



Cladosporium Leaf Spot Management on Spinach Using Bio and Conventional Chemistries

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Spinach (*Spinacia oleracea*) popularity and consumption has increased with the rise of the spring mix salad industry. The crop however is susceptible to a number of leaf spot diseases including anthracnose, Stemphylium leaf spot, and *Cladosporium* leaf spot, all of which can be seed-borne. The incidence of the latter is caused by the fungal pathogen *Cladosporium variable* Link and has noticeably increased in frequency and severity in recent years. *Cladosporium* leaf spot lesions are typically round and tan rarely exceeding 1 cm in diameter. The disease is favored by long periods of leaf wetness but is usually only a minor problem in the baby spinach grown for spring mix. *Cladosporium* leaf spot can however be a significant problem in Florida leaf spinach grown for the fresh market. Consequently, an experiment was conducted to investigate the effectiveness of fungicides for controlling this important foliar disease. A field experiment was conducted at the Everglades Research and Education Center in Belle Glade, FL whereby leaf spinach (variety Bloomsdale) was direct-seeded in double rows atop of six-inch raised beds formed on three-foot centers using the resident organic soil. The experiment consisted of a randomized complete block design with four replications of twelve treatments. The disease was established in the trial by distributing leaf material infected with *Cladosporium* leaf spot between unsprayed spinach rows which also served as buffers between experimental units. The fungicide applications were made using a CO₂ backpack sprayer and a 36-inch hand-held boom equipped with three Tee-Jet 11003 flat fan nozzles angled inward for maximize coverage. Foliar sprays at a volume of 62 GPA commenced at the two-to-four leaf stage and were subsequently followed by weekly applications (Table 1). Disease assessment was conducted by whole-plant visual ratings and expressed as the percentage of foliage exhibiting foliar leaf spot symptoms. All fungicides examined in the 2013 trial provided significant

control though some treatments showed more efficacy than others (Fig. 1). Strobilurin fungicides, either alone (Cabrio), or in pre-mixture with a carboximide fungicide (Priaxor, Merivon, Pristine, and Luna Sensation), generally yielded the best leaf spot control followed by the two broad spectrum protectants, Bravo and Kentan, which were not significantly different from each other. Switch and Tanos were the least efficacious and neither provided adequate leaf spot control. Results show that prospects for fungicidal control of *Cladosporium* leaf spot appears most favorable using a chemical control program containing a strobilurin fungicide, either in pre-mixture or in rotation, with one of the new carboximide fungicides.

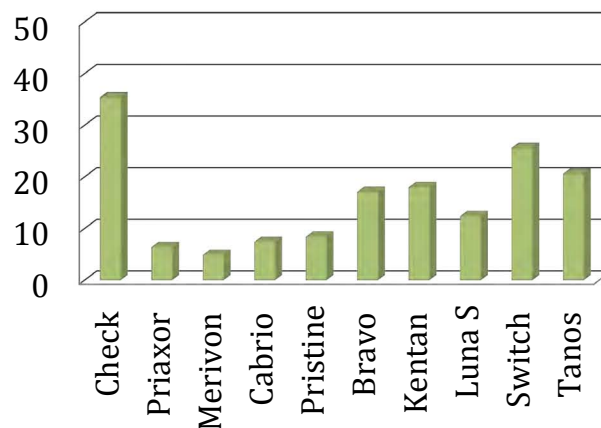


Fig. 1. Percentage of Foliar Necrosis from *Cladosporium variable* per Individual Treatment.

Table 1. Bio- and Conventional Evaluated Fungicides for *Cladosporium* leaf spot on Spinach in 2013.

Fungicide	Active Ingredients	Prod. Rate/Acre	Manufacturer
Priaxor SC	Pyraclostrobin + Fluxapyroxad	6.0 fl oz	BASF
Merivon SC	Pyraclostrobin + Fluxapyroxad	5.5 fl oz	BASF
Cabrio EG	Pyraclostrobin	12.0 oz	BASF
Pristine EG	Pyraclostrobin + Boscalid	10.5 oz	BASF
Bravo Ultrex WG	Chlorothalonil	1.5 lb	Syngenta
Kentan DF	Copper hydroxide	1.5 lb	Isagro
Luna Sensation SC	Fluopyram + Trifloxystrobin	6.0 fl oz	Bayer
Switch WG	Cyprodinil + Fludioxonil	14.0 oz	Syngenta
Tanos DF	Famoxadone + Cymoxanil	8.0 oz	DuPont

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