Reactions of *Glycines* Species and Other Legumes to *Septoria glycines*

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ABSTRACT

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Thirteen genera representing 30 legume species, two weed species (*Abutilon theophrasti* and *Cynanchum laeve*), and five cultivars of soybean were inoculated with *Septoria glycines* in the field and/or greenhouse. Of these, 29 legume species and *A. theophrasti* had leaf symptoms. Only *Cicer arietinum* was symptomless under field and greenhouse inoculations. *C. laeve* was found to be infected in its natural state in the field, but symptoms could not be reproduced when it was inoculated in the greenhouse. Leaf symptoms on the legume species and *A. theophrasti* were separated into three types. All *Glycine* spp. except one accession of *G. tabacina* (PI440994) had lesions typical of soybean brown spot. Ten legume species with green cotyledons had small lesions. Six legume species and *A. theophrasti* had atypical symptoms. Incubated leaf samples from inoculated field and greenhouse-grown plants were used to count pycnidia with cirrhi. Species with small lesions and atypical symptoms had fewer pycnidia with cirrhi than those plants with typical brown spot lesions. *Septoria* was isolated from leaf lesions of field-grown noninoculated *A. theophrasti* and *C. laeve* plants. These isolates were similar in culture to an isolate of *S. glycines* from soybean and, like the soybean isolate, caused typical brown spot lesions on soybeans and *A. theophrasti*.

Septoria glycines Hemmi causes brown spot of soybeans (*Glycine max* (L.) Merr.) and has been reported in Canada, China, Colombia, Germany, India, Korea, Japan, Romania, Russia, and the United States (1,9,11,18,20,22–24,26). In the United States, the disease was first reported in North Carolina in 1923 (26) and is now widespread throughout the soybean production area in the United States.

Symptoms of brown spot appear as reddish brown angular lesions surrounded by chlorotic haloes on the upper and lower leaf surfaces (10). Lesions gradually turn dark brown and necrotic. Lesions are usually larger and more numerous on lower than upper leaves of plants. Lower infected leaves along with the petioles often prematurely drop from the plant. Two distinct types of lesions have been described on soybeans (14,27). The most common type is an angular reddish brown lesion surrounded by chlorosis and is associated with plants grown from yellow seeds. The other type is an angular dark brown lesion without the surrounding chlorosis and is associated with plants grown from green seeds (14).

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S. glycines was described as the causal organism of brown spot in 1915 (9). In 1928, a report indicated that *S. glycines* infected leaves of soybean and *Phaseolus angularis* (Willd.) W. Wight, but this report was not supported with inoculation experiments (17). In 1920, *S. glycines* was reported to cause a disease on *Amphicarpa bracteata* (L.) Fernald (7). In 1987, six perennial wild *Glycine* spp. were reported as hosts to *S. glycines* (15). Recently, *Abutilon theophrasti* Medik. (velvetleaf) was shown to be infected with an *S. glycines* isolate from soybeans and from velvetleaf (8). Other than *A. theophrasti*, *A. bracteata*, *Glycine* spp., and *P. angularis*, other hosts apparently are not known for *S. glycines*.

Septoria spp. are known to vary in their host specificity. Some, such as *S. florida* Tehon & E.Y. Daniels, which infects *Cornus florida* L., are limited to a single host species (4). Others, such as *S. glycines*, infect a few species in closely related genera. A few species, such as *S. graminum* Desmaz., attack many hosts (5). Although *S. glycines* has been studied on soybeans for many years, its host range is not known. The objective of this study was to determine the reactions of *Glycine* spp. and other legumes to *S. glycines*.

MATERIALS AND METHODS

Plant and inoculum preparation. In 1993, 46 entries representing 10 wild perennial *Glycine* spp., *G. soja* (L.) Sieb & Zucc. (from T. Hymowitz and R. Nelson, respectively, at the University of Illinois), five *G. max* cultivars, and 43 accessions of 12 genera representing 19 species in the Fabaceae (from the Western Regional PI Station USDA-ARS, Washington State University; and from T. Hymowitz) were evaluated for their reaction to *S. glycines*. Seeds of wild perennial *Glycine* spp., *A. bracteata*, *Medicago sativa* L., and *Trigonella foenum-graecum* L. were scarified with a sharp pin and incubated on moist filter paper in glass dishes for 4 to 6 days prior to transplanting two seedlings of each accession in sterile soil in 5 × 5 cm peat pots. Seedlings were grown at 24°C under 16/8-h light/dark conditions (220 $\mu E \cdot m^{-2} \cdot s^{-1}$) before being transplanted to the field or pots in the greenhouse. Seeds of all other entries were planted directly in hills in the field or in 10-cm-diameter pots in the greenhouse. Plants of *Cynanchum laeve* (Michx.) Pers. (honeyvine) growing naturally at the edge of a field at the Agronomy/Plant Pathology South Farm, University of Illinois, Urbana, were dug out and transplanted in 10-cm pots in the greenhouse.

