Potato leafhopper (PLH)-Resistant Alfalfa Varieties – To Plant or Not to Plant - Spring 2008

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Potato leafhoppers (PLH) are perhaps the most widespread and damaging insect pests of alfalfa in the NE, causing risk to new seeding establishment and survival, and to established stands during mid-to-late summer. When high populations of PLH are not controlled during the establishment year, large reductions in alfalfa yield and quality can occur.

Risk from this migrating insect pest can vary greatly year to year but it is reasonable to assume that an alfalfa field could be at significant economic risk at least once during it's years in stand. To minimize risk and avoid economic impacts growers are encouraged to monitor crops frequently and, when PLH populations warrant, harvest the forage early or treat with a properly labeled insecticide.

In the past decade another alterative has become available - the use of PLH resistant alfalfa varieties. The question that producers have been asking for some time now is: Do the PLH-resistant alfalfa varieties yield as much as conventional alfalfa varieties when PLH are not a problem? This has been difficult to answer because companies do not enter PLH-resistant alfalfa into the alfalfa variety tests that are sprayed with insecticide because this is not their intended use. Thus we don't have much information to base our answer on.

It is certainly true that the early generation PLH-resistant alfalfa varieties did not yield as much as conventional alfalfa when PLH were not at damaging levels. This has been attributed to 'yield drag', where the PLH resistance trait from an unimproved, wild alfalfa species when bred into conventional alfalfa brought along some other traits of the wild alfalfa species such as more fall dormant and winter hardy, less upright growth habit, yellow flowers, less disease resistance, and lower yield. Plant breeders now have 10+ years of selection behind them for alfalfa that is resistant to PLH that does not have the 'yield drag' characteristics. Thus, the new PLH-resistant alfalfa varieties are now very similar to conventional alfalfa in all aspects other than PLH-resistance including disease resistance. However, while breeders were doing 'catch up' breeding with PLH-resistant alfalfa, they were also continuing their selection programs with conventional alfalfa to improve yield, forage quality, persistence, etc. Thus it is not unreasonable to think that some of the conventional alfalfa varieties on the market would outyield the PLH-resistant varieties in tests where PLH were controlled.

While comparing variety performance is useful, in reality decisions to plant PLH-resistant or conventional alfalfa should consider how the crop will be managed for this insect pest. Is the alfalfa being grown as organic? If so PLH resistant alfalfa is an obvious choice. For the conventional grower, will your alfalfa fields be scouted every year for PLH and sprayed in a timely fashion when PLH damage reaches an economic threshold? If the answer is yes, then that producer should plant the highest yielding conventional alfalfa variety he or she can find. If the answer is no and the fields are not managed to reduce losses from PLH damage, then planting a conventional alfalfa variety will result in lower yields and reduced profit.

Both conventional alfalfa and PLH-resistant alfalfa varieties will yield more when insecticides are applied to control PLH than when insecticides are not applied. The PLH-resistant alfalfa varieties still support a population of PLH, although this population is smaller (a third to a half) than for a conventional alfalfa variety. This smaller population of PLH adult and nymph insects still feed on

the PLH-resistant alfalfa and reduce yield somewhat although the plants do not readily turn yellow and are not stunted.

For example, in 2007 first production year trials at Ithaca and Geneva (second harvest), the average number of PLH per five sweeps per plot when sprayed with insecticide was less than 1 for both the conventional alfalfa and for the PLH-resistant alfalfa; and the average number of PLH per five sweeps per plot when insecticides were not applied was 24 for the conventional alfalfa and was 14 for the PLH-resistant alfalfa. For alfalfa-grass mixture plots (averaged 15%grass) that were not sprayed with insecticide, the average number of PLH was 12 for conventional alfalfa and 5 for PLH-resistant alfalfa.

In the Ithaca and Geneva trials where insecticide was applied, there was no significant yield difference between the conventional alfalfa and the PLH-resistant alfalfa (3.69 vs 3.63 tons per acre dry matter). In the Ithaca trial where insecticide was not applied, the PLH-resistant alfalfa yielded 0.76 t/a more than the conventional alfalfa (3.99 vs 3.23 t/a; no difference in Geneva). For these trials, only one conventional alfalfa variety (WL 357HQ) and one PLH-resistant variety (WL 347LH) were planted.

There are some other tidbits of information that may help a producer in deciding whether to plant PLH-resistant alfalfa or conventional alfalfa. Seed costs of PLH-resistant and conventional alfalfa varieties are comparable. If a producer prefers an aggressive cutting schedule, such that the PLH populations do not have time to build up between harvests (life cycle of PLH is about 1 month), then a PLH-resistant variety may not be that advantageous. However, in the seeding year, the field would certainly need to be sprayed with insecticide because the new seeding would likely not be cut until sometime in July, well after PLH arrive in NY each year. It has been documented that if is severely damaged by PLH in the seeding year, the alfalfa will yield less at first harvest the following year.

With current high costs of pesticides, fuel, and all petroleum based products, economics may tend to favor PLH-resistant alfalfa even more now than in the past. A producer would avoid expense of extra passes across the field and pesticide. In a bad PLH year or a year with heavy PLH damage to alfalfa crops. In a year with high PLH population pressure it may pay to spray such that extra yield would be gained, but fortunately here in NY we don't have heavy PLH damage every year and sometimes yield loss can be avoided by early harvests. Avoiding insecticide applications through the use of PLH-resistant alfalfa varieties will also allow beneficial insects, including bees, to thrive in fields.

Some recommendations include spraying PLH-resistant alfalfa in the seeding year, however if the new alfalfa fields are planted by early May, the PLH-resistant alfalfa plants will have developed the resistance traits by the time PLH arrive in NY in early to mid June. Late planting of alfalfa fields is risky, and will likely need to be sprayed with insecticide to protect both conventional and PLH-resistant alfalfa seedlings from severe PLH damage.

First decide how you plan to manage your forage crop, and then decide what variety best fits that management system.