'Cascade Nectar' Red Raspberry

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'Cascade Nectar' is a new floricaner fruiting red raspberry (*Rubus idaeus* L.) jointly released by Washington State University (WSU), University of Idaho, and the U.S. Dept. of Agriculture–Agriculture Research Service (USDA–ARS). 'Cascade Nectar' has been noted for high yields of medium size, soft fruit with an excellent tart raspberry flavor. The fruit has been successfully machine harvested. The fruit has been used commercially in the production of a raspberry liqueur. Because of its high productivity, some additional uses of the fruit may be found, but most likely 'Cascade Nectar' will have a small, specialized market.

Origin

'Cascade Nectar' was selected from a cross of WSU 608 and 'Tulameen' (Fig. 1) made at WSU Puyallup Research and Extension Center (WSU Puyallup). 'Cascade Nectar' has a diverse background, including cultivars and selections from the Agriculture and Agri-Foods Canada Pacific Agri-Food Research Centre, Agassiz, British Columbia; Canada Department of Agriculture, Research Station, Ottawa, Ontario; Horticulture Research International, East Malling, Kent, U.K.; Scottish Crop Research Institute, Invergowrie, Dundee, Scotland; USDA–ARS, Corvallis, Oregon and WSU Puyallup breeding programs. The cross for 'Cascade Nectar' was made in 1990, seedlings from the cross were planted in the field in 1991 and 'Cascade Nectar' was selected in 1994 and evaluated as WSU 1129.

Performance

Fruit of 'Cascade Nectar' were harvested at WSU Puyallup in 2001 and 2002 from a planting established in 1998. The planting was a randomized complete-block design, with three, three-plant replications, and 0.9 m between plants and 2.4 m between rows. Fruit was harvested one or two times a week depending on environmental conditions. The average fruit weight for the season was calculated as a weighted mean based on the weight of a randomly selected 25 fruit subsample from each plot from each harvest weighted by

the yield for each harvest. Fruit firmness was measured as the force required to close the torus and was calculated as a weighted mean based on a randomly selected five fruit subsample from each plot from each harvest weighted by the yield for each harvest. 'Cascade Delight', 'Cascade Nectar', 'Meeker', 'Tulameen', and 'Willamette' were the named cultivars that were harvested in this planting. 'Meeker' is the most widely grown raspberry in the Pacific Northwest (Moore, 1993). 'Tulameen' is grown worldwide for fresh use (Kempner and Daubeny, 1999). Variables analyzed were yield, fruit weight, fruit firmness, midpoint of harvest and length of harvest season. Data were analyzed as a factorial using ANOVA (SAS 8.1, SAS Inst. Inc., Cary, N.C.) with cultivar and year as main effects.

There were significant cultivar effects for all variables, but no significant cultivar × year effects (Table 1). 'Cascade Nectar' had the largest yield of the cultivars tested. Fruit

weight for 'Cascade Nectar' was similar to 'Meeker' and 'Willamette' and the fruit was significantly softer than the other cultivars. The midpoint of harvest for 'Cascade Nectar' was similar to 'Cascade Delight' and 'Meeker'. No primocane flowers or fruit have been observed on 'Cascade Nectar' at WSU Puyallup.

'Cascade Nectar' has been successfully machine harvested by a commercial grower in Mt. Vernon, Wash. 'Cascade Nectar' has been productive in this planting. The fruit has been used commercially in the production of a raspberry liqueur.

Winter hardiness of 'Cascade Nectar' is unknown as there has not been any significant winter damage for any raspberries in any of the plantings at WSU Puyallup when 'Cascade Nectar' was tested.

Fruit Description

'Cascade Nectar' has an excellent tart red raspberry flavor with a spicy aftertaste. The fruit is short conic in shape and has a bloom on the fruit surface (Fig. 2). Frozen fruit samples of 'Cascade Nectar' and 'Meeker' from the 2001 harvest season at Puyallup, were analyzed for pH, titratable acidity, soluble solids, and total anthocyanins. Titratable acidity was expressed as citric acid equivalents. Total anthocyanins were determined spectrophotometrically from acidified ethanol extracts and expressed as cyanidin 3-galactoside (Torre and Barritt, 1977). The

Fig. 1. Pedigree of 'Cascade Nectar'.

Table 1. Harvest data for five red raspberry cultivars in 2001 and 2002 from 1998 planted raspberries at Washington State University, Puyallup.

Cultivar	Yield ² (kg/hill)	Fruit wt (g)	Fruit firmness (N)	Midpoint of harvest	Length of season (d)
Cascade Nectar	5.2 a	3.2 c	1.43 d	7/21 a	28 a
Cascade Delight	4.4 b	4.9 a	2.17 a	7/21 a	23 b
Meeker	4.0 bc	3.3 c	1.85 b	7/22 a	23 b
Tulameen	4.2 bc	4.2 b	1.91 b	7/19 b	29 a
Willamette	3.5 c	3.3 c	1.61 c	7/9 c	25 b

² Means within a column followed by the same letter are not significantly different at $P \leq 0.05$, by Tukey's studentized range test (HSD).

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Fig. 2. Fruit and receptacle of 'Cascade Nectar'.

