

Economic Thresholds in Potato Leafhopper Resistant Alfalfa Cultivars

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Alfalfa cultivars with resistance to potato leafhopper (*Empoasca fabae*, Harris) (PLH) greatly reduce losses caused by this pest; however, yield losses can occur when PLH populations are high (Hansen et al., 2002; Sulc et al., 2001). Using cage studies, Lefko et al. (2000) concluded that the economic action threshold (ET) was greater for PLH-resistant than for susceptible cultivars, but it is unclear whether this holds true under natural field conditions. We established field studies in western Ohio to monitor yield loss in relation to naturally occurring PLH populations in a cultivar with high PLH-resistance (54H91) and in a susceptible (54V54) cultivar. To provide different PLH control regimes during the summer, three treatments (150 m² subplots) were imposed on cultivars (whole plots) in a RCB design: no insecticide applied, insecticide applied early (12 d regrowth after harvest), and insecticide applied late (19 d regrowth after harvest). Yield loss from PLH was considered the difference between early and no insecticide treatment. Economic yield loss threshold was considered as 200 kg/ha (\$US 0.05/kg alfalfa DM, \$US 10.00 for insecticide treatment).

The potential for economic loss from PLH is often assessed as the number of PLH in 10 sweeps per inch (2.54 cm) of alfalfa canopy height (PLH index). The recommended ET for PLH in alfalfa corresponds closely to a PLH index of 1. In the susceptible 54V54, the PLH index exceeded this value at the time of early insecticide application in all summer growth cycles during the 3-yr study, reaching values as high as 16 (Fig. 1). Economic yield loss was observed for 54V54 in 11 of the 14 summer harvests. In contrast, the PLH index in resistant 54H91 at time of early insecticide treatment never exceeded 5 and in only 4 of 14 summer harvests was economic yield loss measurably greater than the cost of insecticide treatment (Fig. 1). The PLH index at those four harvests ranged from 3 to 4.4, with PLH adult populations averaging 3 times lower and nymphs averaging 11 to 30 times lower in resistant 54H91 compared to 54V54.

The untreated 54H91 produced similar yields over 3 yr as the late insecticide treatment in 54V54 and economic returns similar to those obtained with the early insecticide treatment in 54V54 (data not shown). We conclude that the ET for alfalfa cultivars with high levels of PLH resistance is a PLH index of 3 to 4.

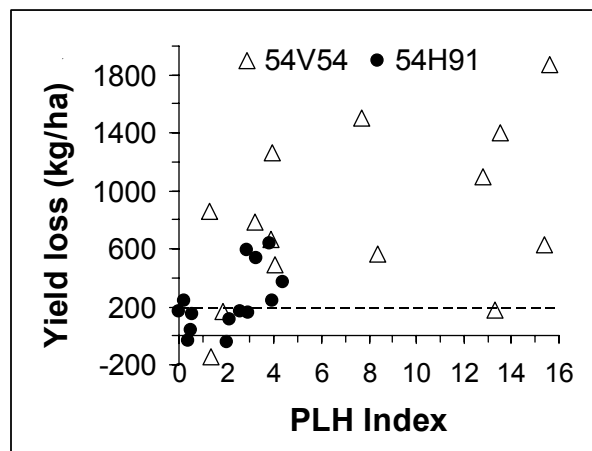


Fig. 1. Forage yield loss vs. PLH index at time of early insecticide application.

References

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