

‘Delmarvel’ Strawberry

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The ‘Delmarvel’ strawberry (*Fragaria ×ananassa* Duch.) was introduced for propagation to nurseries in Feb. 1994 by the U.S. Dept. of Agriculture (USDA), Rutgers Univ., and The Ohio State Univ. ‘Delmarvel’ was selected for its high plant vigor; attractive, symmetrical, and large fruit with good color and flavor and outstanding aroma; late-early to early-midseason ripening; and resistance to the red-stele root-rot disease (incited by *Phytophthora fragariae* Hickman). ‘Delmarvel’ also has shown resistance to anthracnose fruit rot and stolon infection (caused by *Colletotrichum acutatum* Simmonds). ‘Delmarvel’ fruit are firm and tough-skinned; they handle well and have a low proportion of culls. ‘Delmarvel’ yielded as well as ‘Allstar’ in Maryland, as ‘Raritan’ in New Jersey, and as ‘Glooscap’ in Kentucky. ‘Delmarvel’ had fruit that approached the size of ‘Allstar’ in Maryland, had larger fruit than ‘Raritan’ in

New Jersey, and bore primary fruit larger than those of ‘Allstar’, ‘Honeye’, and ‘Glooscap’ in Kentucky. ‘Delmarvel’ produces well on either light or heavy soils and in matted rows or raised-bed culture. Maximum productivity of this cultivar may be realized at USDA hardiness zones 6 and 7.

‘Delmarvel’ is suggested for trial in the middle Atlantic and adjacent regions and is introduced there as a high-quality, early to early midseason, shipping and local market cultivar with multiple fungus disease resistance. ‘Delmarvel’ was named for the Delmarva peninsula, where it initially was selected for the nursery firms of that region that have cooperated with the USDA strawberry breeding program and continue to do so: The Allen Co., Brittingham Plant Farms, Bunting’s Nursery, and Rayner Brothers. The

‘marvel’ suffix alludes to the remarkable aroma and flavor of ‘Delmarvel’ fruit.

Origin and testing history

‘Delmarvel’, tested as MDUS 4923, was a seedling from the ‘Earliglow’ x ‘Atlas’ cross made by A.D. Draper in Beltsville, Md., in 1977 (Fig. 1). Seedlings from this cross were screened for resistance to a five-race composite of the red-stele root-rot-inciting fungus *P. fragariae* in a greenhouse test in Beltsville during Winter 1977–78. Resistant seedlings were transplanted in Spring 1978 to a field at the Univ. of Maryland experimental farm at Wye Research and Education Center, Queenstown, on Maryland’s Eastern Shore. ‘Delmarvel’ was selected in 1979 by G.J. Galletta and A.D. Draper. Plants of the selection were retested for reaction to five races of *P. fragariae*.

‘Delmarvel’ was evaluated in Beltsville from 1980 to 1988 and 1992 to 1994 and was sent for testing to cooperators in Ohio, New Jersey, Pennsylvania, Kentucky, and western North Carolina. Regional testing of ‘Delmarvel’ was postponed after 1988 until sufficient virus-free plants became available for planting in replicated trials in Beltsville and for distribution to cooperating locations. ‘Delmarvel’ plants were increased by micro-propagation from virus-negative mother stock and were released to nurseries in 1994.

Technical description. Plants are vigorous, slightly dense, and produce runners freely. Leaves are medium yellow-green (top) and silver green (bottom). Margins cup upwards, and laminae are slightly rugose. Marginal serrations are broad and acuminate. All leaflets are the same size; central leaflets are broadly ovate. Veins on leaf undersides are prominent and hairy; petioles are thick with medium pubescence. Younger leaves and fruit peduncles have heavy pubescence, the hairs at 90° to the stem axes.

