Saint-Pierre Strawberry

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'Saint-Pierre' is a new June bearing strawberry cultivar (*Fragaria ´ananassa* Duch.) bred for Eastern Central Canada and climates similar to Quebec conditions. 'Saint-Pierre' was released because of its very large, firm light red coloured fruit that last several days after maturing (Khanizadeh, 1994). The fruit do not darken during storage and have a similar level of antioxidants (Gallic Acid, Protocatecuic A., Catechin, P-hydroxybenzoic A., Epicatechin, and Ellagic Acid) as other cultivars with good shelf life (Hébert et al., 2001). It is useful for growers who need to store fruit for several days before marketing. This new cultivar was named for Saint-Pierre village located in Ile d'Orléans, Quebec. The area is well known for its production of horticultural crops, including strawberries. 'Saint-Pierre' was first licensed to "Les Fraises de l'Ile d'Orléans Inc.", located in Saint-Pierre.

Origin

'Saint-Pierre', tested as SJ89264-6, is a progeny resulting from a cross between 'Chandler' and 'Jewel' made in 1989 by S. Khanizadeh. 'Saint-Pierre' has been tested at the Agriculture and Agri-Food Canada sub-station in L'Acadie, Quebec since 1990, and at the Macdonald Campus of McGill University in Ste-Anne-de-Bellevue during 1992-1994. It was also evaluated from 1996-1998 in controlled semi-commercial sites by our private partners Lareault Inc., Les Fraises de l'Ile d'Orléans Inc., Réseau d'Essais de Petits Fruits - CPVQ Inc. (Quebec Regional small fruit trials, Conseil des productions végétales du Québec) in Quebec and also in Europe by Meiosis Ltd (Bradbourne House, Stable Block, East Malling, Kent, Me19 6DZ, UK) and Haberli AG nursery.

Description and performance

'Saint-Pierre' produces attractive and very large, light red, shiny fruit (Tables 1 and 2). The fruit shape is globose to conic. The flesh is orange-red throughout and firm to very firm. Fresh fruit store well for up to 5 days at room temperature.

Table 1. Yield distribution (g.m-1 of row), total yield, fruit weight, ripening season, index of crop concentration and earliness of 'Saint-Pierre' and comparison genotypes at the L'Acadie site.

Genotype	Harvest [z] 1 (1)	2 (6)	3 (9)	4 (13)	5 (16)	6 (22)	7 (28)	Total yield (g.m^{-1}) [y]	Wt / fruit (g) [y]	Ripening season [x]	Index of crop concentration [w]	Index of earliness [w]
Kent	817	885	885	769	510	526	307	3901	9.6	M	0.6	2.5
Chambly	1182	931	972	650	524	313	-	3987	9.4	EM	1.2	2.9
Bounty	60	323	26	974	973	944	636	3265	9.7	L	1.0	1.6
Honeoye	1389	687	593	435	591	312	444	3340	8.0	EM	1.1	3.0
Saint-Pierre	86	194	1087	1587	588	468	-	3450	14.1	L	1.9	1.6
LSD $_{0.05}$								421	1.5		0.6	1.1

[z] Average of the number of times fruit were harvested during the season; the number in brackets is the average cumulative day after the first harvest from second year plantings in 1995 to 1998.

[y] Averaged over 4 years from second year plantings (1995-1998); minimum of four replications per year, data taken from a 1 meter long representative portion of a 2 meter matted row (width 50 cm).

[x] L = late, LM = late-midseason, M = midseason, EM = early-midseason.

[w] Calculated as described previously (Khanizadeh and Fanous, 1992; Galletta et al., 1996) using the Pedigree software (Khanizadeh and Prasher, 1997). A larger index indicates very concentrated ripening and early ripening for the index of crop concentration and index of earliness, respectively.

Availability

A patent is pending for 'Saint-Pierre' and plants are presently available from licensed nurseries in Quebec. Non-exclusive multiplication licences can be obtained from Agriculture and Agri-Food Canada. European nurseries can obtain a multiplication licence from Meiosis Ltd. (Bradbourne House, Stable Block, East Malling, Kent ME19 6DZ). A limited number of plants are available for research purposes from the author (SK).

