densely armed with brittle 3–5 mm thorns. In commercial practice, the 1st primocanes to emerge in spring (usually 2–5) are shortened to 2 nodes 10 days before harvest, and the subsequent flush of 6–10 canes is allowed to grow unchecked. Primocanes are trailing, and may reach 9 m in length and 20–25 mm basal diameter before growth ceases in winter.

Fruit are borne on thorny peduncles arising from leaf axils along the entire length of the cane and extend beyond the foliage. As berries enlarge and ripen, the color changes from green to wine red and to shiny purple black when fully ripe. The fruit picks easily at firm ripe and fully ripe stages. Fully ripe fruit tend to soften and lose their gloss soon after harvest. In southern Victoria, 'Silvan' is harvested from the 1st week of December to the 1st week of January, at the same time as 'Young', 1 week earlier than 'Boysen' and 2 weeks earlier than 'Marion'.

Characteristics

The most outstanding features of 'Silvan' are its high yield, good fruit quality, and disease tolerance. Under comparable commercial management, 'Silvan' yields (11 t/ha) are about 25% more than 'Boysen' (9 t/ha), hitherto the most productive blackberry cultivar in Victoria, 35% more than 'Young' (8 t/ha), and more than double the yield of 'Marion' (5 t/ha). Growers normally achieve fruit sizes of 20–25 mm diameter, 40 mm long, with a mean weight of 6-8 g.

'Silvan' has gained favor among consumers and processors because of its excellent flavor, which, when fully ripe, is sweeter and less acid than 'Boysen', 'Marion', or 'Young', and is reminiscent of the flavor of *Rubus procerus* P.J. Muell., the introduced blackberry species which occurs extensively as a weed in Southeastern Australia, and whose flavor is preferred by processors. The texture of 'Silvan' jam resembles 'Boysen' jam in seediness, fruit coherence, and plug (torus) softness. 'Silvan' is particularly well suited to the jam processing market because of its flavor and processing quality; it is also well suited to the pick-your-own market because of its flavor, size, and appearance both on the plant and harvested. While it is well accepted on local fresh fruit markets, its short shelf life precludes shipping long distances.

Under commercial management, 'Silvan' seems to be more tolerant of anthracnose (*Elsinoe veneta* [Burkh.] Jenkins) than other blackberry cultivars, and maintains vigor despite infection by crown gall (*Agrobacterium tumefaciens* [Smith & Townsend] Conn). Only unthrifty plants seem subject to a dry berry condition, similar to *Peronospora rubi* Rabenh. infection of other blackberry cultivars. Viruses were not found in 'Silvan' in a survey of *Rubus* species in Victoria (3); however, tobacco streak virus was isolated from Victorian plants of 'Silvan' sent to New Zealand (4).

Compared to other *Rubus* cultivars, 'Silvan' seems to be more tolerant of wind, drought and heavy soils and in this sense is stress tolerant. Winter hardines to very cold temperatures has not been evaluated, since the lowest monthly average of daily minimum temperature in the 'Silvan' district is over 2°C (2).

Propagation and Availability

'Silvan' propagates readily by tip rooting primocanes. Cuttings may be struck under mist, but with difficulty. Limited supplies of plants are available from R. Stace-Smith, Agriculture Canada, Vancouver, B.C., and from Knoxfield Horticultural Research Institute, P.O. Box 174, Ferntree Gully, Victoria 3156, Australia.

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HortScience 19(5): 733–734. 1984.

BC 72-1-7 Red Raspberry

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Additional index words. *Rubus idaeus*, disease resistance, *Amphorophora agathonica*

BC 72-1-7, a selection from the British Columbia red raspberry (*Rubus idaeus* L.) breeding program, is being released as germplasm. It has a unique combination of desirable horticultural characteristics and resistance to several pests which will make it a useful parent. The selection is homozygous for gene Ag_1 which confers resistance to *Amphorophora agathonica* Hottes, the aphid vector of raspberry mosaic virus. It is the 1st genotype described which is homozygous for the characteristic. The use of BC 72-1-7 as a parent makes it unneccessary to screen for aphid reaction, since all its seedlings will be resistant. Other useful characteristics of this selection are varying levels of resistance to several diseases including root rot, most likely caused by *Phytophthora erythroseptica* Pethb., postharvest fruit rot caused by *Rhizopus* spp., and probable resistance to pollen transmission of raspberry bushy dwarf virus (RBDV). Useful horticultural characteristics are high yield and bright red, nondarkening fruit color.

Received for publication 5 Mar. 1984. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked *advertisement* solely to indicate this fact.

Origin

BC 72-1-7 is a selection from a 1972 cross of 'Haida' x 'Canby'. Both parents are of Pacific Northwest origin and are heterozygous for gene Ag_1. The selection was selected for *A. agathonica* resistance in the field at Agassiz, B. C. in 1973 by a procedure previously described (3). In 1974 and 1975 it was evaluated for plant and fruit characteristics and subsequently placed in 1977 in a test plot at Abbotsford, B. C. In 1981 the selection was placed in another test plot at Abbotsford and also in plots at the Western Washington Research and Extension Center at Puyallup, Wash.

Description

BC 72-1-7 produces numerous primocanes which are nonpubescent and nonwaxy. They are erect, develop a compact growth habit, and have relatively few spines. Floricanes show basal cracking. Fruiting laterals are upright and medium in length. Internodes are short and laterals thus are closely spaced. Fruit is presented in a cluster habit at the lateral tips. The medium size fruit is a bright nondarkening red color. The fruit does not separate quite as readily from the receptacle as fruit of 'Willamette', 'Meeker', and 'Skeena'; thus, it is probably less suited to machine harvest than these. Fruit firmness is comparable to that of 'Willamette', 'Meeker', 'Skeena', and 'Chilcotin', commercial cultivars in the Pacific Northwest (4, 5).

