

'Chinook' Red Raspberry

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'Chinook' (Fig. 1) is a new primocane fruiting red raspberry (*Rubus idaeus* L.) from the U.S. Dept. of Agriculture-Agricultural Research Service (USDA-ARS) breeding program in Corvallis, Ore. released in cooperation with the Oregon State Agricultural Experiment Station, the Washington State Univ. Agricultural Research Center and the Idaho Agricultural Experiment Station. 'Chinook' is high yielding, early-ripening for a primocane cultivar, and produces large, very firm fruit that ship extremely well. The cultivar should be widely adapted to wherever primocane fruiting raspberries are grown and provide growers with an early-season alternative to 'Autumn Bliss'.

'Chinook' is named after the salmon of the same name (*Oncorhynchus tshawytscha* Walbaum), which was named after the native Chinook tribe that lived(s) along the Columbia River in the Pacific Northwest.

Origin

'Chinook' was selected in 1976 from a cross between ORUS 1838 and ORUS 1842 and has been tested as ORUS 534-10 (Fig. 2); it is a full sib to 'Summit' (Daubeny, 1997; Lawrence, 1989). The pedigree represents a mix of northeast (New Hampshire and New York) and northwest (Washington and Oregon) breeding material.

The most thorough testing was done at the North Willamette Research and Extension Center of Oregon State Univ. (Aurora, Ore.)

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as well as in grower fields in Washington and Oregon. While 'Chinook' had been in grower fields for many years in Washington and Oregon, it was not tested in a replicated trial until it was established at Aurora in 1999 and arranged in a randomized complete-block design, with three, 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 were narrowed to 0.6 m during the dormant season. A temporary trellis using posts and twine was used to keep the fruiting canes from falling to the ground. During the harvest season, fruit were harvested once a week. The average fruit weight for a season is a weighted mean based on the weight of a randomly selected subsample of 25 fruit from each harvest. Yield and average fruit weight from 2000–01 were analyzed as a split-plot in time with cultivar as the main plot and year as the subplot (Table 1). The planting and the analysis (PROC GLM, SAS Institute, Cary, N.C.) included 'Chinook' and 'Heritage', which is the most widely grown and successful primocane fruiting cultivar (Daubeny et al., 1992). The fruit ripening season was characterized by the dates at which 5%, 50%, and 95% of the total fruit yield were harvested

(Table 2). Subjective evaluations were made at least three times each year using a 1–9 scale (9 = the best expression of each trait except color; 9 = dark red for color) for primocane and florican vigor, fresh fruit characteristics including firmness, color, shape, texture when eaten, flavor, and ease of fruit separation from the receptacle. The data presented are means of these observations (Table 3). In 2000 and 2001, samples of the fruit from both cultivars were evaluated informally as a thawed, individually quick frozen (IQF) product by Oregon State Univ. (OSU) and USDA-ARS small fruit researchers at the OSU Dept. of Food Science and Technology Pilot Plant (Corvallis, Ore.). In July 2001, the height and cane diameter were measured and the total number of fruiting and nonfruiting nodes counted for 25 canes of each cultivar.

Description and performance

There was a significant cultivar × year interaction for yield and fruit weight (Table 1). Over two years, the yield of 'Chinook' was similar to 'Heritage' (Table 1). In addition to being widely grown, 'Heritage' is known for its high yields (Daubeny et al. 1992). While 'Chinook' fruit were similar in weight to 'Heritage' in the first harvest season, they were significantly heavier than those of 'Heritage' in the second year (Table 1). 'Chinook' fruit was rated in our trials as being firmer than 'Heritage' (Table 3), and in growers fields as being firmer than 'Heritage' and 'Autumn Bliss' (G. Richter, pers. comm.). Growers who have packed and shipped 'Chinook' have found that it holds up well, better than 'Autumn Bliss', in clam shell packaging and shipped by air freight transcontinentally, in large part due to its firmness (G. Richter, pers. comm.). The fruit are attractive. The shape is more rounded than in 'Heritage', as indicated by 'Chinook's slightly lower shape score. Drupelets are consistent in size and shape, giving the fruit a very uniform appearance and reflecting good drupelet fertility. The fruit are bright red but



Fig. 1. 'Chinook' (right) and 'Heritage' (left) red raspberries.

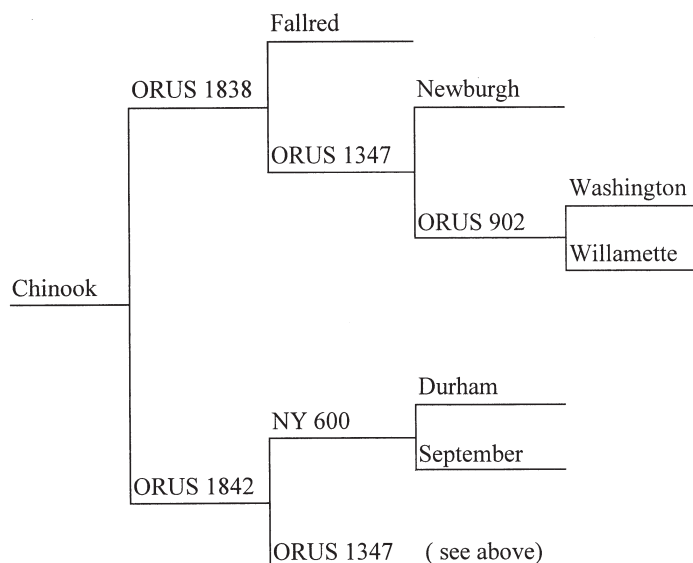


Fig. 2. 'Chinook' red raspberry pedigree.

