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‘Jeanne d’Orléans’ Red Raspberry

Shahrokh Khanizadeh[1], Martine Deschênes, and Claudine Dubé
Agriculture and Agri-Food Canada, Horticulture Research and Development Centre, 430 Gouin Boulevard, St-Jean-sur-Richelieu, Quebec, Canada J3B 3E6

Rong Tsao
Agriculture and Agri-Food Canada, Food Research Centre, 93 Stone Road West, Guelph, Ontario, Canada N1G 5C9

Louis Gauthier and André Gosselin
Les Fraises de l’Île d’Orléans Inc., St-Laurent, Île d’Orléans, Quebec, Canada G0A 3Z0

Yves Desjardins
Horticultural Research Center, FSAA, Laval University, Quebec, Canada G1K 7P4

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‘Jeanne d’Orléans’ is a new late-season, floricane-fruiting red raspberry cultivar (*Rubus idaeus* L.) released by Agriculture and Agri-Food Canada, Horticulture Research and Development Center. Results from replicated trials in L’Acadie show ‘Jeanne d’Orléans’ has larger and firmer fruits (Fig. 1) that have an excellent shelf life and higher soluble solids compared with the commercial cultivars in this study. ‘Jeanne d’Orléans’ also has higher antioxidants than commercially grown raspberries in Quebec (Ehsani-Moghaddam and Sullivan, 2008; Khanizadeh et al., 2009).

The selection was named after Mrs. Jeanne Delisle, a pioneer of small fruit cultivation and development with Les Fraises de l’Île d’Orléans Inc. Île d’Orléans is an island located 20 km east of Quebec City known for the production of high-quality small fruits, including red raspberry. Its economy is based mainly on agricultural production, particularly vegetable crops and small fruit crops. This island is also known as the capital of strawberry production in Quebec and is recognized for its production of high-quality fruits.

Origin

‘Jeanne d’Orléans’, tested as SJR942-7, is a selection from a cross between ‘Meeker’ and ‘Chilliwack’, which was bred in 1994 by S. Khanizadeh. It has been tested since 1997 at McGill University and at the Agriculture and Agri-Food Canada (AAFC) substation in L’Acadie, Québec, as well as on controlled semicommercial sites by our private partners ‘Les Fraises de l’Île d’Orléans’ in l’Île d’Orléans, Québec (lat. 46° N, long. 71° W) and Meiosis Ltd. (Kent, UK).

The data presented here are from replicated trials in fields at AAFC’s substation in L’Acadie during 1999 to 2006.

Description and Performance

A randomized complete four-block design was set up in L’Acadie in 1997 to compare ‘Jeanne d’Orléans’ with four cultivars (Boyne, Festival, Killarney, and Nova) grown commercially in Quebec. Each plot was 4 m long and 10 canes were planted in 1997. Yield and berry weight data were collected twice a week throughout the harvest season from 10 plants during 2000 to 2006. Objective measurements in the form of a 1 to 9 score were recorded for winter injury, color, flavor, firmness, juice loss, and shelf life at midharvest. A scale of 1 to 9 was also used to evaluate adherence to receptacle, drupelet cohesion, shape of the cavity, fruit shape, lustre, external texture, pubescence, juiciness, and juice bleeding at ambient temperature during storage. Data were combined after testing the homogeneity of the experimental error and arcsine transformation was used before analyzing the score data using GLM procedure of SAS (SAS Institute, 1999).

Fully grown primocanes of ‘Jeanne d’Orléans’ are semierect and medium high covered with a medium thick layer of wax and a moderate number of medium-sized reddish purple spines. Leaves are composed of either three or five rugose leaflets when five leaflets can be free to slightly overlapping, dull, and light green. Floricane laterals are longer than those of both ‘Boyne’ and ‘Killarney’.

Fruit of ‘Jeanne d’Orléans’ ripens 8 d after ‘Boyne’ and ‘Killarney’ (data not shown). The fruits are large, medium red (RHS 53A) [Royal Horticultural Society Color Chart (RHS), 1995], elongated conic, firm, very flavorful, and have a cylindrical cavity (Tables 1 and 2). Skin is dull and pubescent. At maturity, ‘Jeanne d’Orléans’ raspberries detach easily from the receptacle without crumbling and have strong drupelet cohesion (Table 1). Soluble solids levels were higher in ‘Jeanne d’Orléans’ than in the commercial cultivars in this study, whereas titratable acidity was similar to ‘Killarney’ but significantly lower than ‘Boyne’, ‘Nova’, and ‘Festival’ (Table 1). Total yield of ‘Jeanne d’Orléans’ was comparable to that of all commercial cultivars in this study, but fruit weight was significantly higher than cultivars in this study. Four replications of 20 fruits were used to evaluate marketability and bleeding by placing them in a petri dish over a white filter paper (Fig. 2) and keeping them at 20 °C (room temperature). ‘Jeanne d’Orléans’ remained marketable (firm and uniform color) for up to 5 d (Table 2) and drupelet bleeding was almost absent, which was much better than comparator cultivars in this study (Fig. 2). It is reported that the ellagic acid content of ‘Jeanne d’Orléans’ is significantly higher than ‘Boyne’, ‘Festival’, ‘Killarney’, and ‘Nova’, which are the most widely cultivated commercial cultivars in Quebec (Khanizadeh et al., 2009).

