'PMR Delicious 51' : An Improved Open-pollinated Melon with Resistance to Powdery Mildew

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Abstract. 'PMR Delicious 51' is a new and improved version of the 'Delicious 51' eastern type melon (*Cucumis melo* L.). It was developed in the Department of Plant Breeding at the Cornell University Agricultural Experiment Station in Ithaca, N.Y. It is well adapted for northeastern U.S. conditions and shows potential for good adaptation in the northwest. It is well suited for home gardeners, market gardeners, and commercial growers who want to grow an open-pollinated (OP) melon. 'PMR Delicious 51' has excellent resistance to powdery mildew races 1 and 2 (*Podosphaera xanthi*) and resistance to fusarium wilt (*Fusarium oxysporum* f. sp. *melonis*) race 2.

Origin and History

'PMR Delicious 51' was developed from a cross made in 1959 of 'Delicious 51' and an F_1 of 'Harvest Queen' × 'Edisto 48-5' as shown in Fig. 1. 'Delicious 51' was developed by Munger and released in 1951 in response to the need for a 'Delicious' type melon with resistance to fusarium race 2 wilt (Munger, 1954). 'Harvest Queen' originated from a cross between 'Iroquois' and 'Market King.' 'Edisto 48-5' was a sister line of 'Edisto,' which was developed by Morris B. Hughes at Clemson College in South Carolina (Bennett, 1959). 'Edisto 48-5' was the source of powdery mildew resistance (PMR) that was introgressed into 'Delicious 51.'

Powdery-mildew-resistant progenies were screened at the seedling stage and resistant segregants were backcrossed to 'Delicious 51' four times and then selfed to an F_3 . A BC_4F_3 progeny was crossed to a monoecious melon, *C. melo* var. *dudaim*, in an attempt to breed a powdery mildew resistant, monoecious, round, 'Delicious 51' type melon for use as a parent in hybrids. This effort, through pedigree and backcross breeding, continued for many years to a BC_9F_2 , but was discontinued due to the difficulty of combining monoeciousness with round fruit. In the BC_9F_7 generation an early progeny that was homozygous PMR was identified. This was selfed to a BC_9F_{10} while selecting for high fruit quality. Two generations of seed increases were done to bring it to a BC_9F_{12} .

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'PMR Delicious 51' is highly resistant to powdery mildew races 1 and 2. This is clearly seen early in the season when susceptible cultivars have already developed clear symptoms of infestation with powdery mildew, but 'PMR Delicious 51' is free from visible symptoms. Plants continue without visible powdery mildew through flowering, fruit development, and harvest. Powdery mildew may develop toward the end of the season under very heavy disease pressure, but in general colonies never develop to the same extent as observed in susceptible genotypes. In a conventionally managed, unsprayed field or an organically managed field, 'PMR Delicious 51' will produce high quality marketable fruit when powdery mildew is present. Based on near-isogenicity with 'Delicious 51' it is assumed to have resistance to fusarium race 2.

Fig. 1. Pedigree of 'PMR Delicious 51' melon.

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Table 1. Average yield, fruit weight, soluble solids, quality, and powdery mildew resistance of melon cultivars in a replicated trial conducted in an unsprayed plot.

Cultivar	Yield (t·ha ⁻¹)	Fruit wt (kg)	Soluble solids (%) ^z	Quality ^y	Powdery mildew ^x
PMR Delicious 51	24.5	1.0	9.9	7.3	R
Delicious 51	5.0	0.9	6.2	2.5	S
Golden Gopher	0.5	0.8	5.2	2.0	S
Earliqueen F ₁	9.5	0.6	5.0	1.6	S

^zTotal soluble solids determined with a Fisherbrand refractometer, 0% to 32% scale.

^yQuality scale: 1 = very poor, inedible, 9 = excellent combination of sweetness and flavor.

^xPowdery mildew (PM) disease index: S = susceptible, heavy PM symptoms; R = little or no symptoms.

Description

'PMR Delicious 51' has a large, dense vine with green foliage. The plant is andromonecious. The round fruit has slight to medium netting with shallow ribbing and slips when ripe. Fruit average about 1 kg and yield is substantially higher than powdery mildew susceptible varieties in the same class (Table 1). Under organic conditions fruit weight has averaged 1.4 kg (High Mowing Seeds, 2004 and Wild Garden Seed, 2004). The interior fruit color is medium orange with thick flesh and a moderately distinct green/orange interface at

the rind, as shown in Fig. 2. The seed cavity is small. The fruit has an average length to diameter (L:D) ratio of 0.9:1.0. Fruit length from stem end to blossom end averages 13.3 cm and width averages 14.0 cm. Depending on growing conditions and management, the fruit mature in 74 to 84 d from when sown in a greenhouse and then transplanted to the field.

'PMR Delicious 51' is a 'Delicious' type melon. Its flavor is very sweet with a slight touch of muskmelon flavor. It appeals to people who prefer a sweet, but mild tasting melon. Taste tests show that the quality (flavor, sugar, and texture) was much higher than the older,

Fig. 2. Fruit of 'PMR Delicious 51' melon.

powdery mildew susceptible varieties 'Delicious 51,' 'Golden Gopher,' and 'Earliqueen F₁' (Table 1).

Availability

Seed is available for the 2004 growing season from: High Mowing Seed, 813 Brook Rd., Wolcott, VT 05680, phone 802-888-1800, www.highmowingseeds.com or Wild Garden Seed, P.O. Box 1509, Philomath, OR 97370, phone 541-929-4068, www.wildgardenseed.com/index.php.

Literature Cited

- Bennet, B.K. 1959. Edisto: A new cantaloupe for the southeast. *Agr. Res.* 3:4.
- High Mowing Seeds. 2004. High Mowing Organic Seeds Online Shop. <http://www.highmowingseeds.com/catalog/melons.html>.
- Munger, H.M. 1954. Delicious 51, an early *Fusarium*-resistant muskmelon. *Farm Res.* 2(1):8.
- Wild Garden Seed. 2004. Wild Garden Seed 2004 Catalog and Website. http://www.wildgardenseed.com/wgs/catalog/product_info.php?cPath=53&products_id=143.