A stock culture of *S. glycines* isolate S9302, a soybean isolate from the Agronomy/Plant Pathology South Farm, was increased on potato-dextrose agar (PDA) in 9-cm-diameter culture dishes at room temperature (23 ± 2°C) under continuous fluorescent light (22 $\mu E \cdot m^{-2} \cdot s^{-1}$) for 2 to 3 weeks. Sterile tap water (about 10 ml per plate) was added, conidia were dislodged with a small brush, and the suspension was filtered through two layers of cheesecloth. Inoculum was adjusted to 10^6 conidia per ml based on counts using a hemacytometer.

Field trial. Eighty-nine entries representing 31 legume species, either sown directly into soil or transplanted as seedlings, were tested for their reaction under inoculated field conditions (Table 1). For direct sowing, two to three seeds were planted in hills at 15-cm spacing in 1.5-m lengths at the Agronomy/Plant Pathology South Farm on 21 May 1993. For seedling transplants, two to three plants were transplanted from a growth chamber to the field on 28 May. The experiment was arranged in a randomized complete block design with two replications. The field had been planted to soybean for 17 years previously and had been used as a brown spot nursery. Plants were inoculated with a conidial suspension of *S. glycines* 32 days after sowing.

Disease severity and types of symptoms were rated 22 and 38 days after inoculation. Disease severity index (DSI) was based on a visual rating using a 0 to 4 scale (0 = no symptoms, 1 = <3%, 2 = 3 to 15%, 3 = 15 to 35%, 4 = >35% leaf area affected). Mean DSI values and their standard errors were calculated for each entry.

Types of symptoms were grouped into three categories (1 = typical lesions [reddish brown lesions with smooth margins surrounded by chlorosis], 2 = small lesions [same as typical lesions but without chlorosis], 3 = atypical symptoms [larger than typical lesion with rough margins and/or chlorosis without lesions]). Data for types of symptoms were not analyzed because of their descriptive nature.

An infected leaf from each entry and replication was sampled on 30 July, sterilized with 10% (vol/vol) commercial bleach (5.25% NaOCl) for 2 min, rinsed twice with tap water for 5 s, and incubated on sterile moist filter paper in glass dishes at 23 ± 2°C under continuous fluorescent light (22 $\mu E \cdot m^{-2} \cdot s^{-1}$) for 4 days. Infected leaves were examined under a dissecting microscope (×20). Samples were inspected for the occurrence of pycnidia with cirrhi.

Greenhouse trials. In the first experiment, nine entries representing seven *Glycine* spp., including soybean cv. Williams, and 24 accessions representing 20 legume species were inoculated with *S. glycines*. Large-seeded entries were planted in 10-cm pots, and small-seeded entries were started in a growth chamber 14 days before moving them to the greenhouse. Seedlings were thinned to one plant per pot prior to inoculation.

Seedlings were inoculated 14 days after sowing with a 10^6 conidia per ml suspension containing 0.05% Tween 20. Immediately after inoculation, the bench where plants were located was covered with 25 × 35 cm transparent polyethylene for 3 days. The experiment was conducted using a randomized complete block design with two replications. DSI and type of symptom were rated as described for the field trial 12 and 19 days after inoculation. An infected leaf from each entry was sampled 18 days after inoculation from each replication. Leaves were washed and incubated as described previously, and the number of pycnidia with cirrhi were estimated in a 0.5-cm-diameter necrotic area under a dissecting microscope (×20) for each leaf. The number of pycnidia with cirrhi was

Table 1. Reactions of 31 legume species inoculated with *Septoria glycines* in the field

