'AC-Yamaska' Strawberry

Shahrokh Khanizadeh¹, Bertrand Thériault², and Odile Carisse³

Agriculture and Agri-Food Canada, Research Station, 430 Blvd. Gouin, St-Jean-sur-Richelieu, QC, Canada J3B 3E6

Deborah Buszard⁴

Department of Plant Science, McGill University, Ste-Anne-de-Bellevue, Quebec, Canada, H9X 1C0

Additional index words. *Fragaria* × *ananassa*, fruit breeding, storage, shelf life, red stele

'AC-Yamaska' is a new June-bearing strawberry cultivar (*Fragaria* × *ananassa* Duch.) bred for eastern central Canada and more specifically for Quebec growing conditions. 'AC-Yamaska' was released because of its very large, dark red, glossy fruit and its late ripening period, which extends the strawberry harvest (Khanizadeh, 1994).

The prefix 'AC' in the name is the abbreviation for 'Agriculture and Agri-Food Canada'. 'Yamaska' is a town located near the shore of Lake Saint-Pierre, a widening of the St. Lawrence River between Richelieu and Nicolet counties in the Province of Quebec. Yamaska is surrounded by rich agricultural lands where farming and market gardening are the main occupations. The word 'Yamaska' is derived from a native Indian word meaning "where there is grass under the water" and it probably refers to the extensive marshes in the area.

Origin

'AC-Yamaska', tested as SJ89700-1, is a progeny resulting from a cross between two late-season cultivars, 'Pandora' and 'Bogota', made in 1989 by S. Khanizadeh. 'Pandora' was originally tested as 'Jilla 33' (Meiosis Ltd. *Fragaria* Portfolio Nov. 1998, Bradbourne House, Stable Block, East Malling, Kent ME19 6DZ) and released by the Horticultural Research Institute in East Malling, U.K., in 1989. It was used as a parent because of its moderate resistance to verticillium wilt (*Verticillium albo-atrum* Reinke & Berth.), powdery mildew (*Sphaerotheca macularis* Wallr. ex Fr.), and gray mold (*Botrytis cinerea* Pers. ex Fr.). 'Bogota' was released in 1978 by the Institute for Horticulture, Plant Breeding, in

Wageningen, The Netherlands (Wassenaar and Van de Lindehoof, 1979). It was used as a parent because it produces orange-red fruit late in the season and is moderately resistant to red stele (*Phytophthora fragariae* Hickman), verticillium wilt, and powdery mildew.

'AC-Yamaska' has been tested at the Agriculture and Agri-Food Canada substation in L'Acadie, Quebec, since 1990, and at the

Macdonald Campus of McGill Univ. in Ste-Anne-de-Bellevue from 1992 to 1994. It was also evaluated from 1996 to 1998 in controlled semi-commercial sites by our private partners Lareault Inc., Les Fraises de l'Ile d'Orleans Inc., Réseau d'Essais Petits Fruits-CPVQ Inc. (Quebec Regional small fruit trials, Conseil des productions végétales du Québec) in Quebec and also in Europe by Kraege Gbr (Postfach 266, 48284 Telgte, Germany).

Description and performance

Plants of 'AC-Yamaska' are vigorous and produce two to five inflorescences per crown. They can tolerate winter temperatures below -30 °C (with 10 cm straw mulch cover). Petioles are 11–21 cm long with three large, dark green, flat, shiny, and obovate leaflets, each with 22–28 serrations. The terminal leaflets have a 1:1 length/width ratio and the flowers are sometimes staminate as in the parent 'Pandora' (Fig. 1).

'AC-Yamaska' produces attractive and very large, dark red, shiny fruit (Fig. 1, Tables

Fig. 1. Fruit and flower of 'AC-Yamaska' strawberry.

Received for publication 2 Nov. 1998. Accepted for publication 1 Mar. 1999. Agriculture and Agri-Food Canada, St-Jean-sur-Richelieu, Contribution No. 335/99.04.02R. 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.

¹Research Scientist and Adjunct Professor, Breeder, Physiologist, and Statistician.

²Technician.

³Research Scientist, Pathologist.

⁴Associate Professor and Dean, Fruit Specialist.

Table 1. Yield distribution (g·m⁻¹ of row), indices of crop concentration and earliness, ripening season, and total yield of 'AC-Yamaska' compared with those of other genotypes.

