

HORTSCIENCE 48(9):1181–1183. 2013.

‘Vintage’ Red Raspberry

Chad E. Finn¹

U.S. Department of Agriculture–Agricultural Research Service, Horticultural Crops Research Unit, 3420 NW Orchard Avenue, Corvallis, OR 97330

Bernadine C. Strik

Department of Horticulture, 4017 Agriculture and Life Sciences Building, Oregon State University, Corvallis, OR 97331

Brian M. Yorgey

Department of Food Science and Technology, 100 Wiegand Hall, Oregon State University, Corvallis, OR 97331

Robert R. Martin

U.S. Department of Agriculture–Agricultural Research Service, Horticultural Crops Research Unit, 3420 NW Orchard Avenue, Corvallis, OR 97330

Additional index words. fruit breeding, *Rubus idaeus*, primocane-fruiting, annual bearing

‘Vintage’ (Fig. 1) is a new primocane-fruiting red raspberry (*Rubus idaeus* L.) from the U.S. Department of Agriculture–Agricultural Research Service (USDA-ARS) breeding program in Corvallis, OR, released in cooperation with the Oregon State Agricultural Experiment Station and the Washington State University Agricultural Research Center. ‘Vintage’ is a high-yielding cultivar that produces large, firm fruit that are bright red-colored and have outstanding flavor. The cultivar should be widely adapted to wherever primocane-fruiting raspberries are grown and provide growers with an alternative to ‘Autumn Bliss’ or ‘Heritage’ with much better fruit quality, particularly flavor and color. An application for a U.S. plant patent has been submitted.

Received for publication 23 May 2013. Accepted for publication 21 June 2013.

This research was partially funded by the Oregon Raspberry and Blackberry Commission, the Washington Red Raspberry Commission, and from a grant through the USDA-ARS Northwest Center for Small Fruit Research.

We gratefully acknowledge Mary Peterson with the USDA-ARS, Connie Pace and Gil Buller with Oregon State University, Patrick Moore with Washington State University-Puyallup, Research and Extension Center, Puyallup, WA, Chaim Kempler and Michael Dossett with Agriculture and Agri-Food Canada (Agassiz, BC), and Ellen Thompson with Pacific Berry Breeding (Watsonville, CA) for their assistance in the evaluation of ‘Vintage’; and Nola Mosier and Kara Sarver for efforts to produce the G1 material that is free of known viruses.

Mention of trade names or commercial products in this manuscript is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the U.S. Department of Agriculture.

¹To whom reprint requests should be addressed; e-mail Chad.Finn@ARS.USDA.GOV.

Origin

‘Vintage’, tested as ORUS 2786-5, was selected from a seedling field in Corvallis, OR, in 2003 from a population grown from open-pollinated seed of ‘Isabel’ red raspberry (Wilhelm and Fear, 1995). ‘Isabel’ is a patented cultivar (PP9,340) developed by Sweetbriar Development, Inc. (Watsonville, CA) that has proprietary selections (B36.7 and C44.1) as parents. ‘Vintage’ is being released primarily as a result of its outstanding fruit quality, especially flavor and bright red color, in a primocane-fruiting red raspberry that is suited for the fresh market.

Description and Performance

‘Vintage’ has been evaluated most extensively in trials at Oregon State University’s North Willamette Research and Extension Center (Aurora, OR; OSU-NWREC) as well as observation plots with the USDA-ARS in Corvallis, OR, Washington State University in Puyallup, WA, Agriculture and Agri-Food Canada in Abbotsford, British Columbia, Canada, and Pacific Berry Breeding in Watsonville, CA. At OSU-NWREC [northern Willamette Valley, OR; lat. 45°16’48” N, long. 122°45’3” W; USDA-ARS Hardiness Zone 8b (USDA Plant Hardiness Zone Map, 2012),

a replicated trial was established in 2007 and arranged in a randomized complete block design with four three-plant replications (0.9 m between plants) used for measuring fresh fruit characteristics, harvest season, yield, and fruit weight. The plants were allowed to fill in the row but the hedgerow was narrowed to 0.6 m wide during the growing season and cut to ground level during the dormant season. A trellis with two wires at each of 1.0 and 1.5 m height was used to support the canes.

