

Benefits of Pyrethroids to Alfalfa

PYRETHROIDS BENEFITS PROJECT

The Pyrethroid Working Group contracted an extensive analysis of the benefits of pyrethroids to agriculture. A multitude of data was analyzed with different methodologies to determine the value of pyrethroids, and the costs to farmers if they were no longer available. These analyses determined: (1) costs to the farmer of key insect pest management practices with and without pyrethroids, (2) yield benefits of pyrethroids, (3) monetary and non-monetary value of pyrethroids based on a farmer survey, and (4) a multi-market analysis to project the aggregate economic benefits of pyrethroids to the U.S. economy. Below are the primary benefits of pyrethroids to alfalfa from these analyses.

BENEFITS TO ALFALFA

1. Costs with and without pyrethroids

- The total market value of alfalfa was \$8.47 billion in 2015 according to USDA-NASS.
- Pyrethroids were central to pest control comprising 56% of the total insecticide treated acres.
- In alfalfa, pyrethroids, one of 5 insecticide modes of action available, are often the primary insecticide used. But rotations to other insecticide classes are important for managing insecticide resistance, and in many cases these alternatives are more expensive.
- The cost advantage of use of pyrethroids was \$2.44 for foliar applications, a cost advantage of 36% over the non-pyrethroid alternatives in alfalfa.
- Without pyrethroids, farmers would incur a 14% increase in overall costs, equating to \$4 million of increased costs to the industry.

2. Yield Benefits

- The most actively managed insect pest for alfalfa farmers is the weevil. The second pest that is key to control for most of the alfalfa production area is potato leafhopper.
- Crop quality and management are key, and by controlling the potato leafhopper in the summer with pyrethroids, yield increases occur on the first cutting the following year in addition to yield increases on the 2nd and 3rd cuttings being treated. Longevity of the alfalfa crop can increase by 1-3 extra years, which can reduce the replanting costs for alfalfa, or spreads the planting costs for this perennial crop over more years.
- Pyrethroids increased yield by 105% compared to untreated controls.
- Pyrethroids reduced crop damage by 80% compared to untreated controls.
- Small plot data showed the reduction in pest abundance for any treatment using a pyrethroid insecticide alone or in a mixture was 75.8% (based on 518 observations) relative to the untreated control; for any treatment using a non-pyrethroid alternative the average reduction was 61.8%.
- The relative advantage of pyrethroids compared to non-pyrethroids for reducing pest abundance was 14%.
- Loss of pyrethroids may lead to yield losses of 2%.



3. Monetary and Non-Monetary Value to Farmers (Case Study)

- The survey results and analysis show that the most actively managed insect pest for alfalfa farmers was weevils.
- About half of alfalfa farmers sprayed an average of 75% of their alfalfa acreage with foliar insecticides. Two out of five used a pyrethroid foliar insecticide on at least some of their alfalfa.
- The estimated value of foliar pyrethroid treatments was \$28 per treated acre.
- Given nearly 18 million acres of alfalfa nationwide in 2015, the estimated rates of insecticide use and value per acre imply a total benefit to farmers of \$180 million; \$65 million of this total was attributable to farmers who used a pyrethroid foliar insecticide on some of their alfalfa acreage.

4. Direct and Indirect impacts

- The value per pyrethroid treated acre was \$17/A for alfalfa hay.
- Pyrethroids were the predominant insecticide used in alfalfa, comprising 56% of all insecticide treated acres, with 4 other classes constituting the remaining share.

With 5 insecticide modes of action available for use on alfalfa, pyrethroids are an inexpensive and effective rotational tool for resistance management.

