

Establishing IPM Recommendations for Aphids in Alfalfa Hay in the Low Desert

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Two aphids are considered major threat to alfalfa during the winter and spring in western US, pea aphid (PA) *Acyrtosiphon pisum* (Harris) and blue alfalfa aphid (BAA) *Acyrtosiphon kondoi* L; synchronizing with the highly demanded hay cuttings for the dairy industry. Many reported less than adequate control of these pests. Broad-spectrum insecticides are frequently used to control aphids, mostly destructive to natural enemy populations. Growers and Pest Control Advisors apply insecticides at least once a season for aphid control, but since the spring of 2013, multiple applications were used with lower efficacy compared to previous years.

The IPM programs for alfalfa in the western region, never developed beyond the chemical reliant stage. Recently, we have been investigating the economic threshold of aphid in the region; an essential component of alfalfa IPM program. We have observed aphids naturally affected by an entomopathogenic fungus since 2015, which identified as *Zoopthora radicans*, in many alfalfa fields in Arizona, California, and other western states. The infection rate reached 80% in some fields in 2016-17 resulting in thousands of acres receiving no insecticide. In addition, many known generalist predators, and parasitoids were recorded. The introduction of more selective insecticides will provide a safety net for these natural enemies if chemical control is ever needed.

The ultimate goals are to improve the decision making process of alfalfa pest management and broaden the base for a biologically reliant IPM practices in western US alfalfa production region.

The Egyptian alfalfa weevil (EAW), *Hypera brunneipennis* (Boheman), is one of the most damaging arthropods in low desert grown alfalfa hay. The EAW start activating in winter when temperature lowered to ~42°F, and continue present in the fields during the first, second, and sometimes third cuttings of the season. The EAW larvae feed heavily on alfalfa leaflets leading to skeletonizing that significantly lowers yield as well as stem to leaflet ratio. The damages are compromising the quality of premium cuts; highly coveted by the dairy and livestock industries. The current economic threshold of 15-20 per sweep of the EAW larvae was established in California in 1975 (Koehler and Rosenthal 1975), but not suitable or adapted by growers in the low desert. Multi-year field trials have been conducted at the University of Arizona Maricopa Agriculture Center (MAC) to investigate this economic threshold in low desert Arizona grown alfalfa. The results showed that the economic threshold is significantly lower than what have been found in 1975. These findings are in accordance with the many observations of agricultural professionals over the last few decades.