Fruit are conic with broad shoulders, a blunt apex, and a slight neck; calyx is reflexed at maturity. Skin is glossy dark red, and flesh is pink to light red (Fig. 2). Achenes are yellow and slightly recessed. Skin toughness is me-

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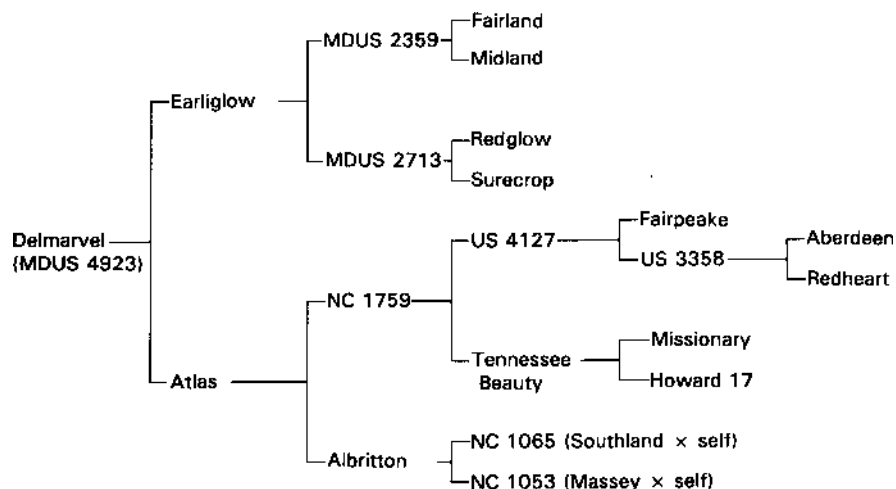


Fig. 1. Pedigree of ‘Delmarvel’ strawberry.

dium, and flesh is medium firm. Flesh consistency is uniform and smooth. The flavor is balanced and subacidic—pleasant for fresh consumption without sugar. The aroma is strong, lingering, and typically strawberry-like. Size over the ripening season varies from large early (20 to 25 g/berry) to medium to small in late season (5 to 8 g/berry). In Beltsville during 1994, 82% of the 'Delmarvel' crop was >10 g/berry compared to 67% for 'Allstar', 60% for 'Lester', and 42% for 'Earliglow'.

Production. Each year from 1986 to 1988, and 1991 to 1993, 'Delmarvel' was established in Beltsville with several standard cultivars (Galletta, 1989) in 1.5-m-long plots and 1 m between plots in a matted-row system. Overhead irrigation for frost protection and drip-tubing for supplemental irrigation were provided. In Cream Ridge, N.J., 2-m-long plots of standard cultivars (Galletta, 1989) and 'Delmarvel' were established in a matted-row system in 1991 and 1992. In Lexington, Ky., standard cultivars (Caldwell, 1989; Luby, 1989) and 'Delmarvel' were established in matted-row, 1.83-m-long × 0.46-m-wide plots on 0.91-m centers in 1992. In Fletcher, N.C., standard cultivars (Caldwell, 1989) and 'Delmarvel' were established as plug plants on plastic-covered raised beds in 1992. Plots were 1.5 m long with 10 plants set 30 cm apart in double rows and with 1.2 m between beds. Each plant in Fletcher was inoculated several times with conidia of *C. acutatum* during the bloom–green fruit stages to ensure field infection of fruit. In addition, stolons of several genotypes were inoculated with conidia of *C. acutatum* race A-1 and were incubated in a moist chamber under a 12-h photoperiod at 28C in a temperature-controlled growth chamber. Three plants of each genotype were inoculated, and tests were run three to four times. Disease development was evaluated 7 days after inoculation. In Wooster, Ohio, standard cultivars (Luby, 1989) and 'Delmarvel' were established in 2-m-long plots in a matted-row system in 1989. Fruit samples were obtained at full ripeness and were evaluated objectively for fruit firmness, percent drip loss, percent soluble solids (SSC) and titratable acidity, and skin and flesh color, using standard techniques (Scheerens and Breneman, 1991). In addition, the aroma (volatile flavor components) of the fresh-pressed juice from each cultivar was assessed organoleptically by a sensory panel of 20 members previously screened for their olfactory acuity.