Fruit were hand-harvested, weekly, from three replications and data collected on harvest season, yield, and average fruit weight (randomly selected 25-berry subsample per harvest) (Finn et al., 2004). The fruit-ripening season in Oregon was characterized by the dates on which 5%, 50%, and 95% of the total fruit were harvested. Subjective evaluations for fresh fruit characteristics were made at least three times each year using a 1 to 9 scale (9 = the best expression of each trait except color where 9 = dark red for color is undesirable and appears overripe). The fruit ratings included firmness (as measured subjectively by hand in the field on six to eight fruit), color (ideal color is bright red), shape (with a uniform, conic berry being ideal), coherence (the ability of the fruit to hold together when handled while being rated by hand in the field on six to eight fruit), texture (rated when chewed while tasting fruit in the field), separation (rating of how easily the ripe fruit were separated from the plant), and flavor (rated by tasting fruit in the field). In each year, samples of the fruit from ‘Vintage’ and ‘Heritage’ were evaluated informally as a thawed, individually quick frozen (IQF) product by Oregon State University (OSU) and USDA-ARS small fruit researchers at the OSU Department of Food Science and Technology Pilot Plant (Corvallis, OR). Fruit chemistry (soluble solids, pH, and titratable acidity) was evaluated in 2008 and 2010 on fruit frozen from two to three harvests. Plant ratings were conducted one time each year during the fruiting season for primocane vigor and prickles (1 = numerous and large; 9 = smooth, no prickles).

Yield and average fruit weight from 2008–10 were analyzed as a split plot in time with cultivar as the main plot and year as the subplot with mean separation by least significant difference. The planting and the



Fig. 1. Ripe fruit of ‘Vintage’ on plant in Oregon.

Table 1. Fruit yield, mean fruit weight, and harvest season (2008–10) for two primocane-fruiting red raspberry cultivars planted in 2007 at the Oregon State University's North Willamette Research and Extension Center, Aurora, OR.

	Fruit wt (g) 2008–10 ^z	Yield (kg/plant)			Harvest season (2008–10) ^y			
		2008	2009	2010	2008–10	5%	50%	95%
Vintage	3.2 a	1.48 a	2.48 a	1.74 b	1.90 a	18 Aug.	10 Sept.	5 Oct.
Heritage	2.4 b	0.32 b	2.03 a	2.79 a	1.72 a	8 Sept.	29 Sept.	15 Oct.

^zMeans within a column followed by the same letter are not significantly different, $P > 0.05$, by least significant difference test.

^yDate at which 5%, 50%, or 95% of the yield for the season was harvested.

Table 2. Subjectively evaluated fruit quality traits and vigor for two raspberry cultivars in a replicated trial at the Oregon State University's North Willamette Research and Extension Center and evaluated in 2008–10.

	Primocane characteristics		Fruit characteristics						
	Vigor ^z	Prickles	Firmness	Color	Shape	Coherence	Texture	Separation	Flavor
Vintage	7.1 a ^y	5.6 a	6.9 a	7.5 b	6.8 b	7.2 b	7.3 a	7.9 a	7.7 a
Heritage	7.6 a	4.4 b	7.1 a	8.8 a	7.7 a	7.9 a	6.8 b	7.1 b	5.9 b

^zTraits scored on a 1 to 9 scale: 1 = poor vigor, extremely spiny, very soft, very light, very uneven shape, crumbly, uncomfortably chewy, fruit does not pick easily, and poor flavor; and 9 = very vigorous, smooth, very firm, dark red, uniform conic, drupelets hold together well, pleasant when chewed, easy separation of fruit from receptacle, and intense flavor, respectively.

^yMeans within a column followed by the same letter are not significantly different, $P > 0.05$, by least significant difference test.