'Saint-Pierre' produced lower yields than 'Kent' and 'Chambly' but was similar to the other cultivars tested. 'Saint-Pierre' is a late cultivar. The fruit started ripening 1-2 days before 'Bounty' at our substation in L'Acadie (Table 1). Some symptoms of powdery mildew were noted on 'Saint-Pierre' plants especially during prolonged high humidity. However, plants appeared less susceptible to mildew than 'Bounty' and 'Kent'. 'Saint-Pierre' plants were as susceptible as 'Honeoye' to the six North American Eastern (NAE) races of Phytophthora fragariae (A1 to A6) based on the presence of red-stele and oospores in the root segments (Khanizadeh et al. 1997). 'Saint-Pierre' and 'Honeoye', at our substation in L'Acadie, had the same level of tolerance to Diplocarpon earlina Ell. & Ev., Dendrophoma obscurans Ell. & Ev. and Mycosphaerella fragariae (Tul.) Lindau, causal agents of leaf scorch, leaf blight, and leaf spot, respectively.

Area of adaptation and uses

'Saint-Pierre' is recommended for Eastern Central Canada, especially in areas where the climate is similar to that in the strawberry production areas of Quebec. Typically, strawberry production in Quebec occurs in areas with winter temperatures down to -30°C and warm and humid summers with an unpredictable mixture of sun and rain (drought some seasons, constant rain other seasons). 'Saint-Pierre' plants perform very well in a matted row system in sandy soils and are also adapted to growing in compact or heavy soils. The fruit is ideal for shipping because of its long shelf life.

Table 2. Firmness, flavour, skin colour, leaf disease susceptibility and shelf life of Saint-Pierre and comparison genotypes at L'Acadie.[z]

Genotypes	Firmness [y]	Flavour [y]	Skin colour [y]	Leaf disease susceptibility [y]	Shelf life [x]
Kent	3.2	3.0	2.8	1.3	2.0
Chambly	3.6	3.3	3.8	3.9	3.0
Bounty	2.0	3.0	3.0	3.0	1.0
Honeoye	3.0	3.0	3.0	2.0	1.0
Saint-Pierre	4.0	4.0	2.0	1.9	5.0
LSD $_{0.05}$	0.4	0.7	0.3	0.7	3.0

[z] Averaged over 5 years from second year plantings (1995-1999), minimum of four replications per year, data taken from a 1 meter long representative portion of a 2 meter matted row (width 50 cm).

[y] Data were transformed to arcsin prior to analysis of variance (SAS Inst., 1988). Firmness: 1 = very soft, 5 = very firm; flavour: 1 = poor, 5 = excellent; skin colour: 1 = very pale, 5 = dark red; leaf disease susceptibility: 1 = very susceptible, 5 = resistant. See Khanizadeh et al. (1994) for details on score evaluations.

[x] Number of days at room temperature for which the fruit were more than 95% marketable.

Literature Cited

Hébert, C., M. T. Charles, L. Gauthier, C. Willemot, S. Khanizadeh, and J. Cousineau. 2001. Strawberry proanthocyanidins: biochemical markers for Botrytis cinerea resistance and shelf-life predictability. Acta Hort (In press)

Khanizadeh, S. 1994. Breeding strawberries for Eastern Central Canada, p. 183-187. In: H. Schmidt and M. Kellerhals (eds.). Progress in temperate fruit breeding. Kluwer Academic, The Netherlands.

Khanizadeh, S. and M.A. Fanous. 1992. Mathematical indices for comparing small fruit crops and trait similarity. HortScience 27:346-348.

Khanizadeh, S., A. Gruber, O. Carisse, D. Buszard, and P.O. Thibodeau. 1997. Red-stele susceptibility of advanced strawberry selections from Quebec. Acta Hort. 439:189-193.

Khanizadeh, S., J. Fortin, M.J. Lareau, and D. Buszard. 1994. Sensory evaluation of six strawberry cultivars after machine harvest, p. 249-254. In: H. Schmidt and M. Kellerhals (eds.). Progress in temperate fruit breeding. Kluwer Academic, The Netherlands.

Khanizadeh, S. and S.O. Prasher. 1997. Pedigree © ®: A database program to draw pedigrees, trace traits, and view images of strawberry genotypes. Adv. Strawberry Research 16:67.

Galletta, G.J., J.L. Maas, J.M. Enns, J.C. Scheerens, R. Rouse, and R.F. Hellebower Jr. 1996. Primetime Strawberry. HortScience 31:1038-1042.

SAS Institute. 1988. Statistical analysis system. SAS/STAT, SAS/BASIC guide for personal computers, version 6.04 (ed.). SAS Institute, Inc., Cary, N.C.

[1]For more information on our research activities visit http://www.pgris.com, http://www.universaldbase.com or http://res2.agr.ca/stjean/personnel/khanizadeh_e.htm
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