All plantings were established in a randomized complete-block design with four replications of each entry, except with five replications in Fletcher. Separate analyses of variance (ANOVAs) were performed for each character for site, year, and season. Yield analysis was done on absolute yields, then converted to tons per hectare for site and year comparisons. Means were compared with Duncan's multiple range test at $P \leq 0.05$.

The total yield of 'Delmarvel' was similar to that of 'Earliglow' and usually similar to that of other standard cultivars in the 1988, 1992, 1993, and 1994 seasons in Beltsville (Table 1). In Cream Ridge, the yield of

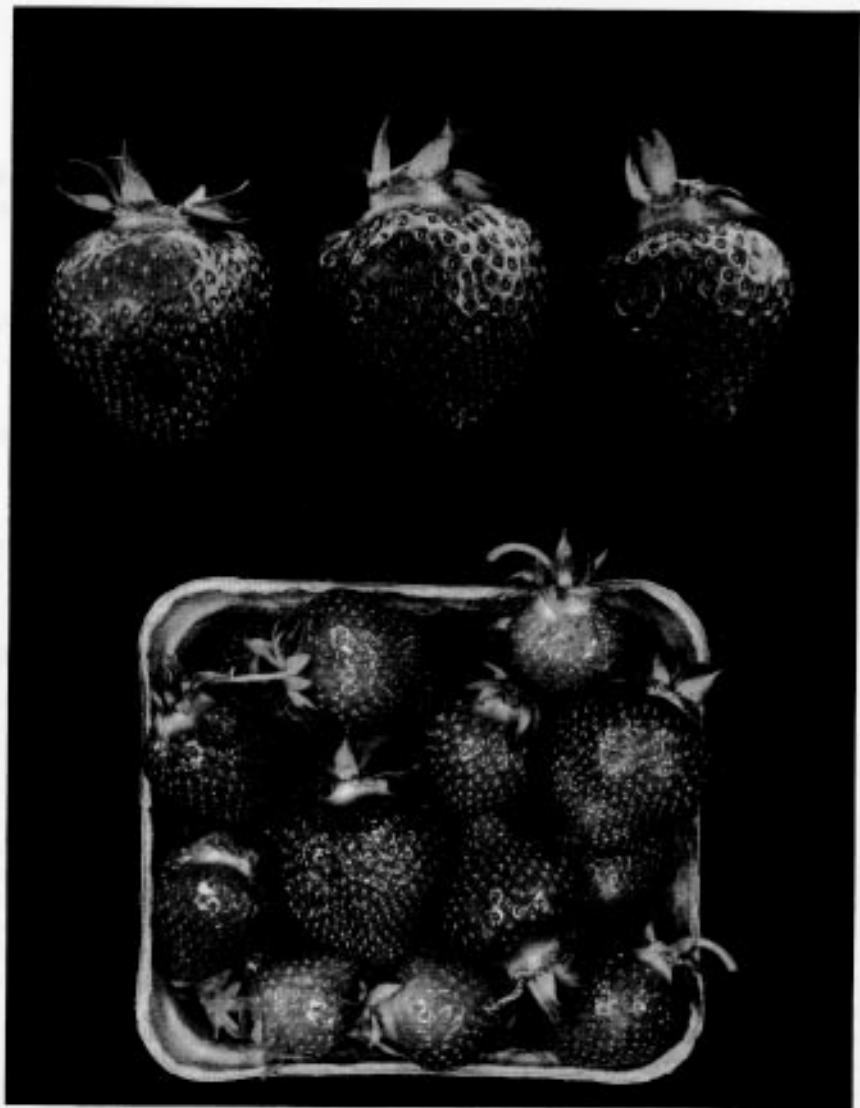


Fig. 2. 'Delmarvel' strawberry fruit.

Table 1. Fruit production of 'Delmarvel' and several standard strawberry cultivars in Beltsville, Md., 1988 and 1992 to 1994.

