

BASIL (*Ocimum basilicum*)
Downy mildew (*Peronospora belbahrii*)

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Field evaluation of basil cultivars for susceptibility to downy mildew, 2020.

Ten basil cultivars were seeded into 72-cell plug trays on 8 Jun. The seeded trays were maintained in a greenhouse on the campus of Michigan State University (East Lansing, MI). The trays were fertilized three times weekly with 200 ppm of 20-20-20 water soluble fertilizer. The field site located at the Southwest Michigan Research and Extension Center near Benton Harbor was prepared by plowing and disking. Fertilizers 33-0-0 N (100 lb/A), 0-0-61 K (180 lb/A), 95% S (25 lb/A), B (20 lb/A) were broadcast applied before preparing raised beds covered with black plastic and a single row of drip irrigation spaced on 8-ft centers. Basil cultivars were transplanted on 13 Jul with 1-ft spacing between plants within a row. Total of 11 basil plants were planted in each 15-ft plot with 10 ft between plots within each 90-ft bed. Plants were fertilized weekly with 28% N at 3.5 gal/A through drip irrigation. Plants were arranged in completely randomized block design with four replicates for each cultivar. This trial was inoculated by placing 17 actively sporulating basil plants among the replicated blocks with spacing of 22 ft within the row and 16 ft between rows. The downy mildew infected plants were prepared by placing basil leaf tissue sporulating with *P. belbahrii* into water and agitated to release the spores. The sporangial suspension (1.0×10^4 sporangia/fl oz) was sprayed onto the plants (0.1 fl oz/plant) in the growth chamber (65°F, 16-hr light period) using a janitorial spray bottle. Immediately after inoculation, the plants were enclosed in translucent bags containing 6 fl oz of water for increased relative humidity. Plants with the sporulating pathogen were transplanted after 10 d in the field on 27 Jul as a source of inoculum. Disease incidence based on the visual estimation of foliage (%) with symptoms was assessed on 21, 31 Aug and 9 Sep and AUDPC was calculated. Defoliation (%) was also assessed for each cultivar on 31 Aug and 9 Sep. Data were analyzed through SAS statistical software using PROC GLM procedure for one-way ANOVA analysis with mean separation through Fisher's least significant difference (LSD).

Significant differences among cultivars were observed for disease incidence, defoliation and AUDPC values. Disease and subsequent defoliation was not observed for 'Vf-67' and 'Vf-72' for any observation date. 'Dolly', 'Genovese Improved', 'Aristotle', and 'Everleaf' had significantly higher disease incidence (>78%) on 21 Aug than all other cultivars. 'Eleanora' had more disease on this date than 'Devotion', 'Thunderstruck', 'Passion', 'Vf-67' and 'Vf-72'. On 31 Aug, new, healthy-appearing foliar growth was observed. The most susceptible cultivars observed on 31 Aug included 'Dolly', 'Genovese Improved', 'Aristotle', and 'Eleanora'; all other cultivars were significantly less susceptible. On the final rating date (9 Sep), four cultivars were more susceptible than all others in the trial and included 'Dolly', 'Genovese Improved', 'Aristotle', and 'Eleanora'. While 'Everleaf' was less diseased (% incidence) on this date than the most susceptible cultivars, it had more symptomatic leaves (45%) than the other cultivars. 'Devotion' had 18.8% disease incidence which was more than that observed in the most resistant cultivars including 'Thunderstruck', 'Passion', 'Vf-67', and 'Vf-72'. Defoliation were first observed in the research plot on some cultivars on 31 Aug as a result of severe foliar disease. A significant amount of defoliation (%) was observed for 'Dolly' and 'Genovese Improved' compared to all other cultivars; 'Dolly' had the most defoliation. On Sep 9, 'Dolly' and 'Genovese Improved' had similar amounts of defoliation which was more than all other cultivars. 'Aristotle' and 'Eleanora' had high levels of defoliation, 58.8% and 31.3%, respectively. All other cultivars had $\leq 5.0\%$ defoliation. According to the AUDPC values, 'Dolly', 'Genovese Improved' and 'Aristotle' were highly susceptible to downy mildew compared to the cultivars evaluated in this trial whereas 'Devotion', 'Thunderstruck', 'Passion', 'Vf-67' and 'Vf-72' were the most resistant.

Cultivars	Incidence (%) [*]			Defoliation (%)		AUDPC for incidence
	21 Aug	31 Aug	9 Sep	31 Aug	9 Sep	
Dolly	90.0 a ^{**}	90.0 a	100.0 a	45.0 a	93.8 a	1805.0 a
Genovese Improved	85.0 a	87.5 a	100.0 a	32.5 b	92.5 a	1777.5 a
Aristotle	78.8 a	87.5 a	100.0 a	8.8 c	58.8 b	1768.1 a
Eleonora	28.8 b	67.5 a	97.5 a	10.0 c	31.3 c	1521.9 b
Everleaf	85.0 a	22.5 b	45.0 b	1.3 c	5.0 d	1010.0 c
Devotion	0.5 c	3.5 b	18.8 c	0.0 c	0.0 d	118.1 d
Thunderstruck	0.0 c	2.3 b	6.5 d	0.0 c	0.0 d	47.3 d
Passion	0.3 c	1.0 b	2.5 d	0.0 c	0.0 d	22.1 d
Vf-67	0.0 c	0.0 b	0.0 d	0.0 c	0.0 d	0.0 d
Vf-72	0.0 c	0.0 b	0.0 d	0.0 c	0.0 d	0.0 d
<i>P</i> -values	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

^{*}Based on a visual estimation of necrotic foliage (%).

^{**}Column means with a letter in common are not statistically different (Fisher's LSD; $P=0.05$).