Species	PI[a]/entry	Disease severity[b] Mean	SE	Pycnidia[c]	Symptom type[d]
Amphicarpa bracteata	CU169	2	0	+	1
	CU183	2	0	+	1
	CU200	2	0	+	1
Cicer arietinum	462187	0	0	–	0
	462188	0	0	–	0
Glycine arenaria	505204	2	0	+	1
G. argyrea	505151	2	0	+	1
G. canescens	440928	3	0	+	1
	505153	4	0	+	1
	505154	3.5	0.5	+	1
G. clandestina	440948	3	0	+	1
	440957	3	0	+	1
	440970	3	0	+	1
G. curvata	505166	3	0	+	1
G. cyrtoloba	440962	3	0	+	1
	440963	3	0	+	1
	440964	3	0	+	1
G. latifolia	319696	3.5	0.5	+	1
	378709	3.5	0.5	+	1
	440978	3	0	+	1
G. max	Asgrow A2396	3	0	+	1
	Burlison	3	0	+	1
	Kenwood	3	0	+	1
	Resnik	3	0	+	1
	Pioneer P9341	3	0	+	1
G. microphylla	339659	3	0	+	1
	339664	2.5	0.5	+	1
	440958	2	0	+	1
G. soja	483464	4	0	+	1
	522205	4	0	+	1
G. tabacina	272099	2	0	+	1
	248253	2.5	0.5	+	1
	339661	3	0	+	1
	373990	3	0	+	1
	373984	3	0	+	1
	440994	1	0	+	2
	440996	2	0	+	1
	446972	2	0	+	1
	483204	2.5	0.5	+	1
G. tomentella	339663	2	0	+	1
	339657	2	0	+	1
	373987	2.5	0.5	+	1
	373988	2.5	0.5	+	1
	440998	2	0	+	1
	441002	2	0	+	1
	441004	2.5	0.5	+	1
	441005	2	0	+	1
	446993	2	0	+	1
	483218	2	0	+	1
	505222	2	0	+	1
	505242	2.5	0.5	+	1
Lablab purpureus	288467	1	0	+	2
	922531	1	0	+	2
Lens culinaris	508090	3.5	0.5	+	3
	508091	4	0	+	3
Lupinus albus	381322	4	0	+	3
	457938	4	0	+	3
L. mutabilis	432332	4	0	+	3
	510573	4	0	+	3
Medicago sativa	536532	3	0	+	3
	536537	2.5	0.5	+	3
Onobrychis viciifolia	110400	2	0	+	1
	110404	2	–[e]	+	1
Phaseolus coccineus	549448	1	0	+	2
	549449	2	0	+	2
P. lunatus	549453	1	0	+	2
	549454	1	0	+	2
P. vulgaris	324642	2	0	+	2
	324645	2	0	+	2
Pisum sativum	206832	3.5	0.5	+	3
	206838	4	0	+	3
Trigonella foenum-graecum	138954	3	1	+	3
	141721	4	–[e]	+	3
Vicia faba	469200	3.5	0.5	+	2
V. hirsuta	422499	2.5	0.5	+	2
V. sativa	167267	4	–[e]	+	2
	170474	3.5	0.5	+	2
	244330	3.5	0.5	+	2
	284305	3.5	0.5	+	2
	393886	3.5	0.5	+	2
	393889	4	0	+	1
Vigna angularis	157649	1	0	+	2
	93815	1	0	+	2
V. mungo	179711	1.5	0.5	+	2
	208462	2	0	+	2
V. unguiculata	353264	1	0	+	2
	487492	1	0	+	2
	512286	1	0	+	2
	527263	1	0	+	2

[a] Six-digit numbers are plant introduction (PI) numbers used by the National Germplasm system of the USDA.
[b] 0 = No symptoms, 1 = <3%, 2 = 3 to 15%, 3 = 15 to 35%, and 4 = >35% of leaf area affected based on two replications. SE = standard error.
[c] + = Pycnidia formed cirrhi on two sampled leaves for each entry after 4 days of incubation on moist filter paper.
[d] 0 = No symptoms, 1 = typical lesions, 2 = small lesions, and 3 = atypical symptoms.
[e] Missing data from one replication.

grouped into four levels based on visual estimates (0 = no pycnidia with cirrhi, low = less than 5, medium = between 5 and 20, and high = more than 20 pycnidia with cirrhi).

In the second experiment, *A. theophrasti* (velvetleaf), *C. laeve* (honeyvine), *G. tomentella*, 11 legume accessions that were not *Glycine* spp., and cv. Williams were planted in 10-cm-diameter pots in the greenhouse on 13 April (Table 2). Plants were inoculated 18 days after planting with a conidial suspension or, for control, either with a filtered conidial suspension (conidial suspension passed through 0.5- and 0.25-µm Millipore membranes) or sterile distilled water. The experiment was arranged with four replications in a randomized complete block design. Plant inoculations, DSI, and type of symptoms were rated 15 days after inoculation. One leaf with lesions from each entry was collected and incubated, and pycnidia with cirrhi were grouped into four levels based on visual estimates as previously described.

