

Aphid Breeding in Alfalfa

Background

The past two years have seen increased aphid pressure throughout the western U.S. This is particularly true for localized regions in the Imperial and San Joaquin Valleys of California where early outbreaks of Blue Alfalfa Aphids (*Acyrtosiphon kondoi* Shinji) are being reported. The reason for the earlier than normal outbreak of Blue Alfalfa Aphids maybe, in part, due to warmer and drier winters and a reduction in predator pressure. This is particularly true for entomopathogenic fungi which attack the aphid body, germinate and grow into the body cavity killing the aphid. These fungi require heavy rainfall, high humidity and cool temperatures for sporulation (Goodel, P, 2014).

Breeding Alfalfa for Aphid Resistance

For over twenty years Forage Genetics has run non-insecticide sprayed field nurseries and forage trials throughout the Imperial and San Joaquin Valleys. Notes are taken throughout the growing season on nursery plants for yield, vigor, disease and insect resistance, and persistence. A big advantage of field nurseries for aphid evaluation is the presences of other plant pests such as Fusarium wilt, Phytophthora root rot, stem nematode and root knot nematode which often act in concert with the aphids to reduce stand life. After three years, of heavy selection pressure it is not unusual for only a dozen plants, out of the thousands planted in a nursery, to be used as potential parents for new varieties. These experimental lines are then evaluated in non-insecticide sprayed forage yield trials at Forage Genetic testing locations in Holtville, Shafter, Dos Palos and Davis sites for an additional three to four years before the best performing experimental lines are advanced for commercialization.



The summary below shows the average percent resistance for non-dormant conventional and Roundup Ready experimental lines from 2009-2013 of aphid testing of Forage Genetic varieties:

Type	Pea Aphid	Spotted Alfalfa Aphid	Blue Alfalfa Aphid
% Resistance			
Non-dormant Conventional	54%	62%	75%
Non-dormant Roundup Ready	56%	63%	73%

Going forward, the addition of the Davis research station and development of molecular markers to identify insect resistant plants will be a tremendous boon to our non-dormant research efforts.

Useful Links

Goodel, Peter, B. January 16, 2014. They're Back! Be On the Lookout for Early Aphids in Alfalfa and Share Your Observations! <http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=12614>).