

# Reaction of Some Pacific Coast Strawberry Cultivars to Leaf Scorch

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## ABSTRACT

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*Diplocarpon earliana* can cause severe leaf scorch on susceptible strawberry cultivars in western Oregon in the autumn. Of 23 cultivars grown on the U.S. Pacific Coast, 6 were resistant, 7 were intermediate, and 10 were susceptible to scorch disease when evaluated in field test plots in November 1979 in Corvallis, OR.

Leaf scorch, caused by *Diplocarpon earliana* (Ell. & Ev.) Wolf, is a widespread and damaging foliar disease of strawberry (x *Fragaria ananassa* Duchesne) in the United States. An extensive description and review of this disease was published by Plakidas in 1964 (3). The disease was found previously in Oregon on several cultivars (5). The reactions to leaf scorch infection of a number of strawberry cultivars grown in eastern United States have been reported (1,4), but there are no reports on the levels of resistance to leaf scorch that are exhibited by strawberry cultivars grown on the U.S. Pacific Coast. The purpose of this paper is to report the occurrence and severity of leaf scorch infection on autumn foliage of Pacific Coast strawberry cultivars grown in field plots at Corvallis, OR.

## MATERIALS AND METHODS

Twenty-three strawberry cultivars grown on the U.S. Pacific Coast, including many of the principal cultivars currently used, were planted at the Lewis-Brown Farm of the Department of Horticulture, Oregon State University, Corvallis, in 10-plant observation rows in

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May 1978. Plants received normal horticultural management but were not sprayed with fungicides. Leaf scorch was severe on some cultivars in this test field in the autumn of 1978 and again in the autumn of 1979.

To evaluate the severity of the scorch disease, three observers independently scored the first five plants in each of the 23 plots in November 1979, using a 5-point scale. The data were subjected to analysis of variance. Leaf samples with typical scorch symptoms were collected and examined, and the fungi associated with these symptoms were identified.

## RESULTS

Spores and acervuli characteristic of *Marssonina potentillae* (Desm.) Magnus var. *fragariae* Sacc., the imperfect stage of *D. earliana*, were readily found on lesions on infected leaflets, and the symptoms were characteristic of the strawberry leaf scorch disease (Fig. 1). When plots were rated for scorch disease, other foliage diseases were rare.

The mean scorch ratings of the 23 cultivars are listed in Table 1. Highly significant differences existed among cultivar ratings and among the three individuals who rated the plots, but their interaction was not significant. The six cultivars with the least leaf scorch, Aiko, Hood, Olympus, Rainier, Shasta, and Tufts, were classified as resistant to *D. earliana* infection (Table 1), and the 10 cultivars with the most leaf scorch were classified as susceptible. Seven cultivars

**Table 1.** Resistance of 23 Pacific Coast strawberry cultivars to natural infection by *Diplocarpon earliana*

Cultivar <sup>a</sup>	Disease rating <sup>b</sup>
<b>Resistant</b>	
Aiko	4.9
Tufts	4.9
Rainier	4.7
Hood	4.5
Shasta	4.5
Olympus	4.4
<b>Intermediate</b>	
Cruz	4.1
Tioga	3.9
Totem	3.9
Shuksan	3.7
Northwest	3.6
Puget Beauty	3.5
Solana	3.1
<b>Susceptible</b>	
Linn	2.3
Sequoia	2.3
Siletz	2.2
Aliso	2.0
Marshall	1.9
Quinault	1.9
Lassen	1.4
Benton	1.2
Fresno	1.1
Ft. Laramie	1.0

<sup>a</sup>The resistant and susceptible groups differ significantly ( $P = 0.01$ ). The intermediate group is internally homogeneous statistically ( $P = 0.01$ ) but arbitrarily separated from the other groups.

<sup>b</sup>On a 1-5 visual scale: 1 = most green leaves infected, most old leaves dead; 2 = most green leaves infected, some old leaves dead; 3 = many green leaves infected, some old leaves dead; 4 = some lesions on some green leaves, few old leaves dead; 5 = few to no leaf lesions, no leaves killed by scorch.

with scorch ratings that fell between the two categories were classified as intermediate and were arbitrarily separated from the resistant and susceptible cultivars by inspection of the

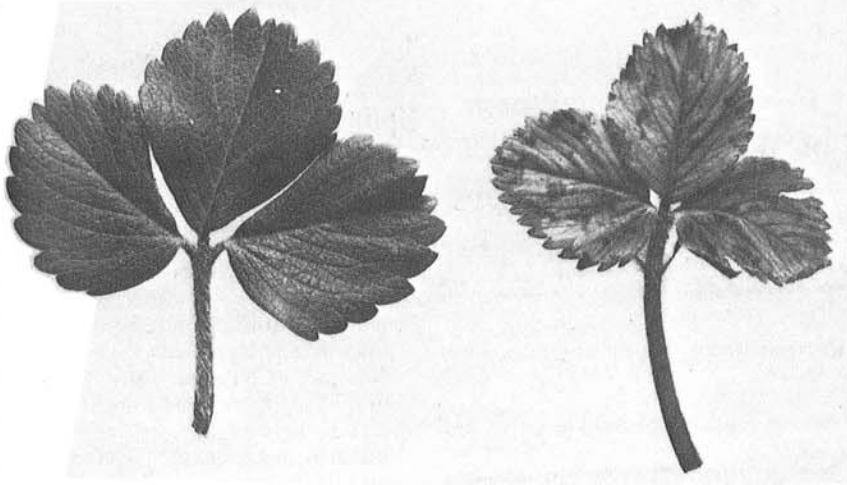


Fig. 1. Variation in susceptibility of two strawberry cultivars to natural infection by *Diplocarpon earliana*: (left) resistant Rainier, (right) susceptible Benton.

data. Scorch ratings within each group of cultivars were statistically homogeneous ( $P = 0.01$ ). The resistant and susceptible groups significantly differed from each other ( $P = 0.01$ ).

#### DISCUSSION

Scorch became noticeable on foliage in September 1979 and grew steadily more severe as autumn progressed but did not appear to cause much damage on new leaves in the spring. The records of the Oregon State University Mycological Herbarium, however, indicate that half of

the 23 Oregon specimens of leaf scorch on file, obtained from 1926 through 1945, were collected in June, and the balance were scattered throughout the rest of the year. New as well as old leaves (3) are generally regarded as susceptible to scorch. The reasons for the discrepancy between our observations and those reported earlier are unknown, but scorch is currently severe enough in the Corvallis area to weaken plants of cultivars such as Benton as they enter the winter season, unless approved fungicidal controls are used (2).

Tests in Maryland showed that several strawberry cultivars grown in eastern United States were very resistant to leaf scorch, but no western U.S. cultivars were evaluated in that test (4). Our study with western U.S. cultivars strikingly parallels the Maryland work. About half of the cultivars exhibited strong or intermediate resistance to scorch disease, but some (Benton and Fresno) were extremely susceptible. A number of scorch-resistant, horticulturally desirable strawberry cultivars for the U.S. Pacific Coast can be used in breeding programs. The best sources of genetic resistance should be incorporated into new cultivars for areas such as western Oregon where the disease may become serious.

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