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## Management of Cercospora Leafspot in Swiss Chard: Varietal Selection

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Cercospora leafspot, caused by the fungus *Cercospora beticola*, is one of the most damaging diseases of Swiss Chard. The fungus can persist between crops as sclerotia in infected residue and soil and can infect weeds including lambs quarters (*Chenopodium album*), bitter dock (*Rumex obtusifolius*) and wild

Variety	Color	Source	Seed Type
Fire Fresh	Red	Seedway	treated
Ion	Red	Seedway	untreated
Silverado	White	Seedway	treated
Fordhook Giant	White	Seedway	untreated
Charsano	White	Seedway	treated
Northern Lights	Rainbow	Harris	untreated
Aurora	Rainbow	Osborne	untreated
Orange Fantasia	Yellow	Osborne	untreated
Bali	Red	Osborne	untreated
Peppermint	White	Osborne	untreated
Flamingo	Red	Osborne	untreated
Eldorado	Yellow	Osborne	untreated
Celebration	Rainbow	Osborne	untreated
Intense	Red	Osborne	untreated
Red Rhubarb	Red	Fedco	organic
Bright Lights	Rainbow	Johnny's	untreated
Orange Ribbed	Yellow	Johnny's	organic
Charbell	Red	Johnny's	untreated
Rhubarb Supreme	Red	Johnny's	organic

Table 1. Swiss chard trial entries. Color groups are broad, encompassing a range of shades. Of particular note, petioles of Peppermint are deep pink at the base, shading to white at the leaf blade.

mustard (*Brassica kaber*). Spores are produced in abundance and spread by the wind, limiting the effectiveness of sanitation for preventing disease. Fungicides are primary tools in preventing Cercospora leafspot outbreaks in Swiss chard but they need to be frequently re-applied to maintain protection during rapid plant growth, and only three fungicide groups are currently labelled and effective (penthiopyrad Group 7, strobilurin fungicides Group 11 and some copper products Group M1). However, the fungus is increasingly becoming resistant to Group 11 fungicides. Basic copper sulfate (e.g. Kocide) is NOT labelled for use in Swiss chard, but copper soap (Cueva) is and is approved for Organic production.

No Swiss chard varieties are immune to Cercospora leafspot, but choosing varieties which are less susceptible to fungal infection can reduce disease

and increase the effectiveness of cultural controls and fungicides. The objective of this study was to determine the relative susceptibility of 19 Swiss chard varieties (Table 1) to natural infection with *Cercospora beticola* under field conditions in Rhode Island. The Spring crop was started in the greenhouse in early March and transplanted to the field April 26; data on *Cercospora* symptom severity were collected in June. The Fall crop was direct-seeded in mid-July and *Cercospora* data were collected on September 21. Conditions in August and September were ideal for leafspot development and plants became infected despite preventative applications of Quadris fungicide (azoxystrobin).

Entry	Score June 1	Score June 28	Score Sept. 21
Bright Lights	1.3	3	2.3
Northern Lights	1.7	4	1
Celebration	2.3	3.7	2
Aurora	2	5	2
Fire Fresh	0.3	1	2.7
Ion	0.3	1	2.3
Flamingo	0.3	2.7	3.3
Charbell	1.3	2.7	2.3
Rhubarb Supreme	1.3	3	4.3
Bali	2.3	3	4.3
Intense	1.7	4	3.7
Red Rhubarb	2	5	4.7
Silverado	0	0	1
Peppermint	0.7	0.3	2.3
Charsano	0	1.3	0.3
Fordhook Giant	1.7	3.7	0.7
Eldorado	0.7	0	1.3
Orange Fantasia	0	1	2
Orange Ribbed	0	2.3	--
Least Significant Difference	0.9	2.0	1.2

Table 2. Severity of *Cercospora* leafspot damage at early maturity and late maturity in Spring and early maturity in Fall. Damage was rated on a relative scale where 0 indicates no damage and 5 indicates severe damage to all leaves. If variety scores differ by more than the Least Significant Difference then the varieties have a 95% chance of being different in future trials. Orange Ribbed was not included in the Fall planting.

In the Spring Ion and Fire Fresh had the least disease of the red-petiole varieties and were similar to the best yellow and white varieties. Both are described as tolerant/resistant to *Cercospora* in the catalog, and the resistance appears to be effective in the field. In the Fall all of the red-red petiole varieties had significantly more *Cercospora* damage than the white petiole varieties. Ion, Fire Fresh and Charbell had

In general varieties with yellow or white petioles suffered less damage from *Cercospora* leafspot than did varieties with red petioles. In the rainbow mixes, the red and pink plants were more severely damaged than the yellow and white plants. Lesions are more visible on leaves which produce betacyanins (red pigments) due to the red margins, but there were also fewer lesions on the yellow and white plants.

As a group the white petiole varieties had the least *Cercospora* damage in both the Spring and the Fall. In the Spring trial the improved varieties Charsano and Silverado had less damage than the heirloom Fordhook Giant, but all three varieties had similar performance in the Fall. Peppermint was similar to Silverado and Charsano in the Spring despite the increased betacyanin production in the stems, but had significantly more disease in the Fall.

At early maturity in the Spring Orange Fantasia and Orange Ribbed were completely clean, while Eldorado had a few lesions on older leaves. However, by late maturity disease had progressed in Orange Fantasia and Orange Ribbed, but not in Eldorado. Orange Ribbed was not included in the Fall trial, and disease levels did not differ between Orange Fantasia and Eldorado.

the lowest disease ratings and significantly less damage than the classic Rhubarb strains. Flamingo and Intense were intermediate, with little disease under low pressure and moderate disease in late Spring and in the Fall.

Differences among the rainbow varieties were limited. All four entries had moderate to severe damage to the red and pink plants, and less damage to the white and yellow plants. Bright Lights had the least damage on both dates in the Spring planting but had significantly more damage than the best single-color varieties. In the Fall Northern Lights had the least disease among the rainbow varieties and all four entries had moderate damage comparable to the yellow petiole varieties and the most resistant red petiole varieties. The differences in disease response between Spring and Fall for the rainbow varieties may have been a result of direct seeding, which selects for the more vigorous white and yellow seedlings.

Careful variety selection can reduce *Cercospora* leafspot damage in chard, and use of less-susceptible varieties together with cultural controls and fungicides has potential to greatly reduce losses. In particular, growers are encouraged to trial Ion and Fire Fresh as alternatives to more susceptible red-petiole varieties.

#### Additional Resources

“*Cercospora* Leaf Spot of Swiss Chard, Beets, and Spinach” by Bess Dicklow, Rob Wick and Ruth Hazzard, UMass Plant, Soil and Insect Science Dept.



Figure 1. Chard varieties from left are Ion, Charbell, and Red Rhubarb. Photos were taken July 6; varieties are in adjacent plots.

<https://ag.umass.edu/vegetable/fact-sheets/cercospora-leaf-spot-of-swiss-chard-beets-spinach>

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