Differences in Susceptibility of *Stylosanthes hamata* to *Colletotrichum gloeosporioides*

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ABSTRACT

SONODA, R. M., and J. B. BROLMANN. 1980. Differences in susceptibility of *Stylosanthes hamata* to *Colletotrichum gloeosporioides*. Plant Disease 64:553-554.

Anthracnose incited by *Colletotrichum gloeosporioides* was more severe on accessions of *Stylosanthes hamata* indigenous to the southeast coast of Florida with 2N=40 chromosomes than on those with 2N=20 chromosomes. The 2N=40 *S. hamata* were found in four localized areas and the 2N=20 ecotypes were widely distributed along the southeast coast of Florida. The 2N=40 accessions had a smaller beak on their seedpods and grew more vigorously in forage evaluation tests. Further tests are needed to determine whether the two types are conspecific.

Stylosanthes hamata L. is indigenous to the southeast coast of Florida and to various areas in the Caribbean, Central America, and South America (7). It is one of several *Stylosanthes* spp. being tested as a forage plant in south Florida (2). One of the limiting factors in the use of *Stylosanthes* spp. is susceptibility to anthracnose incited by *Colletotrichum gloeosporioides* (Penz.) Sacc. (5). The *C. gloeosporioides* attacking *Stylosanthes* spp. in commercial and experimental plantings in Florida was probably introduced on contaminated seed (4). The pathogen was not found in surveys of native stands of *S. hamata* (10) along the southeast coast of Florida.

Most of the *S. hamata* accessions collected from southeast Florida in the summer of 1979 were highly tolerant to *C. gloeosporioides* when inoculated (10). Three accessions were moderately susceptible (10). The most susceptible line was similar in pod morphology, ie, short beak, to an accession collected in 1971 that had excellent agronomic characteristics (2) but whose forage yield was reduced by *C. gloeosporioides* (6). The accession collected in 1971 had 2N=40 chromosomes, whereas most *S. hamata* accessions have 2N=20 chromosomes (3). A study was conducted to determine if differences in susceptibility of *S. hamata* indigenous to southeast Florida coincided with differences in chromosome number and pod morphology.

MATERIALS AND METHODS

Descriptions of *S. hamata* collected from native stands of the species from Fort Pierce, FL, south to Key West during the past 10 yr (approximately 200 collection sites) were searched for accessions having pods with short beaks. Sites with accessions having short beaks were located and cuttings of plant material made. Cuttings were also made from plants in the same area with long-beaked pods. The cuttings were rooted in virgin Oldsmar fine sand in plastic trays in the greenhouse. Eight rooted cuttings of each clone were transferred to Styrofoam cups, two per cup, containing virgin Oldsmar fine sand.

Isolates of *C. gloeosporioides* were collected from lesions on leaves of *S. hamata* growing at the Agricultural Research Center in Fort Pierce. The fungus was grown on oatmeal agar and prepared for inoculation as previously described (10). A spore concentration of 9×10^5 spores per milliliter was sprayed to runoff with an atomizer onto plants in Styrofoam cups placed in plastic bags. The bags were sealed and incubated at room temperature (25–29 C) for 42 hr. The cups were taken out of the plastic bags and placed in the greenhouse, and disease severity readings were made 8 days after inoculation (10). The disease severity rating system was 1 = no disease to 6 = plants dead (10). Chromosomal numbers of the various accessions were determined on root tips by the technique reported by Price (8).

RESULTS AND DISCUSSION

Four collection sites scattered along the southeast coast of Florida had accessions of *S. hamata* with short-beaked pods: Hobe Sound, Tequesta, Riviera Beach-West Palm Beach, and Miami (Fig. 1). Disease severity ratings for clones of plants with short-beaked pods ranged from 3 to 4.2. Plants with short-beaked pods all had 2N=40 chromosomes. Disease severity ratings for 36 clones of plants with 2N=20 chromosomes ranged from 1 to 2.4. All these plants had pods with long beaks.

The 2N=40 plants may be tetraploids of the 2N=20 plants or a separate species. Although the 2N=20 and 2N=40 plants were similar in gross morphology, the 2N=40 plants were a darker green and grew faster than the 2N=20 plants. If the 2N=40 lines are tetraploids of the relatively resistant 2N=20 lines, they would be expected to have twice the number of resistance genes and thus be as resistant.

A 2N=40 *S. hamata* from Venezuela, released for forage use in Australia, was only lightly affected by a Florida isolate of *C. gloeosporioides* (9). This cultivar has long-beaked pods and is different in gross morphology from both the 2N=20 and the 2N=40 lines in southeast Florida. The *S. scabra* reported from Bolivia, Brazil, Colombia, Ecuador, and Venezuela (7) has 2N=40 chromosomes (1) and short-beaked pods similar to the 2N=40 accessions from Florida. Some *S. scabra* lines imported to Florida have been highly susceptible to Florida isolates of *C. gloeosporioides*, while others have been resistant (5). These introduced *S.*

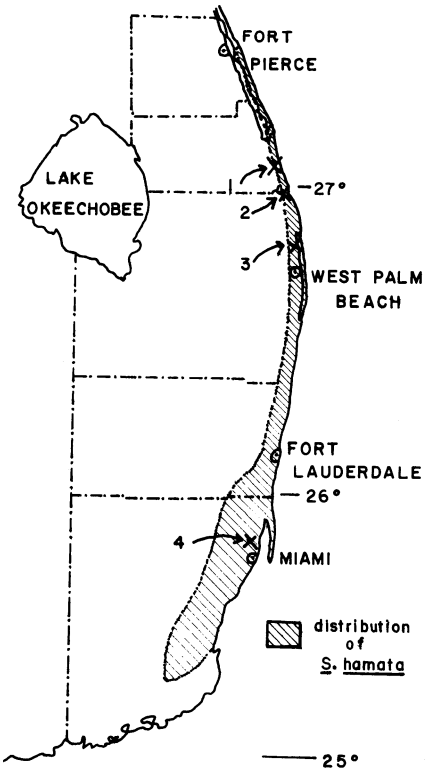

Fig. 1. Distribution of *Stylosanthes hamata* along the southeast coast of mainland Florida. The 2N = 40 accessions were found near Hobe Sound **(1)**, near Tequesta **(2)**, in Riviera Beach-West Palm Beach **(3)**, and in Miami **(4)**.

Florida Agricultural Experiment Stations Journal Series No. 2115.

0191-2917/80/06055302/$03.00/0

scabra lines were greatly different in gross morphology from the 2N=40 *S. hamata* endemic in south Florida. Further work is needed to determine if the 2N=20 and 2N=40 lines endemic in south Florida are closely related or are separate species.

Most of the *S. hamata* stands are located in heavily populated and trafficked areas from Miami to Fort Pierce. The scattered distribution of the 2N=40 lines may be the result of a single occurrence of tetraploidy or a single chance introduction. Other possible explanations for the widely scattered but limited numbers of the 2N=40 lines include independent development of tetraploids and recession of a once more widely distributed species.

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