The 1983 data (Table 1) are typical of those obtained in earlier years at Abbotsford, where BC 72-1-7 consistently produced higher yields but smaller fruit than 'Willamette', 'Meeker', 'Skeena', and 'Chilcotin'. At Puyallup, where comparisons were made with 'Willamette', 'Meeker', and 'Chilcotin', the selection pro-

Table 1. Performance of BC 72-1-7 red raspberry selection and 4 cultivars at Abbotsford, B. C., and Puyallup, Wash., in 1983.

Cultivar or Selection	Marketable yield (kg/plant)		Size[z] (g/fruit)		Preharvest botrytis[y] (%)	
	Abbotsford	Puyallup	Abbotsford	Puyallup	Abbotsford	Puyallup
BC 72-1-7	6.57	2.00	3.3	2.9	3.3 (12)	2.7 (7)
Willamette	4.06	0.82	3.5	3.2	2.3 (12)	1.3 (3)
Skeena	6.02	---	3.9	---	2.1 (7)	---
Meeker	4.81	2.31	3.8	3.2	6.4 (15)	1.3 (3)
Chilcotin	4.92	2.63	3.8	3.5	3.4 (13)	1.4 (6)

[z]Mean of 50 fruit per harvest, adjusted for total weight of fruit harvested.
[y]Mean percentage (by weight) of fruit with visible (*Botrytis*) at each harvest, adjusted for total weight of fruit harvested. Value in brackets is highest percentage of *Botrytis* determined at any one harvest.

duced the smallest fruit of any of the cultivars and higher yields than 'Willamette' but not 'Meeker' and 'Chilcotin'.

Disease reactions

In a year in which there was a high incidence of postharvest fruit rot (caused by *Rhizopus* spp.), BC 72-1-7 showed significantly less rot than 'Meeker' in 1 of 4 tests, significantly less than 'Willamette' in 3 of 4 tests, and significantly less than 'Skeena' and 'Chilcotin' in all 4 tests (5). Its reaction to both pre- and postharvest rot is comparable to that of the commercial cultivars (4), (Table 1).

The selection shows a similar reaction to spur blight [caused by *Didymella applanata* (Niessl) Sacc.] as 'Skeena' and 'Chilcotin' but is less susceptible than 'Meeker' and 'Willamette'. Although it was reported (4) as resistant to cane botrytis, caused by *B. cinerea*, a few infected canes were observed in 1983 and 1984.

BC 72-1-7 has been indexed for RBDV by mechanical inoculation to *Chenopodium quinoa* Willd. at least once a year since it was placed in the field at Abbotsford. In addition, in 1983 it was indexed for the virus using the ELISA technique. To date it has remained free of the virus, despite exposure to infected pollen. At the same time, initially virus-free clones of known RBDV-susceptible cultivars or selections became infected. Thus, it is likely that the selection has at least some resistance to pollen transmission of the virus. Grafting tests to determine if the selection is actually immune to the virus have not been done.

At Puyallup, BC 72-1-7 has shown resistance to a root rot most likely caused by *P. erythroseptica*. No primocane wilting was observed in one-year-old plots of the selection in Aug. 1982 when the mean incidence of wilting of 91 cultivars and selections in the planting was 31%. The incidence of wilting in the planting of such cultivars as 'Sumner' (10%), 'Meeker' (13%), 'Willamette' (17%), 'Skeena' (20%), and 'Glen Prosen' (63%), was consistent with that previously reported for raspberries grown in soil infested with *P. erythroseptica* (1). The plots of BC 72-1-7 in the planting have remained free of primocane wilting through 1983.

Breeding behavior

The breeding behavior of BC 72-1-7 with respect to *A. agathonica* resistance was determined for 5 progenies involving 450 seedlings. In 4 of the progenies, the other parent had the postulated genotype ag_1ag_1 and, in the 5th progeny, the genotype Ag_1ag_1. Reaction to the aphid of 175 of the seedlings was determined initially using the laboratory screening procedure previously described (6). After 4 or 5 examinations only 4 seedlings showed evidence of aphid colonization. These seedlings were classed as susceptible, and 2 of them subsequently were discarded. In retrospect, the 2 seedlings probably were resistant, since colonization was observed in only 1 of the examinations which is similar to the situation determined for a resistant cultivar (6). The 173 selected seedlings, as well as the other 275 seedlings, were planted in a field and subsequently examined at least 5 times for natural aphid infestation. During the examination procedure, susceptible control cultivars consistently supported aphid colonies. Fourteen seedlings including 4 of the prescreened ones (but not the 2 which had shown colonization) were colonized in the field; 12 of these showed evidence on one examination only and the remaining 2 on 2 examinations. It is assumed that these seedlings are actually resistant since colonization was observed relatively late in the season when senescing leaves were present. This situation has been observed previously on known resistant genotypes but is not considered to be a factor in virus spread (2, 7). Seedlings of 5 progenies derived from parents known to be heterozygous for *A. agathonica* reaction were examined in both the laboratory and the field at the same time as the BC 72-1-7 seedlings and segregated as expected. The apparent lack of segregation in the BC 72-1-7 progenies indicates that the selection is homozygous for gene Ag_1.

Availability

Limited quantities of root cuttings from screenhouse grown, virus-indexed plants are available from the Agriculture Canada, Research Station, 6660 NW Marine Drive, Vancouver, B. C., V6T 1X2, or from the Western Washington Research and Extension Center, Puyallup, WA 98371.

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