

‘Hall’s Beauty’ Thornless Trailing Blackberry

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‘Hall’s Beauty’ is a new, early-ripening, high-quality, firm, and sweet thornless trailing blackberry (*Rubus* subg. *Rubus* Watson)

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cultivar with extremely large and attractive double flowers from the U.S. Department of Agriculture, Agricultural Research Service (USDA-ARS) breeding program in Corvallis, OR, released in cooperation with Oregon State University’s Agricultural Experiment Station. Mr. Harvey Hall (Shekinah Berries Ltd., Pyes Pa, New Zealand), with New Zealand HortResearch, the forerunner of The New Zealand Institute Plant & Food Research, originally incorporated the source of thornlessness used in ‘Hall’s Beauty’ into useful germplasm. The collaborative effort between him and USDA-ARS breeders in exchanging *Rubus* germplasm was critical to the current success of both programs; the name of the cultivar reflects gratitude for this relationship and Hall’s tremendous contributions, with his spouse Robyn Hall’s support, to blackberry breeding worldwide. ‘Hall’s Beauty’ is introduced as a machine harvestable, high-quality blackberry that has extremely large, attractive, and ornamental double flowers, which have many more petals than typical blackberries and that produce large, well-formed berries for the fresh or the

processed fruit market. ‘Hall’s Beauty’ should be adapted to areas where other trailing blackberries can be grown successfully. A U.S. Plant Patent has been applied for (USPPAF 15/330,950).

Origin

‘Hall’s Beauty’, tested as ORUS 3453-2, was selected in Corvallis, OR in 2008 from a cross made during 2005 between NZ 9629R-1 and ORUS 1939-4 (Fig. 1). ‘Hall’s Beauty’ shares two grandparents with ‘Columbia Star’ and ‘Columbia Giant’ and all four grandparents with ‘Columbia Sunrise’ (Finn et al., 2014, 2018a, 2018b). ‘Hall’s Beauty’ has the ‘Lincoln Logan’ source of thornlessness (botanically “spineless” but commonly referred to as “thornless” in industry and research communities) through NZ 9629R-1 (Hall et al., 1986). The parent ORUS 1939-4 was thorny, productive, and vigorous with large, glossy, very firm, uniformly conic-shaped fruit with excellent skin “toughness” and very good flavor. In a previous era, this selection would have been released for its yield and outstanding quality, but its thorniness made it commercially inviable. The other parent, NZ 9629R-1, was thornless, very productive and vigorous with small to medium-sized outstanding flavored, uniformly shaped, conic fruit. Gorgeous, extremely large, double flowers that progress to early ripening, consistently sweet, medium-large fruit with a tough skin, are the primary factors that distinguish ‘Hall’s Beauty’ from other trailing cultivars.

‘Hall’s Beauty’ was evaluated most extensively in trials at Oregon State University’s North Willamette Research and Extension Center (OSU-NWREC; Aurora, OR), USDA-ARS (Corvallis, OR), and Enfield Farms Inc. (Lynden, WA). In the Oregon trial plantings, standard cultural practices for trailing blackberry production were used, including annual pre- and postemergent herbicide applications, spring nitrogen fertilization (78 kg N/ha), postharvest removal of floricanes, training of primocanes to a two-wire trellis, and application of 2.5 to 5.0 cm of irrigation per week during the growing season, depending on rainfall. Delayed dormant applications of liquid lime sulfur and copper hydroxide were made to control leaf and cane spot (*Septoria rubi* Westend), purple blotch [*Sphaerulina westendorpii* (Westendrop) Verkley, Quaedvlieg & Crous (formerly *Septoria rubi* Westend)], rust [*Kuehneola uredinis* (Link) Arth.], and anthracnose [*Elsinoe veneta* (Burkholder) Jenk.] as a standard practice without any knowledge of the susceptibility of the selections in trial to these diseases. The cooperating grower in Washington is primarily a red raspberry (*Rubus idaeus* L.) grower and even though plants were spaced and trained similarly to those in the Oregon trials, they were irrigated and received nitrogen fertilizer rates that were standard for red raspberry but greater than typical for blackberry. At OSU-NWREC, ‘Hall’s Beauty’ was planted in a

replicated trial in 2009 and again in 2014, along with other selections and the standards ‘Marion’, ‘Black Diamond’, and ‘Columbia Star’ in a randomized complete block design with three replications. Each experimental unit consisted of three plants. Each replication was harvested once a week to determine harvest season, yield, and average fruit weight (based on a randomly selected subsample from each harvest) (Finn et al., 1997,

2005; Finn and Strik, 2014). ‘Marion’ accounts for the largest blackberry acreage in the Pacific Northwest, ‘Black Diamond’ accounts for the greatest number of blackberry plants established in the Pacific Northwest since 2005, and ‘Columbia Star’ has been the second most planted cultivar since 2014 (USDA-National Agricultural Statistics Service, 2017; P.P. Moore, personal communication). The average fruit weight for a season

was calculated as a weighted mean based on the weight of a randomly selected subsample of 25 fruit from each harvest. The weighted mean was calculated by multiplying average berry weight for each week of harvest by the proportion of total yield picked that week; the values were then summed. These data, collected from 2011 to 2013 and 2016 to 2017, were separately analyzed as a split-plot in time with a fixed effect model with cultivar as the main plot and year as the subplot with mean separation by least significant difference (LSD; SAS PROC GLM, Cary, NC). LSD was only applied when there were significant differences for the trait. Of the multiple genotypes harvested from this replicated trial, only the data from ‘Hall’s Beauty’ and the named cultivars were included in the analysis. The cultivar × year interaction was significant for yield but not for fruit weight and the means for yield in each year are presented and compared (Table 1).

