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'Centennial' Red Raspberry

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'Centennial' is a new red raspberry (*Rubus idaeus* L.) cultivar jointly released by Washington State Univ., Univ. of Idaho, and Oregon State Univ. 'Centennial' has been noted for its large, bright, glossy, medium-red fruit that is ideally suited for the fresh market. The name 'Centennial' was selected to commemorate the 1989-90 Washington State Univ. centennial.

Origin

'Centennial' was selected by B.H.B. in 1978 at Puyallup, Wash., from the 1974 cross made by H.A.D. of 'Meeker' × 'Skeena'. It has been tested throughout the Pacific Northwest as WSU 738. 'Meeker' was released from the Washington State Univ. breeding program in 1967 (Brooks and Olmo, 1972) and is one of the leading commercial cultivars in the Pacific Northwest. 'Skeena' was released from the Agriculture Canada breed-

ing program in British Columbia (B.C.) in 1978 (Daubeny, 1978) and is also commercially important in the Pacific Northwest. 'Skeena' was also the male parent of two other 1974 crosses that resulted in the release of 'Chilliwick' and 'Comox' from the Agriculture Canada, B.C., program in 1987 (Daubeny, 1987).

Performance and Description

The yield of 'Centennial' equalled or exceeded that of three established Pacific Northwest cultivars in replicated trial plantings at three locations (Vancouver, Puyallup, and Mt. Vernon) in Washington (Table 1). There were significant cultivar, year, location × year and cultivar × year effects (location and location × year data not shown). The lower yields in 1986 were primarily the result of winter damage in Nov. 1985. Damage was particularly severe at Puyallup, where -14C was recorded in Nov. 1985.

The fruit of 'Centennial' is large, consistently heavier than 'Chilcotin', 'Meeker', and 'Willamette', three widely grown Pacific Northwest cultivars (Table 1): The fruit has an attractive, long, conic shape and is a bright glossy medium red (Fig. 1). The color of 'Centennial' and the other cultivars is indicated by the anthocyanin concentration (Table 2). Previous work (Sjulin and Robbins, 1987) indicated close agreement between anthocyanin concentration and value in Munsell notation. The increase in anthocyanin concentration in storage at 4C was similar to 'Meeker' and 'Chilcotin', but much less than for 'Willamette' fruit (data not shown). The fruit has a pleasant, mild flavor as determined by us. The soluble solids content is similar to 'Chilcotin', but less than 'Meeker', and the titratable acidity is intermediate between 'Meeker' and 'Chilcotin' (Table 2). The fruit of 'Centennial' is equal to the standard cultivars for firmness (Table 2). The fruit does not separate easily from the receptacle, and, therefore, it is not well-suited to machine-harvesting.

In commercial trials, a few growers received planting stock in which some or all of the plants had crumbly fruit. The crumbly fruit was not associated with raspberry bushy dwarf virus (RBDV), tomato ringspot virus, or with the raspberry mosaic virus complex (Martin, 1988). The plants with crumbly fruit could all be traced back to a single micropropagated source, and the defect was most likely the result of a somatic mutation either during micropropagation or in the stock plant (Jennings, 1967). Plants of this propagation stock have been destroyed. Plants from other propagators and nuclear stock have not exhibited crumbly fruit.

'Centennial' is not a prolific producer of primocanes, but the number produced is ad-

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Fig. 1. Fruit of 'Centennial' red raspberry.

Table 1. Yield and fruit weight of 'Centennial' compared to standard Pacific Northwest red raspberry cultivars.

Cultivar	Total yield (kg/stool) ^{2,3}				Fruit wt* (g)
	1985	1986	1987	Mean	
Centennial	3.22 a	2.56 a	5.52 a	3.83	4.24 a
Chilcotin	2.83 a	2.64 a	5.00 a	3.49	3.65 b
Meeker	3.03 a	2.77 a	4.97 a	3.59	3.42 b
Willamette	2.76 a	2.35 a	3.59 b	2.90	3.43 b

*Evaluated at Vancouver, Puyallup, and Mt. Vernon, Wash. There were significant cultivar, year, location × year, and cultivar × year effects, but no location × cultivar interactions. Mean of three replications of four stools at each location. 3.50 kg/stool = 15,700 kg·ha⁻¹.

²Mean separations within columns by Duncan's multiple range test, *P* = 0.05.