Winter damage measurements were carried out in the spring, when laterals are lengthening and flower buds emerging, on six randomly selected floricanes per plot. ‘Jeanne d’Orléans’ had a significantly greater dieback length (portion of dead cane starting at the tip and moving downward) than cultivars compared in this study (Table 3).

Area of Adaptation and Uses

‘Jeanne d’Orléans’ is recommended for eastern and central Canada. Although it has been observed to have a certain degree of winter-hardiness, protection of ‘Jeanne d’Orléans’ from wind is recommended.

The fruit is ideal for the pick-your-own and fresh markets as well as excellent for shipping as a result of its long shelf life compared with ‘Killarney’, ‘Nova’, ‘Boyne’, and ‘Festival’.

Fig. 1. Fruits of ‘Jeanne d’Orléans’ red raspberry.

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[1]To whom reprint requests should be addressed; e-mail Shahrokh.khanizadeh@agr.gc.ca; www.khanizadeh.info.

Table 1. Adherence to receptacle, drupelet cohesion, shape of fruit cavity, fruit shape, lustre, external texture, pubescence, juiciness scores, and titratable acidity of 'Jeanne d'Orléans' compared with commercially grown cultivars.[z]

Cultivar	Adherence to receptacle	Drupelet cohesion	Shape of fruit cavity	Fruit shape	Fruit lustre	Fruit external texture	Fruit pubescence	Fruit juiciness	Titratable acidity percent citric acid
Boyne	2.4	5.2	3.6	Globose	4.9	3.6	4.8	4.7	2.3
Festival	3.8	5.2	3.0	Globose	6.1	4.0	3.7	5.3	2.8
Killarney	2.6	6.4	3.1	Globose	6.9	3.6	3.3	6.3	1.7
Nova	3.2	5.3	3.6	Globose	6.4	4.3	4.4	5.0	2.7
Jeanne d'Orléans	3.5	3.6	2.2	Elongated Conic	2.0	5.1	6.0	4.5	1.6
Least significant difference	1.8	1.3	1.0	—	0.8	1.3	0.7	2.3	0.6

[z]Adherence to receptacle: 1 = very weak to 9 = very strong; drupelet cohesion: 1 = very tight to 9 = poor; shape of fruit cavity: 1 = cylindrical to 9 = very flattened; lustre: 1 = dull to 9 = very lustrous; external texture: 1 = very fragile to 9 = very tough; pubescence: 1 = absent to 9 = very pubescent; juiciness: 1 = not juicy to 9 = very juicy.

Table 2. Total yield, fruit weight, firmness, flavor, skin color, and soluble solids content of 'Jeanne d'Orléans' compared with selected commercially grown cultivars.

Genotypes	Total yield (g)[z]	Fruit wt (g)[z]	Firmness[y]	Flavor[y]	Skin color[y]	SSC[x] (°Brix)	Juice loss[w] 24 h	Juice loss[w] 48 h	Juice loss[w] 72 h	Shelf life[v] (days)
Boyne	4303	2.2	2.9	3.4	7.3	10.3	3.3	7.5	10.0	1.7
Festival	3983	5.1	3.9	5.3	5.2	10.1	3.0	5.5	9.0	4.0
Killarney	5006	4.1	3.2	3.9	3.9	10.6	2.8	5.2	9.0	3.7
Nova	4754	4.8	3.6	3.3	5.8	9.7	2.8	5.7	9.7	4.0
Jeanne d'Orléans	4016	6.9	5.6	6.2	6.6	14.6	1.2	1.3	2.2	5.0
Least significant difference 0.05	2509	0.9	1.1	1.1	0.8	1.8	0.9	2.2	2.3	0.9

[z]Total yield: sum of four replicates for the entire picking season; fruit weight: average weight of 25 randomly selected fruits.
[y]Firmness: 1 = very soft to 9 = very firm; flavor: 1 = very poor to 9 = excellent; skin color: 1 = very bright to 9 = very dark; color: 1 = very light red to 9 = very dark red.
[x]SSC = soluble solids content.
[w]At 20 °C, average of four replicates, each composed of 20 fruits; 1 = no juice loss to 10 = high juice loss.
[v]Number of days fruits remained marketable at room temperature (20 °C).