Cultivar	Yield		Berry wt (g)		Proportion through 4th harvest (%)
	Total (t·ha ⁻¹)	Marketable (%)	Largest	Mean	
			1988		
Allstar	34.3 a ^z	86 a	25.2 a	15.1 a	32 c
Lester	31.7 a	84 ab	21.4 ab	12.5 b	47 b
Honeoye	29.6 a	78 b	24.4 a	13.3 ab	55 b
Earliglow	26.2 ab	82 ab	22.5 ab	12.0 b	69 a
Delmarvel	18.7 b	81 ab	17.8 b	11.7 b	66 a
			1992		
Allstar	17.6 a	77 a	23.8 a	14.0 a	11 c
Lester	21.2 a	80 a	23.1 a	12.7 a	34 b
Earliglow	16.7 a	75 a	18.7 a	11.8 a	73 a
Delmarvel	17.9 a	78 a	22.6 a	14.5 a	34 b
			1993		
Allstar	22.1 a	87 a	22.0 a	14.0 a	29 c
Lester	18.6 a	91 a	22.0 a	11.0 b	46 b
Earliglow	18.1 a	89 a	16.0 b	9.0 c	72 a
Delmarvel	15.2 a	88 a	18.0a b	11.0 b	77 a
			1994		
Allstar	14.1 a	89 a	20.5 ab	12.2 a	41 c
Lester	14.2 a	84 ab	21.4 a	10.9 ab	59 b
Earliglow	10.1 a	70 c	15.0 b	8.7 b	77 a
Delmarvel	12.9 a	79 b	22.5 a	13.1 a	77 a

^zMean separation in columns within years by Duncan's multiple range test at $P \leq 0.05$.

'Delmarvel' was similar to that for 'Raritan' and 'Earliglow' in some seasons and slightly lower in others (Table 2). In Lexington, 'Delmarvel' yielded about the same as 'Honeoye', 'Glooscap', 'Cavendish', 'Kent', and 'Allstar' and more than 'Earliglow' or 'Lateglow' in 1993 (Table 3). Total yield of 'Delmarvel', grown in Fletcher on raised beds with plastic mulch, was similar to that for 'Sweet Charlie' but lower than that for 'Apollo' (Table 4).

The percentage of marketable fruit of 'Delmarvel' was generally higher than the other cultivars in Beltsville, except in 1994 when the marketable percentage of 'Delmarvel' fruit was lower than for 'Allstar' but higher than for 'Earliglow' (Table 1). The marketable

percentage of fruit for 'Delmarvel' plants grown in Fletcher was higher than for 'Apollo' and 'Chandler' but lower than for 'Sweet Charlie' (Table 4).

Fruit characteristics. Fruit weight of 'Delmarvel' is similar to that of many large-fruited standard cultivars. In Beltsville, the weight of primary 'Delmarvel' berries varied from 17.8 g in 1988 to 22.6 g in 1992 (Table 1). The average weight of 'Delmarvel' fruit was higher than that of its 'Earliglow' parent in two of the four reported years in trials in Beltsville (Table 1). In Cream Ridge, the weight of 'Delmarvel' primary fruit was similar to those for 'Raritan' and higher than that for 'Earliglow'. The average fruit weight of 'Delmarvel' usually exceeded that for

'Earliglow' and was similar to that of 'Raritan' (Table 2). In Lexington, the average 'Delmarvel' fruit weight in the first harvest, mostly primary berries, was similar or superior to that of the other cultivars in the trial (Table 3). Average fruit weight of 'Delmarvel' grown in Fletcher, was similar to that of 'Chandler' and 'Sweet Charlie' but lower than for 'Apollo' (Table 4).

