

Purple Spot: A New Disease of Young Asparagus Spears Caused by *Stemphylium vesicarium*

M. L. LACY, Professor, Department of Botany and Plant Pathology, Michigan State University, East Lansing 48824

ABSTRACT

Lacy, M. L. 1982. Purple spot: A new disease of young asparagus spears caused by *Stemphylium vesicarium*. Plant Disease 66:1198-1200.

Stemphylium vesicarium was isolated from about 80% of small (1-2 mm) elliptical purplish spots on freshly harvested asparagus (*Asparagus officinalis*) spears. *Alternaria* sp. was isolated from about 20% of these spots. The lesions were not associated with any major breakdown of tissue, but large numbers of lesions made the spears unsightly and unacceptable for fresh market or processing sales. In inoculation experiments, *S. vesicarium* was pathogenic only on wounded tissue. *Alternaria* sp. was not pathogenic on either wounded or unwounded tissue. In the field, asparagus was probably predisposed to *S. vesicarium* by sand-blasting or similar injuries.

Numerous purplish spots on young asparagus (*Asparagus officinalis* L.) spears ready for harvest were seen

Journal Article No. 10292 of the Michigan Agricultural Experiment Station.

Accepted for publication 1 August 1982.

The publication costs of this article were defrayed in part by page charge payment. This article must therefore be hereby marked "advertisement" in accordance with 18 U.S.C. § 1734 solely to indicate this fact.

0191-2917/82/12119803/\$03.00/0

©1982 American Phytopathological Society

1198 Plant Disease/Vol. 66 No. 12

sporadically during several years, both in the field and on samples sent to the Michigan State University Diagnostic Clinic. These lesions are small (1-2 mm diam.), elliptical, slightly sunken, and usually occur in large numbers on only one side of the spear. Since asparagus is grown on very sandy soils in Michigan, the position of the lesions suggested a possible relationship with wounding caused by windblown sand during the harvest period.

The experiments described were

carried out to determine if a pathogen was involved in lesion formation and if small wounds were predisposing factors in lesion formation.

MATERIALS AND METHODS

Small purplish lesions were excised with a sterile scalpel from freshly harvested surface-sterilized (0.5% sodium hypochlorite for 15 min) asparagus spears and plated on either water agar (WA) or potato-dextrose agar (PDA) plates. Colonies that were consistently isolated from the lesions were transferred to fresh PDA plates and incubated in a 22 C incubator with a 14-hr photoperiod under fluorescent lights. For inoculum, single conidial cultures of *Stemphylium vesicarium* (Wallr.) Simmons and *Alternaria* sp. were grown on PDA plates. When sporulation had occurred, conidia were collected from a culture of each fungus by placing 8 ml of sterile distilled water on a 9-cm plate, dislodging the conidia by gently rubbing a sterile L-shaped glass rod over the surface of the

plate, and decanting the resulting conidial suspensions. One milliliter of suspension, adjusted to 10^5 conidia per milliliter, was sprayed onto each of six freshly harvested asparagus spears that had either been wounded by pricking repeatedly with a dissecting needle or left unwounded. Wounded and unwounded spears were placed on moist paper towels in different trays. Controls were sprayed with water only. The trays were covered with a clear plastic film and were placed in a 22 C incubator in continuous darkness for 48 hr to establish pathogenicity. Spears were then examined for lesion development and photographed. Thin sections of fresh asparagus spears containing typical lesions caused by *S. vesicarium* were cut with a Hooker microtome (Lab-Line Instruments Inc., Melrose, IL 60160), examined microscopically and photographed. The experiment was repeated once with similar results.

RESULTS

Stemphylium vesicarium (4) was isolated from an average of about 80% of small purplish lesions on asparagus spears, while *Alternaria* sp. (probably *A. alternata* (Fr.) Keissl.) was isolated from only about 20% of the lesions. The lesions produced in vitro were identical to those observed in the field. Lesions developed only on spears that had been wounded and then inoculated with *S. vesicarium* conidia (Fig. 1A). Unwounded spears inoculated with *S. vesicarium* conidia exhibited no symptoms (Fig. 1B). *Alternaria* sp. conidial suspensions sprayed on either unwounded (Fig. 1C) or wounded spears (Fig. 1D) caused no symptoms. Wounded (Fig. 1E) and unwounded (Fig. 1F) controls sprayed with water only and incubated in the same fashion were symptomless.

