'Plum Dandy', a Hybrid Tomato, and Its Parents, NC EBR-5 and NC EBR-6

R.G. Gardner¹

Department of Horticultural Science, North Carolina State University, Raleigh, NC 27695-7609

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'Plum Dandy' is a plum (Roma-type) tomato (*Lycopersicon esculentum* Mill.) that is resistant to early blight [*Alternaria solani* (Ellis

and Martin) Jones and Grout] and adapted to fresh-market production. It is the F₁ hybrid of NC EBR-5 x NC EBR-6.

Origin

NC EBR-5 and NC EBR-6 are inbred tomato lines with early blight resistance derived from the U.S. Dept. of Agriculture (USDA) processing tomato cultivar 71B2 (Barksdale and Stoner, 1977). NC EBR-5 and NC EBR-6 share a common pedigree tracing back to '71B2' (Fig. 1). The processing tomato line 85-PR 218 from Dr. Warren Henderson's breeding program at North Carolina State Univ. provided the fruit shape desired for a fresh-market, plum-type tomato. In addition, NC

EBR-6's pedigree involves a cross with NC 13G-1, a line with a compact growth habit (Gardner and Davis, 1991; Kemble et al., 1994), which provided the brachytic (*br*) gene (Mutschler et al., 1987) for compact growth and the *og* gene for crimson fruit color. 'Plum Dandy' was tested as NC 9380.

Description

NC EBR-5. Plant habit is vigorous and determinate (*sp*), with dense foliage closely resembling that of '71B2'. Staked plants grow to a maximum height of ≈110 cm. Fruit of NC EBR-5 have two or three locules and are elongate, with a slight taper from the shoulder to blossom end. Under some growing conditions, a few fruit may develop a slight nipple at the blossom end. Fruit resemble those of 'Peto 882' in shape and are equivalent in size to those of 'Peto 882' (Table 1). Nonripe fruit are uniformly light green in color (*u*). Fruit pedicels are jointed. Fruit are well filled and ripen to a uniform, bright red exterior and interior color. Fruit have a small core and are generally free of internal white tissue. NC EBR-5 produced total and marketable yields equivalent to or greater than those of 'Peto 882' in replicated trials at Fletcher, N.C. (Table 1). Season of maturity is a week or more later than that of 'Peto 882'. NC EBR-5 has poor fruit-setting ability under low- and high-temperature stress.

Fig. 1. Pedigrees of 'Plum Dandy' F₁ hybrid tomato and its parents, NC EBR-5 and NC EBR-6.

Table 1. Comparison of yields and fruit weight of 'Plum Dandy' hybrid tomato with those of its parents, NC EBR-5 and NC EBR-6, and the standard cultivar Peto 882 in staked, vine-ripe harvest trials at Fletcher, N.C.

Cultivar or line	Yield (Mg·ha ⁻¹)			Wt/fruit (g)
	Early season ^z	Total season		
	Nongraded	Nongraded	Marketable	
Plum Dandy	19	109	98	106
Peto 882	22	87	61	106
NC EBR-5	16	96	81	118
NC EBR-6	14	85	70	95
LSD _{0.05} ^y	5	12	20	17
Plum Dandy	23 b ^x	118 a	106 a	98 a
Peto 882	27 a	99 b	78 b	104 a

¹First 2 weeks of harvest.

²Based on four replicated trials conducted over a 2-year period (1994–95).

³Mean separation within columns by *t* test, *P* ≤ 0.05. Based on 10 replicated trials conducted over a 5-year period (1993–97).

NC EBR-5 is moderately resistant to the foliage blight phase of early blight (Table 2). It is also resistant (*I* gene) to race 1 of *Fusarium oxysporum* f.sp. *lycopersici* (Sacc.) Snyder and Hans. and (*Ve* gene) to race 1 of *Verticillium dahliae* Kleb. Fruit are highly resistant to radial and concentric fruit cracking and to cuticle cracking (weather check).

NC EBR-6. Plants are short and determinate (*sp* and *br*), with dense, dark green foliage closely resembling that of '71B2'. When grown using the short-stake, string-weave trellis system, maximum plant height is generally ≈60 cm as a result of short internodes conditioned by *br*. Nonstaked plants are upright with a compact, dense growth habit.