'Delmarvel' fruit are attractive and symmetrical and have good color and flavor. Fruit appearance, symmetry, firmness, texture, external and internal color, and flavor of 'Delmarvel' plants grown for several years in Beltsville generally were rated very high (Table 5). The fruit quality index, an average of these fruit characteristics' field rating scores for 'Delmarvel' in 1992, 1993, and 1994, ranged from 75 to 77 of a maximum score of 90, indicating a consistent production of fruit with exceptional quality. In Fletcher, fruit of 'Delmarvel' were rated similar or superior to 'Apollo', 'Sweet Charlie', and 'Chandler' in all fruit quality characteristics, except that internal fruit color was rated lower than for 'Chandler' (Table 4). Internal firmness of 'Delmarvel' fruit produced at Wooster was rated lower than for 'Lester', similar to that of 'Earliglow' and 'Allstar', and higher than for 'Lateglow' (Table 6). Percent drip loss (27.5%), SSC (8.9%), and titratable acidity (0.72%) of 'Delmarvel' fruit is similar to those of 'Earliglow' (Table 6). 'Delmarvel' fruit are deep red externally and internally (Table 6). The relatively high sugar : acid ratio of 'Delmarvel' fruit may be responsible, in part, for the outstanding flavor of this cultivar. Indeed, a 20-member sensory panel judged 'Delmarvel' fruit to have an intense, well-balanced, pleasing strawberry aroma (Table 6).

Time of flowering and ripening. 'Delmarvel' flowered in Beltsville with 'Earliglow' and flowered earlier than 'Allstar' in 1988 and 1994 (Table 7). 'Delmarvel' fruit ripened as early as that of 'Earliglow' and earlier than 'Lester' and 'Allstar' fruit in Beltsville in 1988, 1993, and 1994 (Table 1). In 1992, however, 'Delmarvel' ripened later than 'Earliglow' and with 'Lester'. In Lexington, 'Delmarvel' ripened later than 'Earliglow' and earlier than 'Glooscap', 'Allstar', 'Cavendish', or 'Lateglow' (Table 3). The

Table 2. Yield and fruit weight of 'Delmarvel' and standard strawberry cultivars planted in Cream Ridge, N.J., 1991 and 1992.

Cultivar	Total yield (t·ha ⁻¹)		Fruit wt (g)		
	Planting		Mean		Primary fruit
	1991	1992	1991	1992	Planting 1991
	1992				
Raritan	17.4 a ^z	---	9.2 b	---	18.3 a
Earliglow	17.4 a	---	8.4 b	---	13.6 b
Delmarvel	17.0 a	---	11.1 a	---	19.4 a
	1993				
Raritan	10.6 a	12.2 a	10.0 ab	10.6 a	---
Earliglow	7.3 b	12.7 a	8.8 b	8.4 b	---
Delmarvel	9.7 b	9.7 b	11.5 a	11.8 a	---

^zMean separation in columns within years by Duncan's multiple range test at $P \leq 0.05$.

^yData not taken.

Table 3. Total yield, fruit weight, and bed density of 'Delmarvel' and several standard strawberry cultivars in Lexington, Ky., 1993.

Cultivar	Yield		Mean fruit wt, harvest 1 (g)	Bed density ^z
	Total (t·ha ⁻¹)	Proportion through harvests 1 to 3 (%)		
Honeoye	20.8 a ^y	51 bc	17.5 ab	3.75 b
Glooscap	18.2 ab	38 d	11.6 c	2.75 b
Delmarvel	17.3 ab	62 b	21.3 a	5.00 a
Cavendish	15.1 a-c	43 cd	21.0 a	3.00 b
Kent	13.9 bc	52 bc	20.7 ab	1.50 c
Allstar	12.1 b-d	43 cd	19.6 ab	3.25 b
Earliglow	9.7 cd	76 a	15.9 bc	3.75 b
Lateglow	7.4 d	24 e	21.3 a	3.50 b

^zBed density rating of 1 = low to 5 = high, reflecting plant and canopy density across each plot. Ratings made at time of fruiting for each cultivar.

^yMean separation in columns by Duncan's multiple range test at $P \leq 0.05$.

Table 4. Yield, fruit size and characteristics, and percent anthracnose of 'Delmarvel' and several standard strawberry cultivars grown in Fletcher, N.C., 1993.

