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

Brian Irish[1], Lyndon Porter[2], Garett Heineck[3], and Deborah Samac[4]

Alfalfa (*Medicago sativa*) is the fourth most widely grown agricultural crop and most significant forage in the U.S. Alfalfa diseases reduce yield and quality impacting production and producers' economic gains. Spring blackstem and leaf spot, caused by *Phoma medicaginis*, is an important fungal leaf spot pathogen for which good resistance is lacking in commercial cultivars. To identify potential sources of resistance in alfalfa germplasm, an optimized greenhouse seedling inoculation protocol was developed. Several isolates were evaluated for pathogenicity and spore concentrations were determined for the ideal level of disease pressure. A modified rating scale incorporating additional half values was developed to account for differences observed in disease phenotypes. Following these modifications, a group of 79 standard check alfalfa cultivars and 189 alfalfa-related *Medicago* spp. accessions were screened for disease reaction in replicated trials with randomized complete block designs. In addition, 15 plants for each of 2,834 alfalfa germplasm accessions were screened for disease reaction in non-replicated evaluations. All germplasm evaluated was sourced from the USDA-ARS National Plant Germplasm System temperate-adapted forage legume germplasm collection. An inoculum concentration of 5 x 10^4 spores/ml resulted in the standard check cultivars 'Lahontan' (susceptible) and 'Ramsey' (moderately resistant) performing as expected indicating this is an ideal concentration. Several cultivars appeared to be more resistant than recommended moderately resistant checks, with some related *Medicago* species showing very little disease. Many of the alfalfa accessions screened, especially those originating from colder environments (e.g., northern latitudes), appeared to be more resistant than reference cultivars. Resistant germplasm selections have been made from these screenings efforts for further recurrent selection and development of advanced populations. The modified Standard Test protocol, summarized data, and resistant germplasm will become publicly available. This research was partially supported by a U.S. Farmer Research Initiative grant program.

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[1]USDA-ARS Plant Germplasm Introduction Testing and Research Unit, Prosser, WA 99350; [2]USDA-ARS Grain Legume Genetics Physiology Research Unit, Prosser, WA 99350; [3]USDA-ARS Northwest Sustainable Agroecosystems Research Unit, Prosser, WA 99350; [4]USDA-ARS Plant Science Research Unit, St. Paul, MN 55108