Weed samples and comparison of *A. theophrasti*, *C. laeve*, and soybean isolates. Three lesioned leaves from the same plant were collected from various locations on the Agronomy/Plant Pathology South Farm in August 1993 to determine if *S. glycines* could be isolated from the following weed species: *A. theophrasti*, *Amaranthus hybridus* L. (smooth pigweed), *Asclepias syriaca* L. (milkweed), *Chenopodium album* L. (common lamb's-quarters), *Convolvulus arvensis* L. (field bindweed), *Conyza canadensis* (L.) Cronq. (horseweed), *C. laeve*, *Polygonum aviculare* L. (prostrate knotweed), *Portulaca oleracea* L. (common purslane), *Sida spinosa* L. (prickly sida), *Taraxacum officinale* Wigg. (dandelion), *Trifolium pratense* L. (red clover), and *Trifolium repens* L. (white clover). One isolate of a *Septoria* sp. was collected from *C. laeve* (S9300-1) and another from *A. theophrasti* (S9300-2). These two isolates and an isolate from soybean cv. Williams (S9302) were cultured on PDA at 23 ± 2°C under continuous fluorescent light (22 $\mu E \cdot m^{-2} \cdot s^{-1}$) for 15 days. Cross inoculations between *A. theophrasti*, *C. laeve*, and soybean (cvs. Burlison and Williams) with isolates S9300-1, S9300-2, and S9302 were done in the greenhouse. The experiment was arranged in a randomized complete block design with four plant species × four inoculation treatments (three isolates and a control), with three replications for each treatment. Each 10-cm-diameter pot contained two plants. Preparation of plant material, inoculum, inoculation method, ratings, and leaf sampling were the same as in the former experiment. The experiment was repeated once.

Table 2. Reactions of 27 legume species, *Abutilon theophrasti*, and *Cynanchum laeve* inoculated with *Septoria glycines* in the greenhouse

		Exp. 1			Exp. 2		
Genus/species	PI/entry	Severity index[a]	Pycnidia[b]	Symptom type[c]	Severity index	Pycnidia	Symptom type
Abutilon theophrasti	Weed	–[d]	–	–	1	M	3
Amphicarpa bracteata	CU169	3	H	1	3	H	1
Cicer arietinum	462187	0	0	0	–	–	–
	462188	0	0	0	0	0	0
Cynanchum laeve	Weed	–	–	–	0	0	0
Glycine arenaria	505204	2	H	1	–	–	–
G. argyrea	505151	3	H	1	–	–	–
G. curvata	505166	3	H	1	–	–	–
G. max	Williams	3	H	1	3	H	1
G. soja	522205	3	H	1	–	–	–
G. tabacina	373984	2	H	1	–	–	–
	440996	2	H	1	–	–	–
	446972	2	H	1	–	–	–
G. tomentella	373987	3	H	1	–	–	–
	483218	–	–	–	2	M	1
Lablab purpureus	288467	1	L	2	–	–	–
	922531	–	–	–	1	M	2
Lens culinaris	508091	2	H	3	1	L	3
Lupinus albus	381322	3	H	3	2	L	3
L. mutabilis	510573	3	H	3	–	–	–
Medicago sativa	536537	1	L	3	1	M	3
Onobrychis viciifolia	110400	1	L	3	2	M	3
Phaseolus coccineus	549448	1	L	2	–	–	–
	549449	1	M	2	–	–	–
P. lunatus	549453	1	L	2	1	L	2
P. vulgaris	324642	1	M	2	–	–	–
	324645	1	M	2	–	–	–
Pisum sativum	206832	2	M	3	1	L	3
Trigonella foenum-graecum	138954	1	L	3	1	L	3
Vicia faba	469200	1	M	2	–	–	–
V. hirsuta	422499	2	L	2	2	L	2
V. sativa	167267	3	L	2	–	–	–
	244330	2	M	2	–	–	–
Vigna angularis	93815	1	L	2	–	–	–
V. mungo	179711	2	L	2	1	L	2
V. sesquipedalis	487492	1	L	2	–	–	–
V. unguiculata	353264	1	L	2	–	–	–

[a] 0 = No symptoms, 1 = <3%, 2 = 3 to 15%, 3 = 15 to 35%, and 4 = >35% of leaf area affected.
[b] Number of pycnidia formed cirrhi on two sampled leaves for each entry after 4 days of incubation on moist filter paper (0 = no pycnidia, L = 1 to 5, M = 6 to 20, and H = >20).
[c] 0 = No symptoms, 1 = typical lesions, 2 = small lesions, and 3 = atypical symptoms.
[d] No data.