Fig. 2. Ripe fruit of 'Vintage' on plant in Watsonville, CA; note symptoms of sensitivity to high bicarbonates (interveinal chlorosis) on older leaves (E. Thompson).



Fig. 3. Harvested fruit, 'Vintage' on left, 'Heritage' on right.

Table 3. Fruit chemistry characteristic for two red raspberry cultivars grown at Oregon State University's North Willamette Research and Extension Center and harvested in 2008 and 2010.

Cultivar	Percent soluble solids ^z	pH	Titrateable acidity (g·L ⁻¹ as citric)
Vintage	12.20 a	3.44 a	11.58 b
Heritage	12.09 a	3.05 b	20.68 a

^zMeans within a column followed by the same letter are not significantly different, $P > 0.05$, by least significant difference test.

analysis (PROC GLM; SAS Institute, Cary, NC) included 'Vintage' and 'Heritage', which is the most widely grown, nonproprietary, primocane-fruiting cultivar (Daubeny et al., 1992).

There was no genotype × year interaction for fruit weight, but this interaction was significant for yield; therefore, mean yields are presented for each year of the trial (Table 1). 'Vintage' produced yields that, over 3 years, were comparable to 'Heritage', which is considered high-yielding in Oregon (Table 1). Compared with 'Heritage', the harvest season of 'Vintage' started 22 d earlier, reached 50% harvest 19 d earlier, and finished ≈10 d ahead in 2008–10 (Table 1). The harvest season was 11 d longer than that of 'Heritage'.

Although 'Heritage' and 'Vintage' plants were scored similarly for vigor, 'Vintage' canes tended to be stockier, with greater diameters, than those of 'Heritage' and had fewer canes per meter of row (Table 2; Finn, 2011). 'Vintage' canes were rated as being smoother and less prickly than those of 'Heritage' (Table 2), confirming actual measurements of prickle length (1.53 mm vs. 0.77 mm for 'Heritage' and 'Vintage', respectively; Finn, 2011). The canes showed no symptoms of disease and were not sprayed with any fungicides. 'Vintage' is susceptible to phytophthora root rot [*Phytophthora rubi* (W.F. Wilcox & J.M. Duncan) W.A. Man in 't Veld]. One of three plantings of 'Vintage' at the OSU-NWREC showed symptoms of root rot that were less severe than those on 'Caroline', whereas 'Heritage' showed no symptoms. In New York, 'Caroline' is considered to have moderate to good resistance to phytophthora root rot (Weber, 2012). In Puyallup, WA, where phytophthora root rot is a known problem, 'Vintage' grew fine the first year but died in the second year presumably as a result of root rot. In California, 'Vintage' was more susceptible than other cultivars (proprietary) to irrigation water with high bicarbonate levels that caused yellowing and interveinal chlorosis on older leaves (Fig. 2).

'Vintage' consistently produced fruit that were 33% heavier than those of 'Heritage' (Table 1) and were of similar firmness (Table 2). The fruit are an ideal color for the fresh market being bright and much less dark than those of 'Heritage' (RHS 53A-53B vs. 183B; Finn, 2011; Royal Horticultural Society, 2007) (Table 2; Fig. 3). 'Heritage' and 'Vintage' had similarly shaped conic fruit, although the fruit of 'Vintage' can be somewhat rounder (Fig. 3). Although both cultivars had acceptable drupelet coherence, 'Vintage' fruit had slightly less drupelet coherence than 'Heritage' fruit. 'Vintage' fruit consistently separated much more easily from the plant than did 'Heritage' fruit (Table 2). Some growers use machine harvesting to harvest primocane-fruiting cultivars for processing. Although these trials were not evaluated using a machine harvester, the ease with which 'Vintage' fruit separated from the plant may make it a better option for mechanical harvest than 'Heritage'.