Table 1. Fruit weight and yield in 2000, 2001, and mean of both years for two primocane fruiting red raspberry cultivars planted in 1999 at the OSU–North Willamette Research and Extension Center, Aurora, Ore.

| Cultivar | Fruit wt (g) ^a | | | Yield (kg·ha ⁻¹) | | |
|----------|---------------------------|-------|---------|------------------------------|----------|----------|
| | 2000 ^b | 2001 | 2000–01 | 2000 | 2001 | 2000–01 |
| Heritage | 2.3 a | 2.3 b | 2.3 b | 9,598 a | 20,352 a | 14,975 a |
| Chinook | 2.8 a | 3.5 a | 3.1 a | 11,490 a | 20,356 a | 16,148 a |

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

Table 2. Midpoint of harvest (50%) and harvest interval (5% to 95%) of yield harvested in 2000 and 2001 for two primocane fruiting red raspberry cultivars planted in 1999 at the OSU–North Willamette Research and Extension Center, Aurora, Ore.

| Cultivar | 2000 | | 2001 | |
|----------|------------------|------------------------------|------------------|------------------------------|
| | Midpoint harvest | Harvest interval (5% to 95%) | Midpoint harvest | Harvest interval (5% to 95%) |
| Heritage | 8 Sept. | 11 Aug.–5 Oct. | 7 Sept. | 20 Aug.–2 Oct. |
| Chinook | 1 Sept. | 31 July–2 Oct. | 27 Aug. | 13 Aug.–13 Sept. |

Table 3. Mean scores for subjectively evaluated characteristics of two red raspberry cultivars planted in 1999 at the OSU–North Willamette Research and Extension Center, Aurora, Ore.

| Cultivar | Cane | Fresh fruit characteristics | | | | | |
|----------|--------------------|-----------------------------|-------|-------|---------|------------|--------|
| | vigor ^a | Firmness | Color | Shape | Texture | Separation | Flavor |
| Heritage | 8.3 | 6.8 | 6.7 | 7.4 | 7.0 | 7.7 | 6.5 |
| Chinook | 7.0 | 8.0 | 8.0 | 6.7 | 6.7 | 6.8 | 7.0 |

^aTraits scored on a 1–9 scale. 1 = poor vigor, soft fruit, very light colored, misshapen, very seedy, poor separation from the receptacle and poor flavor and 9 = very vigorous, very firm, dark red, well formed, not seedy, separates easily from the receptacle, intense flavor, respectively.

tend to be darker than 'Heritage' (Table 3). Fruit flavor was good, although not much better than 'Heritage' nor as good as most Pacific Northwest floricanes fruiting cultivars (Finn et al., 2001). The combination of excellent fruit firmness and shipping quality with very good fruit quality have been the traits that have made 'Chinook' a commercially viable cultivar in the Pacific Northwest.

One of the most outstanding characteristics of 'Chinook' is the early ripening of its primocane crop when there are few other cultivars to choose from (Table 2); it ripens ≈ 7 –10 d earlier than 'Heritage'. While 'Autumn Bliss' and 'Summit' were not included in the primary evaluation trial for 'Chinook', they were in other plots on the farm and had a similar ripening season. Traditionally, primocane fruiting cultivars are cut to the ground which prevents a floricanes crop. Currently, many commercial growers are only cutting the canes back to just below the last node that fruited in order to have a very early, small crop of floricanes fruit. While we have not assessed the timing of the floricanes crop on 'Chinook', it is expected to behave like 'Autumn Bliss' as early ripening primocane fruiters generally produce an early ripening floricanes crop.

Primocane fruiting cultivars flower basipetally and once they begin flowering the canes grow no taller. While 'Chinook' and 'Heritage' primocane are vigorous and appear to grow at a similar rate until just before flowering, because 'Chinook' begins flowering earlier, its canes

are shorter than those of 'Heritage'. Fruiting 'Chinook' primocanes are shorter (1.55 m) and have fewer nodes (≈ 38) than 'Heritage' (1.64 m and ≈ 43 nodes, respectively). 'Chinook' canes are slightly smaller in diameter than 'Heritage' and are not as sturdy. The combination of heavy fruit load and less sturdy canes produces a plant that must be supported to keep the fruiting primocanes from falling to the ground. While 'Chinook' has on average 5 fewer nodes per cane than 'Heritage', the average number of fruiting nodes per cane is only 1.4 less than 'Heritage' (16.4 vs. 17.8). The spines on 'Chinook' canes are infrequent, with 2–3 purple spines per internode compared to 8–10 for 'Heritage'.

With no fungicides or insecticides applied, 'Chinook' has shown no noteworthy damage from fungal diseases or insects. 'Chinook' shows field tolerance to root rot in commercial fields where other raspberry cultivars had symptoms consistent with phytophthora root rot (*Phytophthora fragariae* var. *rubi* Wilcox and Duncan). 'Chinook' has tested positive for the common strain of raspberry bushy dwarf virus (RBDV) in the field but it is unknown how quickly it becomes infected.

The outstanding characteristics of 'Chinook' are its very early production of a primocane crop with excellent fruit firmness and shipping quality, and very good overall quality. It is expected to do well wherever primocane fruiting cultivars are grown and is recommended primarily for fresh market production.

Availability

'Chinook' nuclear stock has tested negative for tomato ringspot, raspberry bushy dwarf, and tobacco streak viruses by ELISA and has indexed negative on grafting to *R. occidentalis* L. 'Chinook' is not patented. However, 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 'Chinook' is available on written request to C.E.F. The USDA–ARS does not have commercial quantities of plants to distribute. In addition, genetic material of this release has been deposited in the National Plant Germplasm System, accession number CRUB 2193, where it will be available for research purposes, including development and commercialization of new cultivars.

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