Cultivar	Yield			Mean fruit wt (g)	Ratings ^z							
	Proportion through 6th harvest (%)	Total (t·ha ⁻¹)	Marketable (%) ^y		Color			Skin tough.	Flavor	Anth. (%) ^x		
					App.	Firm.	Sym.				Ext.	Int.
Apollo	58 ^w	12.5 a	65 d	13.6 a	7.0 bc	7.2 b	7.1 a	7.0 b	7.0 b	7.0 c	6.9 b	13.5 a
Chandler ^v	18	3.9 c	70 c	12.3 ab	7.2 ab	7.3 b	7.2 a	7.3 ab	7.6 a	7.4 ab	7.4 a	6.3 b
Sweet Charlie	33	7.1 b	92 a	12.2 ab	6.8 c	7.0 b	7.2 a	7.4 a	7.1 b	6.8 c	7.3 a	1.0 c
Delmarvel	35	7.6 b	89 b	11.3 b	7.4 a	7.7 a	7.3 a	7.4 a	6.9 b	7.7 a	7.2 a	1.8 c

^zApp. = appearance; firm. = firmness; sym. = symmetry; color (ext. = external, int. = internal); tough. = skin toughness; anth. = anthracnose. Subjective rating scale was as follows: <6.0 = unacceptable, 6.0 = acceptable, 7.0 = good, and >7.5 = superior.

^yYield losses were due to anthracnose on fruit, other fruit rots, or small or misshapen berries.

^wPercent fruit loss by weight.

^vMean separation in columns by Duncan's multiple range test at $P \leq 0.05$.

^xPlanted 2 weeks later than normal due to unavailability of plants on the optimum planting date.

Table 5. Field rating scores for fruit characteristics of 'Delmarvel' strawberry and several standard cultivars in Beltsville, Md., in 1988 and indices of fruit quality ratings in 1988 and 1992 to 1994.

Cultivar	Appearance	Symmetry	Flesh firmness	Skin toughness	Color			Fruit quality index ^z			
					External	Internal	Flavor	1988	1992	1993	1994
Allstar	8 ^y	7-8	7-8	7-8	8	7-8	7-9	76	75	73	---
Lester	7-8	7-8	7-8	7-8	7-8	6-7	7	73	76	76	78
Honeoye	6-7	6-7	6-7	6	5-7	7	7	65	---	---	---
Earliglow	8	7-8	7-8	7-8	7	7-8	7-9	76	77	74	77
Delmarvel	7	7-8	8	7-8	6-7	7	7-8	73	75	76	77

^zAverages of the seven listed characters in the first part of the table multiplied by 10 to give whole numbers (90 is a perfect score).

^yRatings on a scale from 1 to 9, where 9 = best quality and 6 = acceptable.

^xNot rated.

Table 6. Fruit quality characteristics of 'Delmarvel' and standard strawberry cultivars grown in Wooster, Ohio, in 1989.

Cultivar	Firmness (g) ^w	Drip loss (%) ^v	SSC (%) ^u	TA (%) ^t	SSC/TA	Color						Juice aroma ^x		
						External (skin) ^z			Internal (flesh) ^y			Inten.	Pleas.	Strawb.
						L	θ	SI	L	θ	SI			
Lester	75 a ^s	22.8 b	7.6 cd	0.59 ab	12.9	29.6 b	30.7 a-c	18.6 b	53.5 a	45.4 a	28.2 b	88 ab	93 b	98 bc
Delmarvel	60 b	27.5 ab	8.9 ab	0.72 ab	12.4	27.5 c	29.7 bc	15.2 c	37.1 d	33.2 b	32.7 a	106 a	122 a	126 a
Earliglow	58 b	29.5 ab	9.2 a	0.68 ab	13.5	28.4 bc	28.8 c	17.3 bc	41.4 c	35.8 b	35.4 a	80 b	96 b	116 ab
Allstar	54 b	32.1 ab	7.2 d	0.53 b	13.6	33.8 a	31.6 ab	25.9 a	48.0 b	43.2 a	33.4 a	86 ab	76 b	86 c
Lateglow	33 c	38.5 a	8.3 bc	0.77 a	10.8	35.0 a	33.2 a	28.0 a	47.2 b	42.4 a	33.3 a	82 ab	86 b	82 c

