seed Company.

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