When eaten, ‘Heritage’ fruit are perceived to be seedier than those of ‘Vintage’ and pyrene weights of ‘Heritage’ were slightly larger (1.27 mg vs. 1.20 mg; Finn 2011) (Table 2). Probably the most outstanding characteristic of ‘Vintage’ is that the fruit have outstanding flavor that consistently was scored as excellent, whereas those of ‘Heritage’ were scored as being bland but inoffensive. We have evaluated many primocane-fruiting cultivars including: Autumn Bliss, Autumn Britten, Caroline, Rafzaqu (HimboTop[®]), Jaelyn, Joan Irene, Joan J, Polana, Polka, and Summit among others and none have had as good a flavor as ‘Vintage’ in our environment. Although ‘Vintage’ and ‘Heritage’ fruit were found to have a similar percent of soluble solids, ‘Vintage’ had a slightly higher juice pH and a titratable acidity that was almost 50% less than that of ‘Heritage’ (Table 3). ‘Vintage’ fruit, in addition to having a full raspberry flavor, were perceived to be sweeter as a result of the higher sugar-to-acid ratio. The low titratable acidity may limit the suitability of ‘Vintage’ for use as a processed product other than perhaps an IQF product. In informal evaluations of IQF fruit by an expert but untrained panel, ‘Vintage’ consistently scored better than other primocane-fruiting

cultivars (data not shown). In addition to the outstanding color, size, firmness, and flavor that make ‘Vintage’ a good fresh market option, the fruit are non-darkening when stored in plastic clamshells under refrigeration but softened after 7 d in storage (E. Thompson, personal communication).

‘Vintage’ nuclear stock has tested negative for *Apple mosaic virus*, *Arabidopsis mosaic virus*, *Cherry leafroll virus*, *Prunus necrotic ringspot virus*, *Raspberry bushy dwarf virus*, *Raspberry ringspot virus*, *Strawberry necrotic shock virus*, *Tobacco ringspot virus*, and *Tomato ringspot virus* by enzyme-linked immunosorbent assay; for *Black raspberry necrosis virus*, *Blackberry virus Y*, *Blackberry yellow vein associated virus*, *Raspberry latent virus*, *Raspberry leaf mottle virus*, and *Rubus yellow net virus* in reverse transcription polymerase chain reaction tests; and has indexed negative when grafted onto *R. occidentalis*.

‘Vintage’ is patent pending. When this germplasm contributes to the development of a new cultivar, hybrid, or germplasm, it is requested that appropriate recognition be given to the source. Further information or a list of nurseries propagating ‘Vintage’ is available on written request to C.E. Finn.

The USDA-ARS does not sell plants. In addition, genetic material of this release has been deposited in the National Plant Germplasm System as CRUB 2587 (PI667656).

Literature Cited

- Daubeny, H.A., K. Maloney, and G.R. McGregor. 1992. ‘Heritage’ red raspberry. *Fruit Var. J.* 46:2–3.
- Finn, C.E. 2011. U.S. plant patent application (S.N. 13/199,578): Red raspberry plant named ‘Vintage’. Washington, DC.
- Finn, C.E., F.J. Lawrence, B. Yorgey, and B.C. Strik. 2004. ‘Chinook’ red raspberry. *HortScience* 39:444–445.
- Royal Horticultural Society. 2007. *The Royal Horticultural Society’s colour chart*, 5th Ed. Royal Horticultural Society, London, UK.
- USDA Plant Hardiness Zone Map. 2012. Agricultural Research Service, U.S. Department of Agriculture. Washington, DC. 22 Apr. 2013. <<http://planthardiness.ars.usda.gov>>.
- Weber, C. Raspberry variety review. 2012. Cornell University, College of Agriculture and Life Sciences, Cornell Cooperative Extension. Ithaca, NY. 22 Apr. 2012. <<http://www.fruit.cornell.edu/berry/production/pdfs/raspcultreview2012.pdf>>.
- Wilhelm, S. and C.D. Fear. 1995. U.S. Plant Patent: Raspberry plant cv. Isabel PP9:340. Washington, DC.