Table 2. Fruit morphological characteristics of fruit samples harvested on 6 July 2001 from 1998 planted raspberries at Washington State University, Puyallup.^z

Characteristic	Cascade Nectar	Cascade Delight	Meeker	Tulameen	WSU 608
Fruit weight (g)	4.73 c ^y	8.36 a	4.26 c	5.48 b	3.04 d
Fruit length (cm)	2.26 c	3.28 a	2.07 d	2.59 b	1.96 d
Fruit width (cm)	2.12 bc	2.41 a	2.05 b	2.18 b	1.91 d
Length to width ratio	1.06 c	1.37 a	1.01 c	1.19 b	1.03 c
Receptacle diameter (cm)	0.93 a	0.98 a	0.90 a	0.91 a	0.99 a
Length of receptacle (cm)	1.79 c	2.78 a	1.47 d	2.26 b	1.51 d
Number of drupelets	89.5 c	133.6 a	75.2 d	87.1 c	101.5 b
Drupelet weight (mg)	55.4 a	62.6 a	58.6 a	63.0 a	30.2 b
Individual seed wt (mg)	2.04 ab	2.15 a	1.99 b	2.09 ab	1.36 b
Color ^x					
L*	31.58 a	28.05 c	29.41 bc	29.84 b	31.53 a
a*	27.07 a	26.90 a	26.21 a	25.25 a	26.05 a
b*	9.84 ab	10.16 a	8.83 b	8.99 b	8.69 b

^zAnalysis of 10 fruit per cultivar.

^yMeans within a row followed by the same letter are not significantly different at $P \leq 0.05$, by Duncan's multiple range test.

^xColor measured as L*, a*, b* with a Minolta (Ramsey, N.J.) Chroma Meter CR200b.

titratable acidity and soluble solids of 'Cascade Nectar' fruit (1.13% and 10.9%, respectively) did not differ significantly from 'Meeker' (0.95% and 12.1%, respectively). The pH and total anthocyanins of 'Cascade Nectar' fruit (2.88 and 0.48 mg·g⁻¹ respectively) was less than that of 'Meeker' fruit (3.47 and 0.67 mg·g⁻¹).

Red ripe fruit samples were harvested early in the harvest season on 6 July 2001 at WSU Puyallup. Fruit of 'Cascade Nectar' were similar to 'Meeker' in weight and the length of the fruit was similar to the width (Table 2). The fruit of 'Cascade Nectar' and WSU 608 (one of its parents) were lighter (greater L* value) than the other cultivars evaluated. This may be partially the result of the bloom on the fruit of 'Cascade Nectar'.

Plant Description

'Cascade Nectar' is very vigorous, producing a similar number of canes as 'Meeker'. The plant is similar in size to 'Meeker' for cane diameter, cane length, number of nodes, and internode length for primocanes and floricanes and for lateral length of fruiting laterals (data not shown). Plants have been grown in the hill system with 10 to 12 canes retained per hill and the primocanes pruned to 1.2 m in winter. The following summer, fruiting plots were 1.6 m tall with a width of 1.7 m.

Budbreak for 'Cascade Nectar' (about 9 Mar. 2001) was similar to 'Tulameen' and earlier than 'Meeker'. The date of primocane emergence for 'Cascade Nectar' was about

26 Mar. 2001, which was about 6 d later than 'Meeker' and 'Tulameen'. Basal portions of young canes (<30 cm tall) have 20 to 40 spines per cm of cane, whereas distal portions of taller canes (>1 m in height) had spines that were much smaller and many fewer, <5 spines per cm. Spines are straight and pointed toward the base of the canes. There are pigmented spots at the base of the spine that are lighter than the spines. The spine color is similar to 'Tulameen' and much darker than 'Meeker'. The canes are glabrous and have a coating of wax.

The leaflets of the primocane leaves are generally flat in cross-section. The petioles are pubescent and also have spines that are similar (but smaller) to those on the canes. The primocane leaves are pinnately compound with five leaflets and the floricanes have three leaflets. Emerging leaves are green with some reddening. The leaves have two stipules. The basal lateral leaflets and the distal lateral leaflets of primocanes overlap slightly. The leaflets are doubly serrated and are generally ovate. The tips of all leaflets are acuminate to acute. The base of the terminal leaflet is rounded. The basal lateral leaflets of primocane leaves have petioles >1 mm and the bases of these are rounded and relatively symmetrical. The distal lateral leaflets are sessile with asymmetrical leaf bases.

Disease and Pest Reaction

'Cascade Nectar' is susceptible to the large raspberry aphid (*Amphorophora agathonica* Hottes), the vector for the mosaic virus complex and to raspberry bushy dwarf virus (RBDV) via pollen transmission. In unsprayed plots, the canes had a moderate incidence of spur blight [*Didymella applanata* (Niessl) Sacc.]. 'Cascade Nectar' does not appear to be highly resistant to root rot (*Phytophthora fragariae* var *rubi* Wilcox & Duncan).

Availability

Names of propagators with certified plants of 'Cascade Nectar' will be supplied on request. The Washington Agricultural Research Center does not have plants for sale. 'Cascade Nectar' is not patented.

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