RESULTS

Field trial. Twenty-two days after inoculation, brown spot symptoms developed on soybean leaves. By 38 days after inoculation, 30 of the 31 species had symptoms caused by *S. glycines*. Brown spot severity varied from DSI 1 to 4 (Table 1). Only one species, *Cicer arietinum* L., was symptomless. Eight species (*Glycine canescens* F. J. Herm., *G. soja*, *Lens culinaris* Medik., *Lupinus albus* L., *L. mutabilis* Sweet (Tarwi), *Pisum sativum* L. and *Vicia sativa* L.) had a higher DSI than soybean. Five species, (*Lablab purpureus* (L.) Sweet, *Phaseolus coccineus* L., *P. lunatus* L., *Vigna angularis* (Willd.) Ohwi & H. Ohashi, and *V. unguiculata* (L.) Walp.) had low disease severity (DSI = 1). Among wild perennial *Glycine* species, only plants of *G. tabacina* (Labill.) Benth varied in disease severity from DSI 1 to 3. The rest had ratings similar to or lower than that of soybean (DSI = 3). Pycnidia with cirrhi were detected in all leaf samples except those from *C. arietinum*.

Three types of symptoms were observed among entries. *Onobrychis viciifolia* Scop. and all *Glycine* species except *G. tabacina* had typical brown spot lesions. Ten species (*L. purpureus*, *P. coccineus*, *P. lunatus*, *Phaseolus vulgaris* L., *Vicia faba* L., *V. hirsuta* (L) S.F. Gray, *V. sativa*, *Vigna angularis*, *V. mungo* (L.) Hepper, and *V. unguiculata*) had small lesions. Six species had atypical symptoms. *L. albus* and *L. mutabilis* had large necrotic areas without chlorosis. *L. culinaris* and *M. sativa* had small lesions with irregular margins. *Pisum sativum* and *T. foenum-graecum* had chlorotic leaves with very small dark green spots with embedded pycnidia.

Greenhouse trials. Of 33 entries tested in experiment 1, only *C. arietinum* was

symptomless and had no pycnidia on sampled leaves (Table 2). Sixteen entries had a 1 or 2 DSI rating 19 days after inoculation (Table 2). On sampled leaves of all *Glycine* spp., more than 20 pycnidia with cirrhi formed within the 0.5-cm-diameter marking. Twelve other legume entries had fewer than five pycnidia with cirrhi. Species of *Lablab*, *Phaseolus*, *Vicia,* and *Vigna* had small lesions. Seven species (*L. culinaris*, *L. albus*, *L. mutabilis*, *M. sativa*, *O. viciifolia*, *P. sativum*, *T. foenum-graecum*) had atypical symptoms.

Of 16 entries tested in experiment 2, *C. arietinum* and *C. laeve* were symptomless (Table 2). The remaining 14 entries were susceptible. All entries except *A. bracteata* and soybean cv. Williams had a DSI of 1 or 2 and were rated low to medium for frequency of pycnidia with cirrhi. *A. bracteata* and soybean cv. Williams had a DSI of 3 and were rated high for frequency of pycnidia with cirrhi. Plants with atypical symptoms generally had fewer pycnidia with cirrhi and lower DSI than plants with atypical lesions. *L. purpureus*, *P. lunatus*, *V. hirsuta*, and *V. mungo* had small lesions. *A. theophrasti*, *L. culinaris*, *L. albus*, *M. sativa*, *O. viciifolia*, *P. sativum*, and *T. foenum-graecum* had atypical symptoms.

Weed samples and comparison of *A. theophrasti*, *C. laeve,* and soybean isolates. From leaf lesions of the 13 weed species sampled from various locations on the Agronomy/Plant Pathology Farm, only *A. theophrasti* and *C. laeve* had pycnidia of *Septoria* spp.