Fruit of NC EBR-6 have two to three locules and are elongate, resembling 'Peto 882', with a slight taper from the shoulder to blossom end. Fruit sometimes have a slight nipple at the blossom end. Nonripe fruit are a glossy, uniform light green (*u*). Fruit are well filled and ripen to a bright red exterior and interior color as a result of having the crimson gene (*og*). Fruit have a small core and are free of internal white tissue. Ripe fruit are firm (subjective ratings) and remain firm for an extended period after ripening on the plant. Fruit are slightly smaller than those of NC EBR-5 (Table 1).

Total and marketable yields of NC EBR-6 were equivalent to those of 'Peto 882' in replicated trials (Table 1). Season of maturity is later than that of 'Peto 882'. Observations in early and late season in piedmont North Carolina indicate that NC EBR-6 has good fruit-setting ability under low-temperature stress and moderate fruit-setting ability under high-temperature stress.

NC EBR-6 is moderately resistant to the foliage blight phase of early blight (Table 2). In addition to early blight resistance, NC EBR-6 is resistant to fusarium wilt (*I*) and to verticillium wilt (*Ve*). Fruit are highly resistant to radial and concentric fruit cracking and to cuticle cracking.

'Plum Dandy'. The hybrid has a fairly compact determinate plant (*sp* gene) with dense, dark green foliage that provides good fruit cover. When grown using the short-stake, string-weave system of culture, 'Plum Dandy' is intermediate between its parents in height, resulting from the influence of *br* in heterozygous condition, and normally terminates growth at ≈90 cm. Because of its dense growth habit and prolific fruit set, moderate to heavy pruning, depending on in-row spacing, is needed to open the plant for air circulation and to produce optimum fruit size.

Fruit of 'Plum Dandy' have two, occasionally three, locules and are elongate in shape, resembling those of 'Peto 882', with a slight taper from the shoulder to blossom end. Nonripe fruit are a glossy, uniform, light green (*u*). Fruit pedicels are jointed. Fruit ripen to a bright red exterior and interior color and have good firmness and flavor (subjective ratings by author). 'Plum Dandy' is adapted to both vine-ripe and mature-green production. When plants are pruned, fruit size of 'Plum Dandy' is comparable with that of the standard cultivar Peto 882 (Table 1). Season of maturity for 'Plum Dandy' has been slightly later than that of 'Peto 882'.

Total and marketable yields of 'Plum Dandy' consistently exceeded those of 'Peto 882' in replicated trials over a 5-year period (Table 1). 'Plum Dandy' has been tested extensively with growers in North Carolina. Production and fruit quality in spring and early summer plantings have been very good in North Carolina and at several other locations in eastern and midwestern areas of the United States. Trials in late summer and fall plantings in piedmont North Carolina and in experiment station trials in Florida indicate that 'Plum Dandy' is not well suited for high-temperature, wet-weather production seasons because of limited fruit set and susceptibility to bacterial spot.

'Plum Dandy' is resistant to fusarium wilt (*I*) and to verticillium wilt (*Ve*). 'Plum Dandy'

Table 2. Percent defoliation of tomato plants caused by early blight, Fletcher, N.C., 1993.

Cultivar or line	Days after planting	
	65	77
Peto 882	53	85
Plum Dandy	8	25
NC EBR-5	5	10
NC EBR-6	8	40
71B2	3	5
LSD _{0.05}	14	20

is moderately resistant to early blight and was less damaged by early blight than 'Peto 882' (Table 2) and other commercial plum tomato cultivars in early blight trial plots. Fruit are highly resistant to all types of cracking, including cuticle cracking, which can be a severe problem on 'Peto 882' fruit when harvested at the vine-ripe stage of maturity.

Use

'Plum Dandy' provides growers with an early blight-resistant plum tomato cultivar with improved fruit quality characteristics. NC EBR-5 and NC EBR-6 are not intended for direct use as cultivars. They should be useful to other breeders because of their combination of early blight resistance with desirable fruit and plant characteristics.

Availability

'Plum Dandy' was released on an exclusive basis for commercial seed production and sales to Harris Moran Seed Company. Small samples of 'Plum Dandy' and its parental lines for trial and breeding purposes are available from R.G. Gardner, Mountain Horticultural Crops Research and Extension Center, Fletcher, NC 28732-9244.

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