

Basil (*Ocimum basilicum* ‘Devotion’, ‘Dolly’, ‘Emerald’, Everleaf’, ‘Genovesse’, ‘Obsession’, ‘Passion’, ‘Prospera’, ‘Thunder’, ‘UF-1978’) Downy mildew; *Peronospora belbahrii*

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Evaluation of basil cultivars for resistance to downy mildew, 2021

This research trial was conducted at Michigan State University’s Southwest Michigan Research and Extension Center, Benton Harbor, MI during the summer of 2021. Ten basil cultivars were seeded into flats containing a soilless medium (Suremix MI Grower Products, Inc., Galesburg MI) in a greenhouse on the campus of Michigan State University, East Lansing, MI (MSU). Plants were fertilized daily with 200 ppm of soluble fertilizer (Peter’s fertilizer ICL Specialty Fertilizers, Dublin, OH). When seedlings were 3 weeks old, they were pruned to delay flowering. On 23 Jun, when seedlings were 4 weeks old, they were transplanted into beds established at the Michigan State University Southwest Michigan Research and Extension Center. Four plots (replicates) made up of 13 single plants for each cultivar were planted 18 in. apart in raised beds covered with black plastic in a completely randomized design. Plants were watered using drip tape irrigation. Basil plants were inoculated with basil downy mildew in a greenhouse at MSU campus. Sporulating basil plants, 12 plants spread equally across the row, were transplanted into the buffer rows on the edges of the experimental plot on 23 Jul.

Once disease symptoms were observed in the experimental plot, visual assessments were made every 6-7 days starting on 11 Aug. Incidence (%) of plants infected and leaves with symptoms (%) per plot was recorded for 4 weeks until the incidence of leaves with symptoms neared 100% for the most susceptible cultivars on 30 Aug. Average monthly high and low temperatures (°F) were 80.3/63.0 in Jul and 84.0/63.9 in Aug. Rainfall (in.) was 1.78 and 3.44 for Jul and Aug respectively. Area under the disease progress curve (AUDPC) was calculated using incidence of leaves with symptoms and plants infected. Data were analyzed using SAS PROC GLIMMIX and statistical differences were compared using analysis of variance (ANOVA) and Fisher’s least significant difference (LSD) test to observe statistical differences in incidence of leaves with symptoms and symptomatic plants, and AUDPC. On the last observation date, all plants of the cultivars Genovesse, Everleaf, Dolly, Emerald, Dolly, Devotion, Thunder, and Obsession had developed downy mildew symptoms while UF-1978 and Prospera remained asymptomatic. According to the AUDPC data for symptomatic plants, more Genovesse, Everleaf, and Emerald plants developed disease than Thunder, Passion, Obsession, UF-1978, and Prospera plants; Dolly and Devotion were similar in the percentage of symptomatic plants. When the incidence of leaves with symptoms was assessed on 30 Aug, Genovesse had a greater level of infection than all others with the exception of Emerald and Dolly. Also on this date, Thunder, Passion, and Obsession, UF-1978, and Prospera had fewer diseased leaves than all other cultivars. According to the AUDPC data for leaves with symptoms, Genovesse, Emerald, Dolly had more diseased leaves than Thunder, Passion, Obsession, UF-1978, and Prospera.

Downy mildew incidence

Cultivar	Symptomatic plants (%)					Leaves with symptoms (%)				
	11 Aug*	17 Aug	24 Aug	30 Aug	AUDPC	11 Aug	17 Aug	24 Aug	30 Aug	AUDPC
Genovesse	100.0 a	100.0 a	100.0 a	100.0 a	1913.5 a	28.3 a	43.8 a	63.8 a	83.5 a	1031.0 a
Everleaf	88.5 ab	98.1 a	100.0 a	100.0 a	1852.9 a	14.5 b	21.3 bc	31.3 bc	50.0 bc	534.8 bc
Emerald	88.5 ab	96.2 a	100.0 a	100.0 a	1840.4 a	13.3 bc	30.0 ab	40.0 ab	62.8 ab	680.0 ab
Dolly	81.8 ab	84.6 ab	92.3 ab	100.0 a	1692.3 ab	15.8 b	37.5 ab	48.0 ab	66.3 ab	801.8 ab
Devotion	63.5 bc	82.7 abc	100.0 a	100.0 a	1677.9 ab	9.5 bcd	19.5 bc	33.8 bc	55.0 b	539.6 bc
Thunder	28.8 de	67.3 abc	86.5 ab	100.0 a	1386.6 bc	2.4 cd	4.8 c	10.5 dc	28.8 dc	190.3 dc
Passion	28.8 de	57.7 bc	78.8 b	96.2 b	1262.5 c	1.6 d	5.3 c	8.3 dc	15.0 de	136.9 dc
Obsession	33.8 cd	49.7 c	82.7 ab	100 a	1261.9 c	1.4 cd	4.0 c	7.5 dc	22.5 de	149.4 dc
UF-1978	0.0 e	0.0 d	0.0 c	0.0 c	0.0 d	0.0 d	0.0 c	0.0 d	0.0 e	0.0 d
Prospera	0.0 e	0.0 d	0.0 c	0.0 c	0.0 d	0.0 d	0.0 c	0.0 d	0.0 e	0.0 d
P-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	0.0011	0.0002	<0.0001	<0.0001

*Column means with a letter in common are not statistically different at $P=0.05$ using Fisher’s LSD test