Fruit evaluations were made during the harvest seasons using a 1 to 9 scale (9 = the best expression of each trait). The subjective fruit ratings included drupelet fertility (rating of drupelet set), firmness (as evaluated by hand in the field on six to eight fruit), color (ideal is a solid, dark black), shape (with a uniform, long conic berry being ideal), texture (as rated when chewed while tasting berries in the field), separation (how easily the ripe fruit were separated from the plant), and flavor (rated by tasting fruit in the field) (Table 2). Fruit glossiness (ideal is glossy), skin toughness (while holding fruit, thumb was rubbed across the fruit surface and ideally the skin surface did not break and “bleed”), and tolerance of heat/ultraviolet light damage (when fruit were fully ripe, the incidence of bleached or sunburned fruit was scored where 9 = no evidence of injury) were rated in 2016–17. The number of fruit per lateral was determined based on counting the fruit on five typical fruiting laterals in each plot once during the season in 2016–17. Some of the fruit harvested in 2013 were frozen, puréed, and assessed in a blind evaluation by a blackberry panel composed of growers, packers, processors, and researchers as described in Yorgey and Finn (2005) (Table 3). Titratable acidity, percent soluble solids, and pH were determined from harvested fruit (Table 4). Fruit samples of ‘Black Diamond’, ‘Chester Thornless’, ‘Columbia Star’, ‘Columbia Sunrise’, ‘Hall’s Beauty’, and ‘Marion’ were analyzed for the



Fig. 1. Pedigree for ‘Hall’s Beauty’. The female parent is shown on top.

Table 1. Berry weight and yield in 2014–16 for ‘Black Diamond’, ‘Columbia Star’, ‘Hall’s Beauty’, and ‘Marion’ blackberry at Oregon State University’s North Willamette Research and Extension Center (Aurora, OR); planted in replicated trial (three plots of three plants each) in 2009 and 2014.

Cultivar	Berry wt (g)	Yield (kg/plant)			
		2011	2012	2013	2011–13
2009 planting					
Black Diamond	6.0 bc ^z	7.02 ab	2.09 c	3.17 c	4.09 c
Columbia Star	7.6 a	7.48 a	5.92 a	8.18 a	7.19 a
Hall’s Beauty	6.5 b	4.68 b	3.59 bc	6.07 b	4.78 bc
Marion	5.5 c	6.44 ab	4.75 ab	4.92 bc	5.37 b
2014 planting	2016–17		2016	2017	2016–17
Black Diamond	6.6 a		6.73 a	6.32 a	6.53 a
Columbia Star	6.9 a		7.24 a	6.92 a	7.08 a
Hall’s Beauty	6.9 a		7.40 a	6.21 a	6.81 a
Marion	5.7 a		4.50 b	4.72 a	4.61 b

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

Table 2. Subjectively evaluated fruit quality traits for ‘Black Diamond’, ‘Chester Thornless’, ‘Columbia Star’, ‘Hall’s Beauty’, and ‘Marion’ blackberry in two replicated trials (three plots of three plants each) planted in 2009 and 2014 for drupelet fertility, firmness, color, shape, texture, separation, and flavor (2011–13 and 2016–17) and the number of fruit per lateral, heat/ultraviolet light injury symptoms, skin toughness and glossiness were evaluated at Oregon State University’s North Willamette Research and Extension Center (2016–17; Aurora, OR).^z

Cultivar	Drupelet fertility	Firmness	Color	Shape	Texture	Separation	Flavor	Fruit/lateral	Heat/ultraviolet		
									damage	Skin toughness	Glossiness
Black Diamond	7.0 b ^y	6.7 b	8.0 b	7.3 b	6.7 b	8.2 ab	6.3 c	10.4 ab	6.3 d	6.6 b	7.5 b
Chester Thornless	6.4 c	7.5 a	8.9 a	5.7 c	5.3 c	7.6 c	5.4 d	11.8 a	5.7 e	6.4 b	8.4 a
Columbia Star	8.6 a	7.9 a	8.2 b	8.5 a	8.1 a	8.4 a	8.2 a	7.8 c	8.4 a	8.1 a	7.1 b
Hall’s Beauty	7.6 b	8.0 a	8.3 b	7.2 b	7.8 a	8.0 bc	7.6 b	7.8 c	7.8 b	8.0 a	8.3 a
Marion	5.9 d	4.6 c	7.4 c	5.3 c	8.1 a	8.4 a	8.3 a	8.6 bc	6.9 c	4.5 c	7.3 b

^zA 1 to 9 scale was used where 9 = the best expression of each trait and 1 = the worst for all traits except for fruit/lateral, which was a count.

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