

POSTER SESSION PAPERS

Mildew Resistant Garden Phlox®

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NATURE OF WORK

Garden phlox, from cultivars of the native *Phlox* species *carolina*, *maculata*, and *paniculata*, is an important herbaceous perennial for the landscape and nursery trade. Powdery mildew is recognized as a major limiting factor when growing garden phlox in warm, humid areas. Resistant cultivars of garden phlox may reduce production costs and increase landscape success.

Evaluations of garden phlox mildew resistance have been conducted in climates unlike that experienced in the humid southeastern United States (Hawke, 1999). Cultivar response is often different when plants considered highly resistant in other areas are exposed to the extended warm, humid growing conditions in the southeast (Bir and Hawke, 1999).

Erysiphe cichoracearum, a causal organism of powdery mildew in phlox, spores germinate optimally under damp conditions between the temperatures of 59 and 86°F. (Powell and Lindquist, 1992.). These temperatures are close to the daily average maximum and minimum temperatures from early June through mid-September at Mountain Horticultural Crops Research Station (MHCRS), Fletcher, North Carolina. In addition, there is morning fog the majority of days from early June through mid-September at MHCRC.

In April 1999 a completely random design experiment with three 1-qt plants of each cultivar was planted on 3-ft centers in a soil that had been prepared according the North Carolina Cooperative Extension Service (NCCES) recommendations following soil tests. Plants were irrigated until established then never irrigated again. Weeds were removed by hand and fertilizer was applied according to NCCES recommendations.

Included in the test were 'Blue Boy', 'Blue Paradise', 'David', 'Delta Snow', 'Duesterlohe' (syn. 'Nicky'), 'Fairest One', 'Flamingo', 'Franz Schubert', 'Laura', 'Little Boy', 'Magnificence', 'Miss Jill', 'Miss Jo-Ellen', 'Miss Karen', 'Miss Katherine', 'Miss Lingard', 'Miss Margie', 'Miss Mary', 'Mount Fuji', 'Natascha', 'Norah Leigh' (syn. 'Darwin's Joyce'), 'Prince of Orange' (syn. 'Orange Perfection'), *Phlox caroliniana*, 'Prime Minister', 'Robert Poore', 'Rosalinde', 'Russian Violet', 'Sir John Falstaff', 'Starfire', 'Tenor', 'The King', and 'White Admiral'. The incidence and intensity of powdery mildew infestation on each plant was recorded monthly from June through early September of 1999, 2000, and 2001.

RESULTS AND DISCUSSION

By the end of the first growing season, it became evident that disease pressure from powdery mildew was intense. Many plants were thoroughly infested and did not survive the first winter. Cultivars that did not survive were replanted in Spring 2000. When many of the same cultivars as well as others were not alive in Spring 2001, we re-evaluated the trial due to severe disease pressure and decided not to collect data if $\frac{2}{3}$ of any cultivar was dead. The cultivars 'Blue Boy', 'Blue Paradise',

Table 1. Resistance of garden phlox surviving 3 years of powdery mildew at Mountain Horticultural Crops Research Station, Fletcher, North Carolina.

Highly Resistant	Moderately Resistant	Poorly Resistant
'David'	'Fairest One'	'Franz Shubert'
'Delta Snow'	'Magnificence'	'Miss Jill'
'Natascha'	'Miss Jo-Ellen'	'Miss Karen'
'Robert Poore'	'Miss Katherine'	'Miss Margie'
'Speed Limit 45'	'Norah Leigh'	'Miss Mary'
<i>Phlox carolina</i>	'Rosalinde'	'Mount Fuji'
		'Duesterlohe' (syn. 'Nicky')
		'Russian Violet'
		'Sir John Falstaff'
		'Starfire'
		'Tenor'
		'The King'
		'White Admiral'

'Norah Leigh', 'Flamingo', 'Laura', 'Miss Lingard', 'Prince of Orange', and 'Prime Minister' had at least two-thirds of plants die during the trial. Table 1 includes survivors. No cultivar was immune to powdery mildew under our conditions.

To determine overall resistance, powdery mildew infestation ratings from the beginning of June and mid-September were averaged. Those with the 11% or less of foliage showing powdery mildew were considered highly resistant. Those averaging 25% to 50% were considered moderately resistant, and over 50% of foliage showing powdery mildew were considered poorly resistant.

Significance to the Industry: Even under severe powdery mildew pressure there are garden phlox cultivars that exhibit a high degree of disease resistance. These include the cultivars 'David', 'Delta Snow', 'Natascha', 'Robert Poore', 'Speed Limit 45', and the species *Phlox caroliniana*.

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