^zDetermined by color reflectance values, n = 7 with three subsamples per berry; L indicates lightness to darkness with 100 = pure white and 0 = pure black; θ = hue angle, in degrees, with 90 = pure yellow and 0 = pure red; SI (saturation index) is a measure of pigment intensity with higher values indicating greater pigmentation.

^yDetermined by color reflectance values, n = 7 with two subsamples per berry. L, θ, and SI as previously described.

^xDetermined by sensory evaluation (judges = 20). For aroma intensity, 0 = weak or imperceptible; 165 = strong, overpowering. For pleasantness of aroma, 0 = harsh and unpleasant, 165 = extremely pleasant. For strawberry-likeness of aroma, 0 = not at all like strawberries, 165 = exactly like strawberries.

^wCortical firmness determined by Instron analysis of a 1-cm-thick axial slice of fruit, n = 7.

^vDetermined from 100-g bulk lots, n = 2.

^uSSC = total soluble solids content, n = 7.

^tTA = total acidity, determined from 10-g samples, n = 2.

^sMean separation in columns by Duncan's multiple range test at P ≤ 0.05.

ripening season of 'Delmarvel' was similar to that of 'Sweet Charlie' in Fletcher in 1993 (Table 4).

Plant growth and characteristics. Plants of 'Delmarvel' grow vigorously, produce abundant runner plants, and are similar or superior to 'Lester', 'Earliglow', or 'Allstar' in these respects in Beltsville (Table 7). Plant stands of 'Delmarvel' tended to be higher in spring than in fall. Vigor of 'Delmarvel' plants was rated slightly lower than for 'Earliglow' plants in 1988. However, vigor of 'Delmarvel' plants was rated similar or superior to the vigor of 'Earliglow' plants in 1994. Bed density of 'Delmarvel' plots in Lexington was rated superior to those for all other cultivars (Table 3). 'Delmarvel' apparently is equally well-adapted to matted-row culture and raised-bed plasticulture, although its performance with plasticulture in Fletcher probably was at the southern limits of its range of adaptability.

Disease resistance

'Delmarvel' plants rated well for freedom from leaf diseases in Beltsville over four growing seasons: fall of the planting years (1987 and 1993) and spring (1988 and 1994) and summer (1988) (Table 7). Because we relied on natural infection in the field (with no applications of postharvest fungicides), incidence and severity of the commonly encountered leaf diseases may vary from season to season and from year to year, depending on availability of inoculum and weather conditions. In 1988, 'Delmarvel' plants scored ≥6.8 of a maximum score of 9.0 for freedom from leaf

diseases in all three seasons, and in 1994, it scored ≥6.9 in the two seasons it was recorded. These ratings were similar or superior to the standard cultivars in each year's test. Leaf diseases encountered were powdery mildew [caused by *Sphaerotheca macularis* (Wallr. ex Fr.) Jacz. f.sp. *fragariae*], leaf scorch [caused by *Diplocarpon earliana* (Ell. & Ev.) Wolf], and leaf blight [caused by *Phomopsis obscurans* (Ell. & Ev.) Sutton].

Initially screened as a seedling to a mixture of *Phytophthora fragariae* races A-1, A-2, A-3, A-4, and A-6 in a greenhouse bench test (Scott et al., 1975), 'Delmarvel' plants were retested as an advanced selection to confirm resistance to red-stele disease. On a scale from 1 to 9 (1 = dead plant; 9 = apparently healthy plant), 'Delmarvel' consistently rated 8.0 to 9.0, indicating that it is resistant to at least these five races of *P. fragariae* (Table 7).