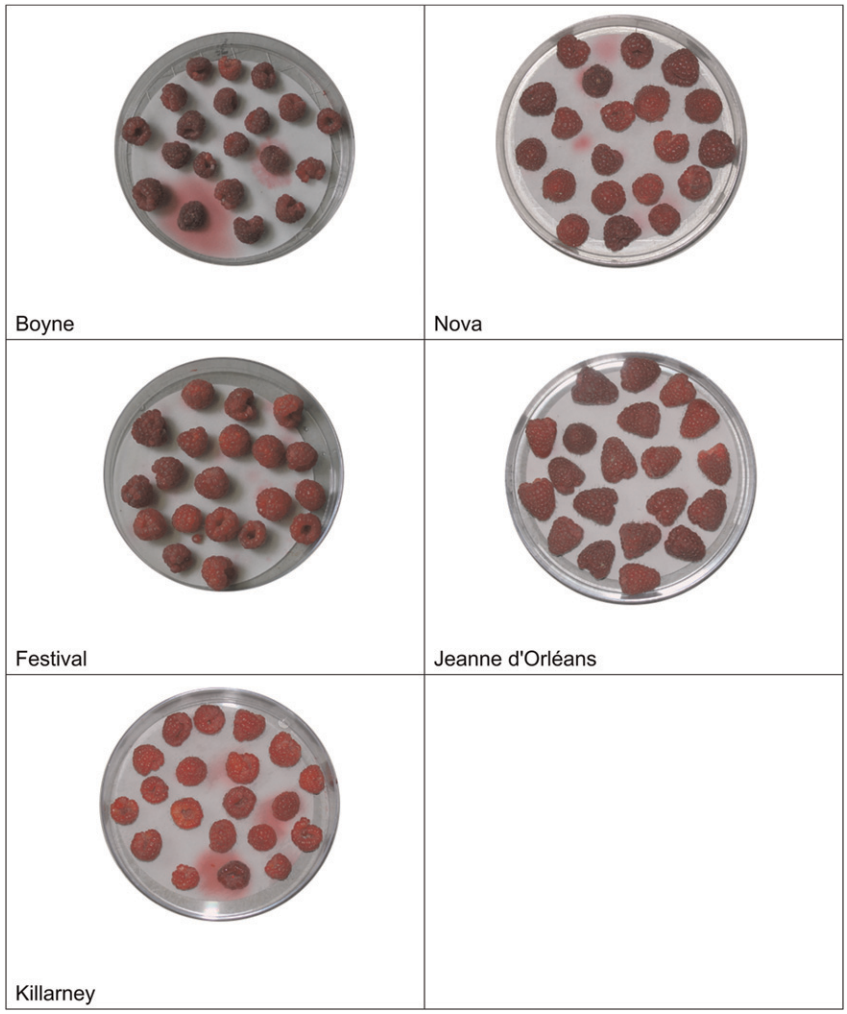

Fig. 2. Juice loss from 'Jeanne d'Orléans' compared with other commercially grown cultivars after 24 h at room temperature (20 °C)

Table 3. Total cane length and cane dieback of 'Jeanne d'Orléans' compared with 'Boyne' and 'Killarney'.[z]

Cultivar	Total cane length (cm)	Dieback		Midportion	
		Length (cm)	No. of dead buds	Total no. of buds	No. of dead buds
Boyne	106	4	2.3	27.0	4.6
Killarney	110	5	2.0	22.1	2.7
Jeanne d'Orléans	113	29	9.7	15.9	2.9
Least significant difference 0.05	23	17	4.3	6.1	1.9

[z]Cane damage measurements were carried out in the spring of each year when laterals are lengthening and flower buds emerging on six randomly selected canes.

Availability

Canadian Plant Breeders' Rights (PBRO 06-5438) and a U.S. patent (U.S. PP 20080263733) have been issued (http://khanizadeh.info/patent/), and the plants are available from licensed nurseries in Quebec. Nonexclusive multiplication licenses can be obtained from Agriculture and Agri-Food Canada, Saint-Jean-sur-Richelieu, Quebec. European nurseries may obtain a multiplication license from Meiosis Ltd. (Bradbourne House, Stable Block, East Malling, Kent, UK ME19 6DZ). A limited number of plants is available for research purposes from the corresponding author.

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