



—Scientific Note—

Screening for Resistance to *Stemphylium* In Florida-adapted Baby Leaf Spinach

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Spinach can be grown either for processing or the fresh market, however, consumers of fresh market demand a convenient, healthy and visually appealing product. Planting density for baby leaf spinach it ranges from 3.7–7.4 million seeds/acre. Due to this higher planting density, baby spinach is more susceptible to biotic stresses such as diseases. In the Everglades Agricultural Area (EAA) of south Florida, spinach is planted for baby leaf production. Given Florida's warm temperatures and high humidity, *Stemphylium* leaf spot (SLS), incited by *Stemphylium* species, is an serious disease which causes spots on the leaves; only a 3% incidence of leaf spots is tolerated by retailers. Although fungicides are utilized to manage the disease, there are relatively few products labeled for Florida (Raid and Kucharek, 2006) and the pathogen has already developed insensitivity to popular fungicides. With host-plant resistance a long-term goal for Florida growers, we performed studies to screen spinach accessions for their resistance to SLS and assessed different fungicides.

For the first objective, two field experiments were conducted with 28 and 31 commercial hybrids and experimental accessions during the 2019–20 growing season using a randomized complete design (RCBD). Baby leaf spinach was planted in the field and grown using standard production practices in 9.4-m sections on 1.8-m wide raised beds. Baby spinach was inoculated when plants had four to six true leaves using a mixture of three pathogenic isolates. An additional trial was conducted to screen 26 experimental hybrids in the greenhouse using seedling trays to mimic baby leaf production. 'Kolibri' seeds known to be infested with *Stemphylium* spp. were planted in every other row to ensure exposure to the pathogen. Disease severity was assessed 16 d following inoculation, and was rated as follows: 0 (no foliar symptoms) to 5 (more than of 75% of the total foliage infected with brown spots).

For accomplish the second objective, two additional field trials were chemically treated with 15 fungicides, using the susceptible 'Stanton'. Treatments were arranged in a RCBD with three replicates.

Baby leaf spinach had different levels of disease pressure in the three germplasm trials. Significant differences ($P < 0.0001$) were found among accessions in both fields experiments and in the greenhouse test ($P = 0.0079$). No genetic material tested was completely immune, but the commercial hybrid 'Caladonia', and experimental accessions SVVC5663, SV2141VS, and SVVC5761 showed the least amount of disease in all three experiments. Many of the experimental accessions had previously shown resistance to *S. boytriosum*, but these experiments were inoculated with *S. versicarium*. This may explain why some of these accessions were not as resistant as expected. Little is known about the race structure of *Stemphylium* recovered in Florida. A pathogen characterization should be pursued to understand pathogen population within the state. Host resistance is not sufficient to combat this disease and growers need efficacious fungicides to design an integrated disease management.

In a trial examining low-risk fungicide treatments, LifeGard, Silmatrix, LifeGard alternated with Cueva, Kocide 3000, and OSO demonstrated significant ($P > 0.0001$) control of SLS but not at commercially acceptable levels. In the second trial, fungicides Luna Sensation, Miravis, Miravis Prime, Xemium, and Pristine significantly ($P > 0.0001$) reduced SLS in baby spinach. While these newer labeled fungicides offered excellent control of leaf spots in baby spinach, disease reduction was not complete. A combination of several compounds and the use of resistant genetics may alleviate the effects of SLS in the long term.

Literature Cited

Raid, R.N., and T. Kucharek. 2006. Florida plant disease management guide: Spinach. EDIS Plant Pathology Department, UF/IFAS Extension (PDMG-V3-48 series). <<https://edis.ifas.ufl.edu/pdf/PG/P05400.pdf>>

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