Pycnidia with cirrhi formed on soybean and *A. theophrasti* leaf samples after inoculation with isolates S9300-1, S9300-2, and S9302 in the greenhouse. Symptoms and pycnidia on leaves of *C. laeve* were not observed. Colonies of all three isolates were black on PDA. Isolate S9300-1 developed dense mycelia, while isolates S9300-2 and S9302 developed less dense mycelia. Pycnidia were globose or subglobose, and black. Conidia were smooth, hyaline, and most were slightly bent. Conidia of isolate S9300-1 had one to four septations. Conidia of isolates S9300-2 and S9302 had one to five septations.

DISCUSSION

Except for *C. arietinum*, 31 legume species tested, including soybeans and *A. theophrasti,* were susceptible to *S. glycines*. This expands the known host range of this fungus, which previously included only *A. bracteata* (7), *Glycine* spp. (15), and *P. angularis* (17). *Septoria* spp. have been characterized as host-specific pathogens (2). Only three of 25 *Septoria* spp. recorded on legumes in the United States occur on more than two genera (5). *A. theophrasti*, a member of the Malvaceae, and soybeans both originated in Asia and are often associated in soybean fields (16). Besides *A. theophrasti* being a host for *S. glycines* (8), it also has been reported as a host for other soybean pathogens, including *Phomopsis sojae* S.G. Lehman, *Colletotrichum truncatum* (Schwein.) Andrus & W.D. Moore, and *C. gloeosporioides* (Penz.) Penz. & Sacc. in Penz. (16). *S. glycines* was first reported in Asia (9) and probably originated in Asia, evolving with soybean or its progenitor, *G. soja*. We have not seen a report of *S. glycines* being isolated from *A. theophrasti* in Asia. It is not known if the fungus adapted to *A. theophrasti* after it became established as a weed in U.S. soybean fields or if *A. theophrasti* is a host for *S. glycines* in its natural habitat. The other weed, *C. laeve*, was not infected under greenhouse conditions even though an isolate from that host was obtained from the field. The plants of *C. laeve* inoculated in the greenhouse were not started from seed, but were dug from the field and transplanted to the greenhouse. These plants were not in very good condition, and this may have affected the results. More studies are needed to determine if it, like *A. theophrasti*, is really a nonlegume host for *S. glycines*.

Of the legume species tested, only *C. arietinum* was not infected by *S. glycines*. *Cicer* was first placed in the tribe Vicieae (19), but based on several features it was demonstrated to be an anomaly (13). For example, *Uromyces* species observed on members of Vicieae did not occur on *Cicer* (3), and phytoalexin production of *Cicer* differed from that of other species in the Vicieae (12). Since *C. arietinum* was the only legume that was not a host, more accessions of this species and other *Cicer* spp. need to be inoculated with *S. glycines* to confirm that species in this genus are hosts.

Lim (14) described two distinct types of lesion on soybeans infected with *S. glycines*. Atypical symptoms, unlike either of these and first described in our study, occurred on six legume species and velvetleaf. Atypical symptoms for some of the species may be a nonhost or resistant reaction. Symptoms on some of these species developed only on the lower senescent leaves, and the number of pycnidia with cirrhi generally was lower than that found on plants having typical and small lesions.

An expanded host range of *S. glycines* raises questions concerning the taxonomic and pathological relationship of this fungus to other *Septoria* species that infect legumes. *Septoria* has more than 2,000 described taxa (25). Many of the species are named after their primary host. A *Septoria* from a previously unrecorded host often was described as a new species based on conidium shape, size, and septation; pycnidium shape, size, and color; ostiole size and character; and color of disease spots, position of symptoms, and host range (2). Recently, five new *Septoria* spp. on *Cornus* L. were identified using morphological characteristics (4). A comprehensive study of the descriptions of 1,181 *Septoria* spp. based on Saccardo's *Sylloge Fungorum* indicated that conidium length was important for species identification (6). Three *Septoria* species, *S. glycines*, *S. sojae* Syd. & Butler, and *S. sojina* Thum., occur on soybeans (21). They are distinguished by conidial size of 10 to 18 µm × 4.5 to 5 µm for *S. sojina,* 40 to 50 µm × 0.5 to 1 µm for *S. sojae*, (9,21), and 16.5 to 52.5 µm × 1.3 to 2.1 µm for *S. glycines* (9,10). Twenty-five *Septoria* spp. have been recorded on legumes in the United States (5). The specific descriptions in many cases are meager and lack morphological details. *Septoria* spp. occurring on soybean and other legumes need to be studied further to understand the taxonomic and pathogenic relationships of species that infect legumes.

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