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Evaluation of Strawberry Host Plant Resistance to Powdery Mildew in 21 Genotypes Under Greenhouse Conditions in San Luis Obispo, California, Winter 2024

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Powdery mildew of strawberry, caused by *Podosphaera aphanis*, is an economically important disease that infects flowers, fruit, leaves, and petioles. This report evaluates the host resistance to powdery mildew of 21 cultivars and elite breeding lines (genotypes) under greenhouse conditions in San Luis Obispo, CA, in winter of 2024. Disease incidence and severity were evaluated for all cultivars. 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 10 December 2024 where powdery mildew-infected strawberry plants were present with high levels of sporulation. Transplants were planted in 1-gal. plastic nursery pots (Greenhouse Megastore, Sacramento, CA, U.S.A.) containing a soilless potting mix 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 28 days after planting (7 January). Treatments were replicated four times, with each replicate consisting of three plants (one plant/pot) in a 3- × 3-ft. area, 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 to cool at 75°F. There were 21 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 was 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 test was calculated using ARM version 2024.2.

The first visual symptoms of infection were detected on 24 December, 14 days after planting transplants in the greenhouse. The powdery mildew incidence and severity evaluation on 23 January, 44 days after planting, offered the most treatment separation. The disease index was calculated to combine both severity and incidence into a single value. Overall, powdery mildew pressure was high, reaching 79.6% incidence and 23.2% severity in Golden Gate, the most suspectable cultivar (Supplementary Table S1). 088W02 was the most resistant cultivar, with 5.0% disease incidence and 0.3% disease severity. This shows the dramatic difference in susceptibility to powdery mildew among strawberry genotypes.

Keywords: 060z12, 088W02, 122X08, 152X15, 152X18, 24-407R, 24-410R, 24-413R, 24-414R, 24-415R, Angelina, Cuyama, Golden Gate, HW026.029, Monterey, PE-16.4092.013, PEP-15.1890.010, PS-13.467.089, Royal Royce, SB_13_164-030, SB_14_028-025, *Podosphaera aphanis*, susceptibility

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***e*-Xtra:** Supplementary material is available online.

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

				Powdery mildew (%) on 23 January[y]			
Cultivar	**Breeding program**	**Disease index[x]**		**Severity**		**Incidence[z]**	
088W02	Good Farms	0.03	f	0.3	g	5.0	g
24-414R	Planasa	0.11	f	0.6	g	8.3	g
24-410R	Planasa	0.28	ef	1.2	fg	14.9	fg
24-407R	Planasa	0.51	ef	1.6	fg	23.9	efg
HW026.029	Driscoll's	0.69	ef	1.8	efg	27.3	d–g
PE-16.4092.013	Plant Sciences Inc.	0.74	ef	2.8	efg	25.6	d–g
SB_13_164-030	Plant Sciences Inc.	0.75	ef	2.5	efg	27.8	d–g
24-415R	Planasa	0.81	ef	2.4	efg	26.5	d–g
PEP-15.1890.010	Plant Sciences Inc.	1.37	def	3.4	d–g	36.3	c–f
Angelina	Driscoll's	1.95	c–f	4.7	c–g	40.5	cde
152X15	Good Farms	3.26	c–f	6.3	c–f	58.3	abc
152X18	Good Farms	3.62	c–f	5.4	c–g	47.4	b–e
PS-13.467.089	Plant Sciences Inc.	4.13	c–f	6.6	b–f	46.0	b–e
Monterey	University of California, Davis	4.51	c–f	7.4	b–e	47.6	bcd
24-413R	Planasa	4.56	c–f	6.6	b–f	38.0	c–f
122X08	Good Farms	4.87	c–f	7.2	b–f	44.7	b–e
Royal Royce	University of California, Davis	5.21	cde	8.8	bcd	55.8	bc
060z12	Good Farms	6.27	bcd	9.4	bc	58.6	abc
SB_14_028-025	Plant Sciences Inc.	6.55	bc	7.5	b–e	54.8	bc
Cuyama	Driscoll's	8.26	bc	11.9	b	67.9	ab
Golden Gate	University of California, Davis	18.71	a	23.2	a	79.6	a
LSD $P = 0.05$		5.08		5.6		23.7	

[x] Disease index was calculated by multiplying disease incidence and disease severity for each plot.

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

[z] 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 2024.2 (Gylling Data Management, Brookings, SD, U.S.A.).