

# Cassia obtusifolia, a Possible Reservoir for Inoculum of Colletotrichum fragariae

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## ABSTRACT

*Colletotrichum fragariae*, which causes strawberry anthracnose, has been found attacking *Cassia obtusifolia* in Florida. Isolates from this weed produced typical anthracnose symptoms on potted strawberry plants, and isolates from strawberry infected potted *Cassia* seedlings.

*Cassia obtusifolia* is widely distributed in central Florida and may be a principal source of primary inoculum of *C. fragariae*.

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*Additional key words:* *Fragaria* × *ananassa*, sicklepod, coffeeweed.

Sporadic outbreaks of strawberry anthracnose, caused by *Colletotrichum fragariae* Brooks, have occurred in Florida nurseries for many years. *Colletotrichum fragariae* attacks stolons, petioles, and crowns of strawberry plants in Florida and Louisiana nurseries (1, 2, 3, 6). Since 1968 anthracnose has severely limited plant production in Florida of the favored but highly susceptible cultivars 'Tioga' and 'Fresno'. The primary inoculum apparently is not carried by the plants that are set in Florida nurseries because these plants are usually obtained from North Carolina or California. Anthracnose is not known to occur in either of these states. The soil also can be ruled out as the source of primary inoculum (4). Primary inoculum could arise from either infected crowns (4, 5) or fruit (8) when nurseries are planted near fruiting fields. However, in central Florida anthracnose is also severe in nurseries planted on freshly cleared ground well isolated from any known source of inoculum. There are no published reports of *C. fragariae* attacking any genus other than *Fragaria*. Moreover, Brooks (A. N. Brooks, unpublished data) was unable to obtain infection of several cover crop plants commonly used in central Florida.

Examination of chance seedlings of *Cassia obtusifolia* L. (sicklepod, coffeeweed) in strawberry seedling flats and in and around a nursery showed that they were infected by *C. fragariae* (7). Infection of *Cassia* was first noticed because of blackening of the lower 2- to 5-cm of the stems of 8- to 15-cm seedlings. Examination of these under a dissecting microscope revealed abundant acervuli with black setae and masses of spores. Acervuli with spores could be found on the largest seedlings examined (up to ca. 45 cm in height). *Colletotrichum fragariae* could be isolated, however, only from seedlings up to ca. 20 cm high because various faster growing fungi overgrew the plates from larger seedlings. No attempt was made to isolate *C. fragariae* from the larger seedlings by the use of differential media, but the presence of spore masses on the acervuli indicates that these plants could still be a source of inoculum. These observations suggested that this weed which is

widely distributed in central Florida may be a principal source of primary inoculum of *C. fragariae*.

The only symptom of infection of *Cassia* by *C. fragariae* is a diffuse blackening of the lower portions of the stem. This same symptom is apparently caused by infection by various other fungi because the stems of most *Cassia* seedlings in the field turn black. Therefore, the stems must be examined for the presence of acervuli with setae to determine if *C. fragariae* is present.

*Pathogenicity of Cassia isolates on strawberry.*—Pure cultures of *C. fragariae* were obtained from volunteer *Cassia* seedlings growing in strawberry seedling flats and in a strawberry nursery. One isolate from each source was chosen for pathogenicity tests. These were subcultured on potato-dextrose agar in petri dishes. When they were sporulating abundantly, the cultures were flooded with sterilized distilled water and the resulting spore suspensions were poured into sterilized atomizers. There were 900 and 800 spores/ml, respectively, in the inoculum of the isolates obtained from a *Cassia* seedling grown in a strawberry seedling flat and the isolate obtained from field-grown *Cassia*. The spore suspension from each isolate was atomized onto the foliage and stolons of three potted Tioga plants. Control plants received sterilized distilled water only. All plants were immediately covered with polyethylene bags for 4 days. The stolons and petioles were examined for anthracnose lesions 6 days after inoculation. The plants were then observed for 4 more weeks.

Anthracnose lesions developed on all strawberry stolons inoculated with either isolate. Severe petiole lesions developed on two of the plants inoculated with the isolate obtained from a *Cassia* seedling grown in a strawberry flat. These plants wilted and died within 4 weeks. Tests for pathogenicity of the *C. fragariae* isolate from field-grown *Cassia* were performed in late October, and ensuing low temperatures in the greenhouse apparently prevented development of petiole lesions or wilt of these plants.

*Pathogenicity of strawberry and Cassia isolates on Cassia.*—Seeds harvested from *Cassia* plants in the field were cracked and germinated in distilled water. Six germinated seeds were planted in each of several 10-cm pots. The pots were divided into two groups. The plants in one group were inoculated 3 days after planting when the youngest seedlings were just emerging. Plants in the second group were inoculated when the seedlings were 10-15 cm high 23 days after planting. Inoculum was prepared as described in the preceding section from isolates obtained from the following sources: (i) strawberry stolon lesion (2,230 spores/ml), (ii) strawberry fruit rot lesion (1,100 spores/ml), (iii) single spore isolate from *Cassia* (1,420 spores/ml). The suspension from each isolate was atomized onto the stems of the *Cassia* plants in three pots in each group. Control plants in three pots in each group received sterilized distilled water only. All pots were covered with clear polyethylene bags for 5 days. Seedlings in the first group were pulled 10 weeks after inoculation and inspected under the dissecting microscope. Those in the second group were pulled and inspected 23 weeks after inoculation.

Acervuli of *C. fragariae* developed abundantly on all *Cassia* seedlings in both groups inoculated with the runner or fruit rot isolates. Acervuli developed on only 27% of the *Cassia* seedlings in each group inoculated with the single spore isolate from field-grown *Cassia*. No acervuli developed on any of the control plants in group one. Acervuli did develop, apparently from natural inoculation, on two of the control plants in the second group (inoculated 23 days after planting). *Colletotrichum fragariae* was readily reisolated from *Cassia* seedlings in either group on which acervuli were visible. There was little or no injury to infected plants which were approximately the same size as control plants when they were pulled.

**DISCUSSION.**—*Cassia obtusifolia* is a common weed in central Florida and emerges any time of year in citrus groves, pastures, and cultivated fields. This study proves that it is infected by *C. fragariae* both in the field and under controlled conditions. Although *C. fragariae* acervuli were not found on ca. 300 *Cassia* plants obtained from areas isolated from strawberry

fields, it is possible that a small percentage of these are infected and could provide the primary inoculum in nurseries. During this investigation *C. fragariae* survived for 4.5 months, the length of the experimental period, on potted *Cassia*. It can probably survive at least that long on plants in the field. *Cassia* stems are also hard and woody and rot slowly when they are disked into the soil. Therefore, *C. fragariae* probably survives a week or more on these stems. One week is usually ample time for new *Cassia* seedlings to emerge from freshly disked soil. Some of these newly emerging seedlings probably become infected by being in contact with infected stem pieces or by spores splashed from the stem pieces and, in turn, provide inoculum to infect strawberry plants that are set later. If only a very small percentage of *Cassia* plants around a nursery were infected by *C. fragariae*, they would provide adequate inoculum to cause a complete loss of plants because anthracnose usually spreads very rapidly through plantings of the highly susceptible cultivars Tioga and Fresno.

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