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Evaluation of Strawberry Host Plant Resistance to Powdery Mildew in 20 Genotypes Under Greenhouse Conditions in San Luis Obispo, California, Spring 2024

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Powdery mildew of strawberry, caused by *Podosphaera aphanis*, is a disease that infects all aboveground parts of the plant and is especially common on leaves, fruit, and stems. The disease is commonly associated with white, visible mycelium. This report evaluates the host resistance to powdery mildew in 20 strawberry genotypes under greenhouse conditions in San Luis Obispo, CA, in the spring of 2024. Disease incidence and severity were evaluated for all genotypes. Results of this study will inform strawberry growers in selecting resistant cultivars for optimized production.

The trial was conducted in a greenhouse at the Cal Poly Crops Unit in San Luis Obispo, CA. Bareroot transplants were planted directly in a greenhouse on 7 March 2024 where powdery mildew-infected strawberry plants were present with high levels of sporulation (>90% incidence). Transplants were planted in 1-gal. plastic pots (Greenhouse Megastore, Sacramento, CA, U.S.A.) containing a soilless potting mixture called CB 1294 (Sun Gro Horticulture, Nipomo, CA, U.S.A.), with 10 g of Osmocote Plus (Scotts, Marysville, OH, U.S.A.) added to the surface of each pot 20 days after planting (27 March). Treatments were replicated four times, with each replicate consisting of three plants (one plant/pot) in a 3- × 3-ft area, and were arranged in a randomized complete block design on greenhouse benches. Plants were irrigated automatically for 2 min three times per week using an arrow dripper (1 liter/h) (Netafim USA, Fresno, CA, U.S.A.). The greenhouse temperature control system was set to heat at 55°F and cool at 75°F. There were 20 genotypes in the trial. Disease severity was based on the percentage of the upper and lower leaf surfaces covered by visible mycelial growth of each fully emerged trifoliate leaf. Disease incidence was assessed as the percentage of trifoliate leaves with at least one powdery mildew lesion. The disease index was calculated by multiplying disease incidence and disease severity for each replicate. No yield data were collected due to very low fruit production during the trial. Stolons (runners) and fully ripe fruit were removed from plants once per week. Data were subjected to analysis of variance (ANOVA), and Fisher's least significant difference (LSD) mean separation was calculated using ARM version 2023.6.

The first visual symptoms of infection, noted as mycelial growth, were detected on 25 March, 18 days after planting transplants in the greenhouse. The powdery mildew incidence and severity evaluation on 18 April, 6 weeks after planting, offered the most treatment separation. The disease index was calculated to combine both disease severity and incidence into a single value. Overall, powdery mildew incidence and severity were high, reaching 88.4% disease incidence and 28.7% disease severity in the most suspectable cultivar, Royal Royce (Supplementary Table S1). 088W02 was the most resistant cultivar with 26.4% disease incidence and 1.3% disease severity. This shows the significant difference in susceptibility to powdery mildew among strawberry genotypes. This trait should be considered by growers when selecting cultivars.

Keywords: 122T43, 40Y40, 60z12, 88W02, 89T02, Albion, BG 10.3169, BG 10.3181, BG 4.367, BG 9.3128, BG 9.3142, Eclipse, Fronteras, Monterey, PE 14.145.059, *Podosphaera aphanis*, Portola, PS 10.1160, PS 9.271, Royal Royce, San Andreas

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e-Xtra: Supplementary material is available online.

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Supplementary Table S1. Strawberry genotypes sorted in ascending order by powdery mildew disease index.

			Powdery mildew (%) on 18 April[z]	
Genotypes	**Breeding program**	**Disease index[y]**	**Severity**	**Incidence**
88W02	Good Farms	0.36 h	1.3 h	26.4 f
BG 9.3142	Plant Sciences Inc.	1.48 gh	2.8 h	45.8 ef
122T43	Good Farms	1.97 gh	3.4 gh	43.5 ef
40Y40	Good Farms	2.07 fgh	3.9 fgh	45.1 ef
Fronteras	University of California, Davis	2.99 fgh	5.2 eh	57.1 de
PS 10.1160	Plant Sciences Inc.	7.67 e–h	10.8 d–g	69.1 bcd
Portola	University of California, Davis	8.85 d–g	11.6 c–f	67.8 cd
89T02	Good Farms	9.43 c–g	11.0 d–g	83.4 abc
BG 10.3181	Plant Sciences Inc.	10.03 c–f	11.9 c–f	76.6 a–d
San Andreas	University of California, Davis	11.78 cde	12.5 cde	92.6 a
BG 9.3128	Plant Sciences Inc.	12.74 b–e	13.4 cd	93.1 a
PS 9.271	Plant Sciences Inc.	13.47 b–e	16.0 bcd	83.9 abc
Eclipse	University of California, Davis	13.84 b–e	16.7 bcd	82.3 abc
Monterey	University of California, Davis	14.18 b–e	15.7 bcd	91.3 a
BG 4.367	Plant Sciences Inc.	15.24 b–e	16.8 bcd	83.7 abc
60z12	Good Farms	15.50 b–e	18.3 bcd	80.2 abc
BG 10.3169	Plant Sciences Inc.	16.17 bcd	18.4 bcd	86.5 abc
PE 14.145.059	Plant Sciences Inc.	16.96 bc	19.3 bc	81.3 abc
Albion	University of California, Davis	20.73 ab	22.6 ab	92.0 a
Royal Royce	University of California, Davis	25.09 a	28.7 a	88.4 ab
LSD $P = 0.05$		8.00	8.0	19.5

[y] Disease index = (disease incidence) × (disease severity) for each plot. Cultivars that do not share a letter are significantly different according to Fisher's least significant difference (LSD) mean separation test ($\alpha = 0.05$) calculated using ARM version 2023.6 (Gylling Data Management, Brookings, SD, U.S.A.).

[z] This disease assessment was made 44 days after planting.