

Spring Black Stem & Stemphylium Leaf Spot Resistance Screening in the USDA-ARS National Plant Germplasm System's *Medicago* Spp. Genetic Resources

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Medicago species, are important perennial and annual forage legumes grown around the world. Of these, alfalfa (*M. sativa*) is fourth most planted agricultural crop in the United States and the most significant forage. Among other things, plant diseases significantly reduce yield and quality impacting production and producers' bottom line. Spring black stem (SBS), caused by *Phoma medicaginis*, is an important fungal leaf spot pathogen for which good disease resistance is lacking in commercial cultivars. Potential sources of disease resistance for crop improvement may be found in the more than 4,000 alfalfa and wild relatives germplasm accessions conserved by the USDA National Plant Germplasm Systems (NPGS). To identify potential sources of resistance in the germplasm collections, greenhouse seedling inoculation protocols were optimized following modifications to the published NAAIC standard test protocol. Nine mid-western U.S. isolates were evaluated for pathogenicity and spore concentrations (high through low) were assessed in order to determine ideal level of disease pressure and response. In addition, a modification to the (1-5) published rating scale incorporating half ratings (e.g., 1.5) was introduced to account for subtle differences observed in phenotypes. Following these modifications, a group of 80 alfalfa cultivars commonly used in published standard tests and a subset of 80 alfalfa-related species were screened for disease reaction in replicated randomized complete block designs. Following optimization, preliminary results suggest that reducing concentration to around 50,000 spores/ml (from recommended 1-4,000,000 spores/ml) is ideal when screening alfalfa germplasm. Also, screening protocols have been implemented correctly as recommended susceptible 'Lahontan' and moderately resistant 'Ramsey' standard check cultivars are performing as expected. Interestingly a few standard checks (e.g., 'Travois' and '5411') were more resistant than the 'Ramsey' resistant cultivar and a several of the related *Medicago* spp. (e.g., *M. cretacea*) showed very little disease susceptibility. Plant introduction (PI) accessions are currently being evaluated for disease reaction and resistant germplasm will be selected for development of advanced populations. The suggested modified and optimized protocol, the summarized data and resistant germplasm will become publicly available. This research is being partially supported by a U.S. Farmer Research Initiative grant.