Fresh unstained sections cut through lesions incited by *S. vesicarium* revealed that the lesions were sunken in the middle and cells beneath the sunken area were discolored when examined in cross section (Fig. 2).

DISCUSSION

Because asparagus is usually grown on very sandy soils in Michigan, the probability of wounding from blowing soil during windy periods is quite high. The introduction of the no-till cultural system (3) into asparagus farming has caused the previous year's fern growth to be chopped and left on the soil surface, where it is colonized by microorganisms and possibly serves as a source of *S. vesicarium* conidia, although this remains to be established.

Germinating conidia of *S. vesicarium* are able to penetrate young asparagus spears only after a wound has provided a portal of entry, according to these results. Because of the large number of lesions that sometimes appear on asparagus

spears and because most of them appear on only one side of the spear, wounding is probably caused by wind-driven sand and soil particles. If such wounding occurs, followed by dew or rain at night, and if there is a source of *S. vesicarium* conidia, the purple spot disease may occur during harvest. Further research is needed to

determine source of inoculum and optimum conditions for disease development.

This is the first report of *S. vesicarium* as a wound pathogen on asparagus spears; however, *S. botryosum* Wallr. has been isolated from asparagus seed (2), and *Pleospora herbarum* (Pers. ex Fr.)

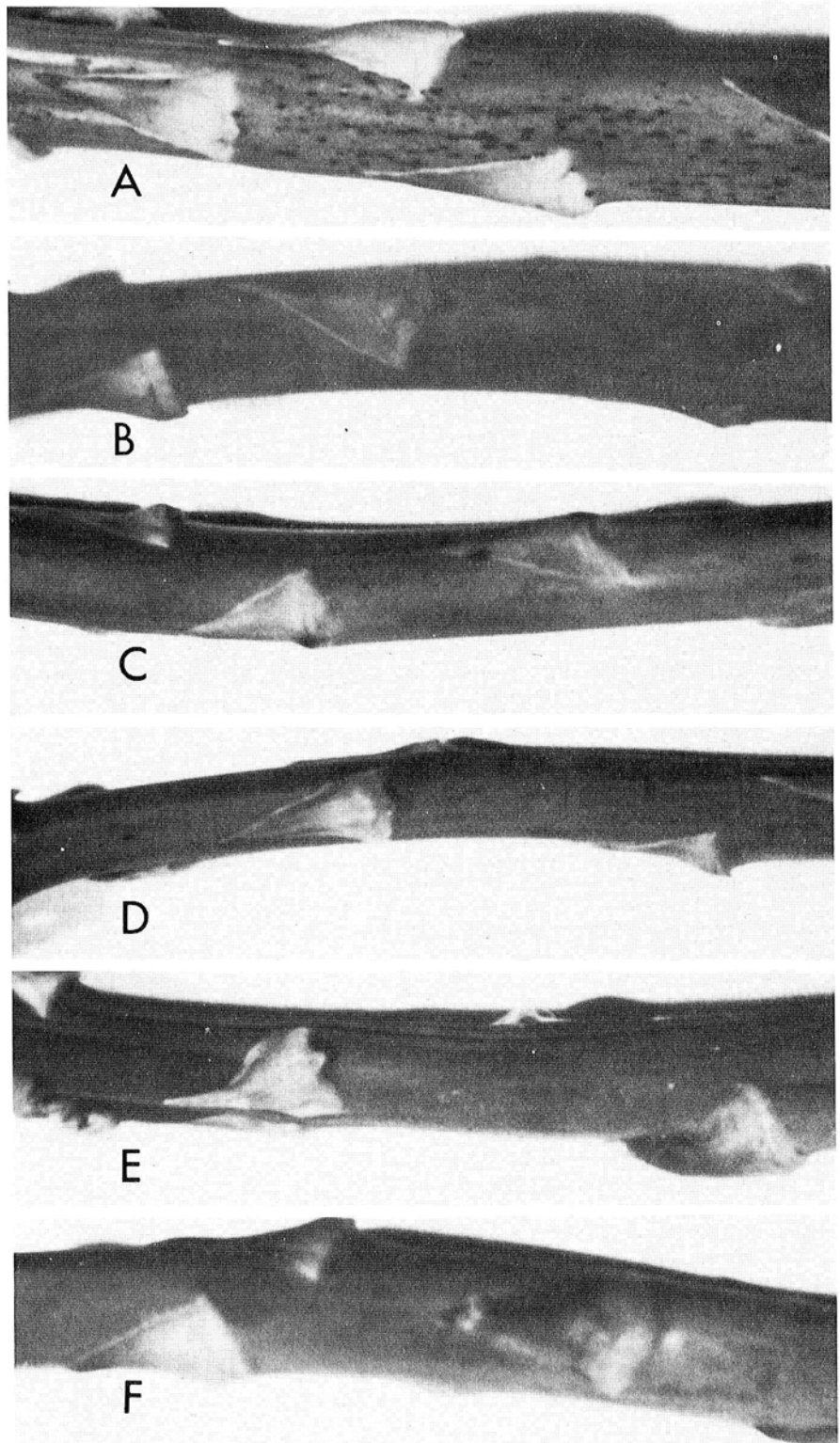


Fig. 1. Asparagus spears used in inoculation studies: (A) Wounded spear inoculated with conidia of *Stemphylium vesicarium* and (B) unwounded spear, (C) wounded spear inoculated with conidia of *Alternaria* sp. and (D) unwounded, (E) wounded and (F) unwounded control sprayed with water only. Spears were wounded by pricking repeatedly with a dissecting needle, then were incubated in a moist environment in the dark at 22 C for 48 hr.

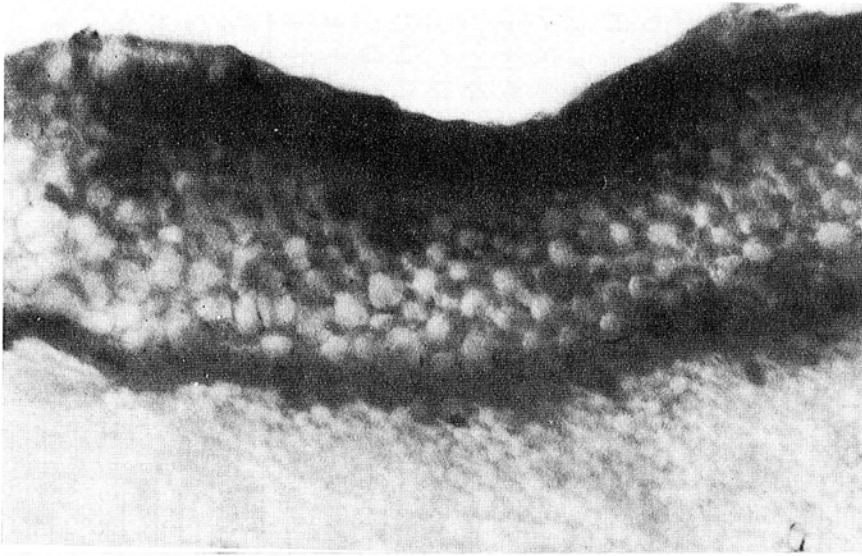


Fig. 2. Cross section of a sunken lesion incited by *Stemphylium vesicarium* cut from fresh tissue of an asparagus spear ($\times 400$).

Rabenh. (the teleomorph of *S. botryosum*) was reported to be associated with the asparagus rust fungus (*Puccinia asparagi* DC) on the cladophyles (1). The teleomorph of *S. vesicarium* has not been identified unequivocally, but Simmons (4) suggested that it might be *Pleospora allii* (Rabenh.) Ces. & de Not.

ACKNOWLEDGMENT

I thank Dr. Barbara Dyko for identification of *Stemphylium vesicarium*.

LITERATURE CITED

1. DaCosta, M. E. A. P., and DaCamara, E. de S. 1953. Species aliquae Mycologicae Lusitaniae II. Port. Acta Biol. 4:162-176.
2. Graves, J. W., and Skolko, A. J. 1944. Notes on seed-borne fungi. I. *Stemphylium*. Can. J. Res. (C)22:190-199.
3. Putnam, A. R., and Lacy, M. L. 1977. Asparagus management with no-tillage. Mich. Agric. Exp. Stn. Res. Rep. No. 339. 9 pp.
4. Simmons, E. G. 1969. Perfect states of *Stemphylium*. Mycologia 61:1-26.