Table 7. Earliness of flowering, plant characteristics (field rating scores), and resistance to *Phytophthora fragariae* (in greenhouse bench tests) of 'Delmarvel' strawberry and several standard cultivars in Beltsville, Md., in 1988 and 1994.

Cultivar	Flower stage	Plant rating score ^z							P. <i>fragariae</i> resistance
		Plant				Leaf diseases			
		Stand		Vigor		Fall	Spring	Summer	
1988									
Allstar	4.3 c ^{y,x}	7.9 a	8.2 a	8.5 ab	8.8 ab	6.6 a	7.1 a	5.6 c-e	8.5 ^w (R)
Lester	5.5 b	7.9 a	8.0 a	8.4 ab	8.0 a-c	6.9 a	7.6 a	7.6 a	8.5 (R)
Honeoye	6.0 ab	7.4 a	7.2 a	7.3 b	7.5 c	7.0 a	6.4 b	5.3 d	3.0 (S)
Earliglow	6.8 a	8.8 a	8.8 a	8.8 a	9.0 a	5.5 b	7.0 ab	6.5 bc	8.5 (R)
Delmarvel	6.8 a	7.4 a	8.4 a	7.2 b	7.8 bc	7.1 a	7.1 a	6.8 ab	8.8 (R)
1994									
Allstar	5.0 b	6.5 b	6.3 b	7.8 a	8.0 a	7.5 a	5.8 c	---	---
Lester	7.8 a	7.0 b	6.8 b	7.8 a	7.5 a	7.0 a	6.5 ab	---	---
Earliglow	8.9 a	7.5 ab	7.3 b	7.3 a	6.8 b	6.3 b	5.9 bc	---	---
Delmarvel	7.0 a	8.3 a	8.8 a	8.0 a	8.3 a	7.5 a	6.9 a	---	---

^zRatings on a scale from 1 to 9, where 9 was the best quality.

^yRatings on a scale from 1 to 9, where 1 = few flowers open, 3 = all primary flowers open, 5 = 50% open, 7 = 75% open, and 9 = 100% of the flowers open at the rating time.

^xMean separation in columns within years by Duncan's multiple range test at P ≤ 0.05.

^wRatings on a scale from 1 to 9, where 1 = plant dead and 9 = plant apparently healthy. R = resistant; S = susceptible.

^vNot rated.

In stolon inoculation tests performed in a growth chamber in Raleigh, N.C., 'Delmarvel' (15 mm mean lesion length) was rated resistant to infection by *C. acutatum*, compared to susceptible 'Chandler' plants (70 mm mean lesion length) (R.D. Milholland, unpublished data).

Fruit of 'Delmarvel' were less affected by anthracnose than 'Chandler' or 'Apollo' in field inoculation trials in Fletcher (Table 4). Fruit loss of 'Delmarvel' due to anthracnose incidence was similar to that for 'Sweet Charlie'.

Plant availability

For a list of nursery sources for 'Delmarvel' plants, interested parties should contact G.J.G., USDA/ARS, Fruit Laboratory, 10300 Baltimore Blvd., Beltsville, MD 20705.

Literature Cited

Caldwell, J.D. 1989. Southern United States strawberry cultivars. *Fruit Var. J.* 43(1):33-37.
Galletta, G.J. 1989. Northeastern United States strawberry cultivars. *Fruit Var. J.* 43(1):31-33.

Luby, J.J. 1989. Midwest and plains states strawberry cultivars. *Fruit Var. J.* 43(1):22-31.
Scheerens, J.C. and G.L. Breneman. 1991. Fruit quality patterns among strawberry cultivars based on decade of release or area of adaptation, p. 111-114. In: A. Dale and J.J. Luby (eds.). *The strawberry into the 21st century*. Timber Press, Portland, Ore.
Scott, D.H., J.L. Maas, and A.D. Draper. 1975. Screening strawberries for resistance to *Phytophthora fragariae* with single versus a composite of races of the fungus. *Plant Dis. Rptr.* 59:207-209.