

2017 AFRP Research Project Objectives

Bacterial Stem Blight of Alfalfa: Connection with Frost Damage, Development of Resistant Germplasm, and Mapping Resistance Genes **USDA-ARS - Samac**

Project Award: \$250,000

Objectives:

- Once alfalfa breaks dormancy in the spring, it is vulnerable to frost damage. The risk of frost damage is increased by the presence of certain ice nucleation-active bacteria on plant surfaces that initiate the formation of ice crystals. In the Intermountain West, alfalfa producers and extension professionals have observed significant damage from frosts in both spring and fall, setting back growth and reducing yields. Associated with frost damage is damage from the disease bacterial stem blight (BSB), caused by the ice nucleation-active bacterium *Pseudomonas syringae* pv. *syringae*. The bacterium promotes frost formation, penetrates stems at frost injury sites, and subsequently decays leaves and stems. Currently there are no cultivars with resistance to BSB and little is known about the disease in the field. Most alfalfa producers and researchers are unfamiliar with the disease. Our goal is to understand the epidemiology of this disease and develop tools for reducing losses due to the disease. We propose the following objectives: (1) Obtain information on the extent of bacterial stem blight damage occurring in commercial alfalfa production fields, the association of disease with frost damage, and the relationship of disease with bacterial populations; (2) Identify DNA markers and candidate genes associated with disease resistance loci; and (3) Develop germplasm with enhanced resistance to bacterial stem blight. The research will help ascertain how common the disease is in frost-prone areas and will help educate alfalfa researchers and producers on the importance of this disease, how to recognize it, and ultimately how to avoid it. This research should improve yields in frost-prone areas, which represent a significant percentage of the alfalfa acreage nationwide.