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# Evaluation of Perennial *Glycine* Species for Resistance to Soybean Fungal Pathogens That Cause Sclerotinia Stem Rot and Sudden Death Syndrome

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## ABSTRACT

**The cultivated soybean [*Glycine max* (L.) Merr.] has a relatively narrow genetic base and most commercial cultivars are susceptible to *Sclerotinia sclerotiorum* (Lib.) de Bary and *Fusarium solani* (Mart.) Sacc. f. sp. *glycines*, which, respectively cause Sclerotinia stem rot (SSR) and sudden death syndrome (SDS). The objective of this study was to screen all the available accessions of the perennial *Glycine* species for resistance to the pathogens that cause SSR and SDS. For SSR evaluations, five seedlings of each of 787 accessions were screened once in a series of eight non-replicated runs. Seedlings were inoculated with an agar plug cut from the edge of a 1-d-old fungal culture by placing the plug next to the stem. Of the 787 accessions, 183 had partial resistance with 144 of these accessions being *G. tabacina* (Labill.) Benth. A selected set of 53 accessions was further screened in two replicated trials with five plants per each of four replications. *Glycine tabacina* had several accessions that were consistently rated as partially resistant. For SDS evaluations, five plants of each of 767 accessions were screened once in a series of eight runs. Plants were inoculated by a layered technique in which infested sorghum seed were placed below the transplanted seedlings. In the initial evaluation of 767 accessions, 134 had partial resistance with 65 of these accessions being *G. tomentella* Hayata. In a replicated set of selected accessions, *G. tomentella* had several accessions that were consistently rated as partially resistant. These perennial *Glycine* species represent potential untapped sources for improving disease resistance in soybean.**

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THE GENUS *Glycine* Willd. is composed of two subgenera, *Glycine* and *Soja* (Moench) F. J. Herm. The cultivated soybean and its wild annual progenitor *Glycine soja* Sieb. and Zucc. belong to the subgenus *Soja*. Both species are diploid ($2n = 40$) and are cross compatible. The subgenus *Glycine* contains 16 wild perennial species. They are indigenous to Australia and grow in diverse geographical areas under a wide range of climatic conditions. These species are diploid ($2n = 40$), with aneuploidy ($2n = 38$ and 78) and tetraploidy ($2n = 80$) occurring in *G. tomentella*, *G. tabacina*, and *G. hirticaulis* Tind. and Craven (Tindale and Craven, 1993; Kollipara et al., 1997; Singh et al., 1998). Genomic symbols have been assigned to each species on the basis of cytogenetic, biochemical, and molecular studies (Kollipara et al., 1997).

Useful traits have been identified from accessions of at least some of the perennial *Glycine* species. Some species carry resistance to soybean pathogens like *Heterodera glycines* Ichinohe (Riggs et al., 1998), *Microsphaera diffuse* Cke. & Pk. (Mignucci and Chamberlain, 1978), *Phakopsora pachyrhizi* H. Sydow & Sydow (Hartman et al., 1992; Schoen et al., 1992), *Phytophthora soja* Kaufmann & Gerdemann (Kenworthy, 1989), *Septoria glycines* Hemmi (Lim and Hymowitz, 1987), and yellow mosaic virus (Horlock et al., 1997).

*Sclerotinia sclerotiorum* on soybean is referred to as

**Abbreviations:** SDS, sudden death syndrome; SSR, Sclerotinia stem rot.