POTATO LEAFHOPPER RESISTANT VARIETIES

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Resistance to Potato Leafhopper in alfalfa was discovered over 40 years ago but this trail has been slowly incorporated into alfalfa varieties and those available have been underused by farmers. This occurred because the first varieties with this trait had low levels of resistance and did not perform well in the field. Also this resistance is not complete; it raises the spray threshold and reduces the need for spraying but, if insect levels become sufficiently high, fields may still need to be sprayed. Later generations have had good resistant but some yield drag (reduced yield in the absence of the insect compared to nonresistant varieties). The latest generation of potato leafhopper resistant varieties has both good resistance and little yield drag (Table1).

Table 1. Performance of PLH resistant alfalfa varieties (% of trial mean) in absence of PLH

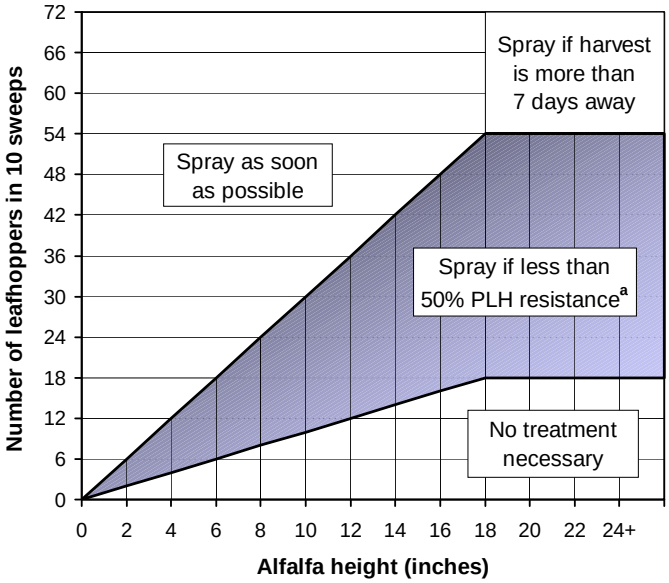
	54H91		Enforcer		FSG 400LH		WL345LH		WL346LH		WL347LH	
Age of stand	% of trl mn	site-years	% of trl mn	site-years	% of trl mn	site-years	% of trl mn	site-years	% of trl mn	site-years	% of trl mn	site-years
1	102	22	99	4	100	6	100	2	103	3	96	1
2	98	54	101	3	96	12	98	4	99	7	100	1
3	93	42			91	6			96	4		
4	92	33							94	1		

Data from 'Compare Alfalfa Varieties' at www.uwex.edu/ces/forage

Potato leaf hopper damage in the first year can reduce yield for the life of the alfalfa stand. Thus controlling potato leafhoppers on new seedings is crucial. Resistant varieties are especially useful when spraying is not feasible (e.g., when establishing alfalfa under a cover crop).

Resistance to this insect does not give total resistance but will allow alfalfa to tolerate low levels of insect without needing to spray, possibly reduce the number of sprayings needed. Research, resulting in the recommendations in Figure 1, has shown that the threshold for spraying highly resistant (HR, >50% resistance) alfalfa varieties can be raised to three times that of susceptible varieties (e.g., the spraying threshold of 1 insect per inch of alfalfa height in 10 sweeps for susceptible varieties can be raised to 3 insects per inch of alfalfa height in 10 sweeps for HR resistant varieties). It should be noted that these spray guidelines are based on

Figure 1. Economic action thresholds for control of potato leafhopper in alfalfa varieties differing in resistance to the pest. *Source: Mark Sulc and Ron Hammond, The Ohio State University, 2004.*



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average costs of insecticide treatment and average hay value. Growers should consider spraying at lower action thresholds this year, when hay costs are high.

PLH resistance level is determined in a test where alfalfa varieties are rated for yellowing and stunting relative to check varieties when potato leafhopper is present (http://www.naaic.org/stdtests/potatolhres.htm).

This test is quick and is helpful but does not tell the whole story. In coordinated tests run at Iowa State and Ohio State over the last few years, yield of HR resistant varieties was compared to susceptible checks when potato leafhopper was present. The data in the table 2 show the percent yield advantage of the alfalfa varieties with HR resistance over the susceptible checks.

These data tell two important things: first, yield advantage was consistent between the seeding year and first production year. This means that the resistance develops early and is available in the seeding year, unlike some had thought.

Table 2. Yield increase of Potato Leaf Hopper Resistant varieties over susceptible check varieties when insect was above recommended spraying threshold.

Variety	Potato leaf hopper resistance yield index †	
Seeded in 2005	2005	2006
54H91	50	36
WL347LH	41	35
FSG 400LH	34	32
Enforcer	33	27
WL345LH	15	18
Bluebird HR	20	15
Seeded in 2006	2006	2007
53H92	50	45
6426PLH	39	37
4P424	38	38
Evergreen 3	29	30
54H91	28	28
GH773LH	17	25

† Percent yield increase above susceptible checks when potato leaf hoppers caused injury to alfalfa

However, the most significant finding is that some HR varieties yielded 40 to 50% more than the susceptible varieties when potato leafhopper was present while some HR varieties showed less yield advantage. This means that, while all alfalfa varieties with HR resistance will yield better than susceptible varieties when potato leafhopper is present, some show much greater yield advantage.

Farmers can best select potato leaf hopper resistant varieties by looking at yield data from unsprayed trials in the UW variety trials available in UW extension publication A1525 from local county extension offices or on the web at http://learningstore.uwex.edu/Forage-Variety-Update-for-Wisconsin2007-Trial-Results-P175C40.aspx or from your local county extension office. Then, if a PLH resistant variety is desired and, especially, if alfalfa is planted with an oat or barley cover crop, use the table above to select a variety that had the greatest yield advantage over susceptible checks.

As you are selecting alfalfa varieties to plant this spring, remember the value of potato leafhopper resistance. Alfalfa varieties with high resistance (HR) to potato leafhopper will cost very little, if any, more than alfalfa varieties susceptible to this insect. Resistance or good scouting and spraying is particularly important for seeding year stands to ensure that future yields are not reduced. This means that potato leaf hopper resistance is critical when planting alfalfa with a cover crop where spraying is not an option, but leafhopper can infest and damage the stand. Also, potato leafhopper resistance may reduce the number of sprayings needed in new or established stands but, more importantly, will give a wider window for spraying without damage due to the higher threshold.