³Mean of three years for three replications of four stools at each location.

Table 2. Fruit characteristics of 'Centennial' compared to standard Pacific Northwest red raspberry cultivars.²

Cultivar	Soluble ² solids (%)	Titrateable ² acidity (% citric)	Fruit* firmness (N)	Anthocyanin ² concn (mg/100 g)
Centennial	8.7 b ²	1.18 c	1.41 a	24.0 b
Chilcotin	8.4 b	1.73 a	1.36 a	23.4 b
Meeker	10.0 a	0.90 d	1.32 a	22.9 b
Willamette	6.9 c	1.38 b	1.43 a	31.3 a

*Mean separations within columns by Duncan's multiple range test, *P* = 0.05.

²Mean of four replications harvested at Puyallup, Wash., 13 July 1984.

³Means for weekly harvest of three replications of four stools at Puyallup in 1985–87.

⁴Mean of three harvests at red-ripe stage of maturity at Puyallup in 1983. Anthocyanin concentration expressed as mg of cyanidin 3-galactosidase/100 g tissue (Torre and Barritt, 1977).

bility to cold, aphids, and diseases as noted above, plantings were vigorous at all test locations, even though no insecticides or fungicides were used. Despite its susceptibility, 'Centennial' had large fruit and the yield equalled or exceeded standard cultivars to which it was compared for the 3-year test period at the three Washington locations (Table 1).

Adaptabilities and uses

'Centennial' appears to be well-adapted in southern portions of the Pacific Northwest (south of about 48°N). It has not been reliably cold hardy at Abbotsford, B.C., and is not recommended where 'Meeker' may be damaged by cold. The fruit should meet the requirements of both fresh-market and processing uses; however, it is not suited to machine-harvesting.

Although it has not been rigorously tested outside the Pacific Northwest, 'Centennial' has yielded well and produced large fruit at Raleigh, N.C. It also is being grown commercially around Watsonville, Calif. These indications suggest that 'Centennial' may be adapted to areas south of the location it was developed and tested.

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equate once the planting is established. The reduced number of primocanes may be an advantage with the increasing restrictions in the use of chemicals for cane growth control, i.e., primocane suppression. Young primocanes are pubescent and have many dark purple, moderately soft prickles, 0.5 to 1 mm long, with 0.5-mm-diameter dark purple spots at the base of the prickles. There is a slight reddening of the lower surface of the petiole. Primocanes are very robust, reaching >4 m in length and 2 cm in diameter. The flowering laterals are long and strong, not as upright as 'Skeena' but more so than 'Meeker'.

At Puyallup, the cold hardiness of 'Centennial' was similar to 'Meeker', as indicated by the reduction in yield after the severe 1985 winter. At Abbotsford, 'Centennial' has consistently suffered more winter damage than 'Meeker'.

Disease and pest reactions

'Centennial' is susceptible to *Amphorophora agathonica* Hottes, the aphid vector of the raspberry mosaic virus complex. However, in the Pacific Northwest, *A. agathonica* is most prevalent in British Columbia and northern Washington (Martin, 1988), where 'Centennial' would not be recommended because of potential winter damage. At Puyallup, where there is a high frequency of RBDV, 'Centennial' has tested positive for the virus using the ELISA technique.

Reactions of 'Centennial', in comparison to other Pacific Northwest cultivars, to diseases caused by fungi are given in Table 3. 'Chilliwack' and 'Comox' are included as recent releases sharing 'Skeena' as a parent. 'Centennial' has exhibited some resistance to root rot at Puyallup.

Although 'Centennial' exhibits suscepti-

Table 3. Disease reactions of 'Centennial' compared with six Pacific Northwest red raspberry cultivars.²

Disease	Centennial	Chilliwack	Comox	Chilcotin	Meeker	Skeena	Willamette
<i>Rhizopus</i> spp.) Spur blight (<i>Didymella applanata</i> (Niessl) Sacc.)	1	3	2	2	1	2	1
Cane botrytis							
KOOL ROT (<i>Phytophthora erythroseptica</i> Pethyb.)	3	3	1	2	3	1	2

²Disease reactions are based on observations made in several years and usually from more than one trial site at Abbotsford, B.C., and Puyallup, Wash.

³Ratings, 5 = resistant and 1 = highly susceptible.