Genotype	Harvest ^z							Total yield (g·m ⁻¹) ^y	Wt/fruit (g) ^y	Ripening season ^x	Index of crop concn ^w	Index of earliness ^w
	1 (1)	2 (6)	3 (9)	4 (13)	5 (16)	6 (22)	7 (28)					
Joliette	209	542	711	749	338	205	---	2752	15.3	M	1.4	2.5
AC-Yamaska	---	12	211	1290	542	678	---	2733	16.0	L	2.3	1.9
Oka	516	467	607	520	291	254	---	2653	13.6	M	1.0	3.0
Kent	409	443	443	385	255	263	154	2350	14.0	M	0.6	2.5
Glooscap	385	563	651	342	221	161	---	2322	11.8	M	1.3	2.5
Chambly	591	466	486	325	262	157	---	2286	13.9	EM	1.2	2.9
Bounty	30	162	313	487	487	472	318	2268	12.0	L	1.0	1.6
Sparkle	184	299	319	276	327	247	---	1650	13.2	LM	1.3	1.5
Blomidon	113	353	474	363	151	157	---	1609	12.0	L	1.4	1.4
LSD _{0.05}								600	2.3		0.6	1.1

^zNumber of times fruit were harvested during the season; the number in brackets is the cumulative day after the first harvest during (1995–98).

^yAveraged over 4 years (1995–98), minimum of four replications per year, data from the L'Acadie site, genotypes are ranked by total yield.

^xL = late, LM = late-midseason, M = midseason, EM = early-midseason.

^wCalculated as described previously (Galletta et al., 1996; Khanizadeh and Fanous, 1992) using the Pedigree software (Khanizadeh and Prasher, 1997).

1 and 2). Fruit shape is oblate to globose and occasionally short-wedge. The flesh is dark throughout and fairly firm (Table 2). Fresh fruit store well for up to 5 d at room temperature.

'AC-Yamaska' produced yields similar to those of the cultivars Joliette, Oka, Kent, Glooscap, Chambly, and Bounty. It out-yielded 'Sparkle' and 'Blomidon'. 'AC-Yamaska' fruit ripening started 5 d after 'Bounty' in our area, but it reached its midpoint earlier than 'Bounty' due to its concentrated cropping (short season); therefore, it is considered a late cultivar.

No symptoms of powdery mildew were noted on 'AC-Yamaska' plants since observations began in 1990. The only tested plants to show susceptibility to mildew were 'Bounty' and 'Kent'. 'AC-Yamaska' plants were similar to 'Sparkle' in terms of susceptibility 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). 'AC-Yamaska' had the same level of tolerance to leaf scorch (*Diplocarpon earlina* Ell. & Ev.) and leaf blight (*Dendrophoma obscurans* Ell. & Ev.) as 'Chambly' and the same susceptibility to leaf spot (*Mycosphaerella fragariae* (Tul.) Lindau) as 'Kent'. No signs of gray mold fruit rot (*Botrytis cinerea* Pers. ex Fr.) were observed on any cultivars except 'Glooscap' and 'Blomidon', which showed intermediate susceptibility to this disease.

Area of adaptation and uses

'AC-Yamaska' is recommended for east-central Canada, especially in areas where the climate is similar to that in the strawberry production areas of Quebec. It is useful where there is a need to extend the strawberry season. 'AC-Yamaska' plants perform very well in sandy soil and they are also adapted to grow-

Table 2. Firmness, flavor, skin color, and shelf life of 'AC-Yamaska' compared with those of other genotypes.^z

Genotypes	Firmness ^y	Flavor ^y	Skin color ^y	Shelf life ^x
Joliette	4.1	3.3	2.8	4
AC-Yamaska	3.6	3.6	3.6	5
Oka	2.0	3.7	4.0	1
Kent	3.0	3.0	2.2	2
Glooscap	2.7	3.1	3.6	1
Bounty	2.0	3.7	3.0	1
Sparkle	3.1	3.0	3.0	2
Blomidon	3.2	3.0	3.0	1
LSD _{0.05}	0.1	0.2	0.2	1.3

^zAveraged over 4 years (1995–98), minimum of four replications per year, data from the L'Acadie site.

^yData were transformed to arcsin prior to analysis of variance (SAS Inst., 1988). Firmness: 1 = very soft, 5 = very firm; flavor: 1 = poor, 5 = excellent; skin color: 1 = very pale, 5 = dark red. See Khanizadeh et al. (1994) for details on score evaluation.

^xNumber of days at room temperature for which the fruit were >95% marketable.

ing in compact or heavy soil. This genotype is presently being evaluated in other provinces of Canada, in the United States, and in Europe.

Availability

A patent is pending for 'AC-Yamaska' 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 Mallong, Kent ME19 6DZ). A limited number of plants are available for research purposes from the author (S.K.).

Literature Cited

- Galletta, G.J., J.L. Maas, J.M. Enns, J.C. Scheerens, R. Rouse, and R.F. Heflebower, Jr. 1996. Primetime strawberry. *HortScience* 31:1038–1042.
- 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., 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., 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. and S.O. Prasher. 1997. Pedigree®: A database program to draw pedigrees, trace traits, and view images of strawberry genotypes. *Adv. Strawberry Res.* 16:67.

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

Wassenaar, L.M. and C.P.J. Van de Lindehoof. 1979. *Nieuwe aardbeirassen: Bogotà en Korona*. De Fruitteelt 493–495.