Reducing Potato Leafhopper (PLH) impacts on alfalfa through PLH-resistant cultivars intercropped with perennial forage grass

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Potato leafhopper (PLH) [*Empoasca fabae* (Harris)] is the most damaging alfalfa (*Medicago sativa* L.) insect pest in the Northeast (NE). Forage grasses in mixture with alfalfa can cause PLH to emigrate. Some recent alfalfa cultivars have glandular hairs and PLH-resistance, yet are not immune to damage from PLH. Potato leafhopper-resistant alfalfa cultivars intercropped with perennial forage grass could be an IPM strategy that would have environmental, agronomic, and economic benefits to forage producers.

The objective was to compare PLH populations, PLH damage scores, forage yield, and botanical composition of a conventional alfalfa cultivar (WL 357HQ) and a PLH-resistant cultivar (WL 347LH) both in monoculture and intercropped with one of three grass species (orchardgrass (*Dactylis glomerata* L.), timothy (*Phleum pretense* L.), and tall fescue (*Festuca arundinacea* S.)). Trials were established at Geneva NY, Ithaca NY, RockSprings PA, and Landisville PA in spring 2006. Data were collected in 2006 and 2007. Planned comparisons of resistant vs. conventional alfalfa were tested for significance for the monoculture plots and for each grass species. Populations of PLH were low in 2006 and 2007 at Geneva and RockSprings, thus only data from Ithaca and Landisville are presented.

The number of PLH per sweep set was counted for each plot at Harvest 1 in 2006 and Harvest 2 in 2007. Monoculture conventional alfalfa averaged significantly higher PLH sweep counts than resistant alfalfa at first harvest in 2006 (70 vs. 40 PLH) and second harvest in 2007 (25 vs. 12 PLH), and lower second harvest yield just in the first production year (0.78 vs. 1.01 tons per acre dry matter in 2007).

The percent grass at first harvest in 2006 (average 33%) and at second harvest in 2007 (average 21%) in the conventional alfalfa-mixture plots compared to the resistant alfalfa-mixture plots for each grass species was similar and not statistically significant. For orchardgrass and tall fescue mixture plots in 2006, the conventional alfalfa plots did not have significantly higher numbers of PLH per sweep set than the resistant alfalfa plots (orchardgrass: 16 vs. 11 PLH; tall fescue: 30 vs. 25 PLH). Similarly for orchardgrass and tall fescue in 2007, the conventional alfalfa plots did not have significantly higher numbers of PLH per sweep set than the resistant alfalfa plots (orchardgrass: 9 vs. 3 PLH; tall fescue: 7 vs. 3 PLH). For alfalfa-timothy mixtures, three of the four planned comparisons between conventional alfalfa and resistant alfalfa were statistically significant (P-values of 0.06 or lower), and averaged over the three significant comparisons, the PLH counts per sweep set were significantly higher for the conventional alfalfa than for resistant alfalfa (30 vs. 9 PLH). All planned comparisons for PLH damage scores (1-no apparent damage to 5-severe damage) were statistically significant and the resistant plots had PLH damage scores that averaged 1.3 units lower that the conventional plots.

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