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‘SJCA38R6A74’ (Eden)

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‘SJCA38R6A74’ (*Malus ×domestica* Borkh.) is a new high-quality cultivar with improved firmness, crispness, and much longer shelf life than ‘McIntosh’ and ‘Cortland’. The fruit has superior flavor and does not abscise at maturity. The flesh is juicy, firm, crisp, and resistant to bruising. Flesh resists browning, making it an excellent candidate for fresh fruit slices, fruit salad, dried apple chips, and processing (juice, cider). The trademark ‘Eden’ is used for sale, distribution, and marketing (www.inspection.gc.ca/english/plaveg/pbrpov/cropreport/app/app00005085e.shtml).

Origin

‘SJCA38R6A74’, also tested as A38R6A74, originated from a cross made in 1971 between ‘Linda’ and NY44428–5 (‘Jonamac’) (Fig. 1) at the Agriculture and Agri-Food Canada (AAFC), Horticultural Research and Development Center (HRDC) at Saint-Jean-sur-Richelieu, Quebec.

Description

‘SJCA38R6A74’ trees are semivigorous spreading with wide angle branches with a tendency of limbs to droop. New shoots are pubescent. Fruit is borne on spurs. Leaves are oblong to slightly obovate, double serrate with a hairy underside, cuspidate apex, and cuneate to obtuse base. Leaf length:width ratio is 1:96 and petioles are 2.5 to 4.0 cm long. Trees are hardy at Frelighsburg and L’Acadie, Quebec (latitude 45°N, longitude 72°W), which have average winter minimum temperatures of –25 °C. Powdery mildew (*Podosphaera leucotricha* [Ell. & Ev.] Salm.) or fireblight (*Erwinia amylovora* [Burr.] Winslow et al.) infections have not been observed on leaves during the evaluation period. The scab susceptibility of ‘SJCA38R6A74’ is similar to ‘Macspur’, ‘McIntosh’, and ‘Cortland’. Fruit is susceptible to bitter pit, especially if the season is dry and no irrigation is provided, but is resistant to watercore.

Flowering starts at the same time as ‘Macspur’ and unopened flowers are medium pink (RHS 58A) (Royal Horticultural Society Colour Chart, 1995) in full balloon stage. The broad ovate petals overlap slightly and are mainly white with a slight medium pink blush (RHS 58A) and the pedicels are green at full bloom.

Fruit are flat globose (oblate) or globose (Fig. 2), attractive, medium to very large size with an average of 140 g (Quebec) to 220 g (British Columbia). The basin is downy, medium width, fairly deep, and slightly wrinkled. The calyx is partly open and the lobes are persistent and upright. The calyx tube is funnel-shaped and stamens are in

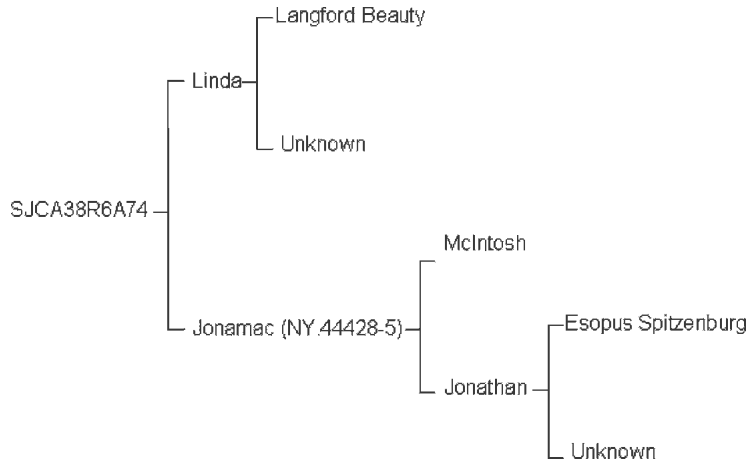

Fig. 1. Pedigree of ‘SJCA38R6A74’ apple.

Fig. 2. Fruit of ‘SJCA38R6A74’ apple.

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Fig. 3. Browning comparison of 'SJCA38R6A74' to 'Macspur' 24 h after cutting and held in a refrigerator at 5 °C.

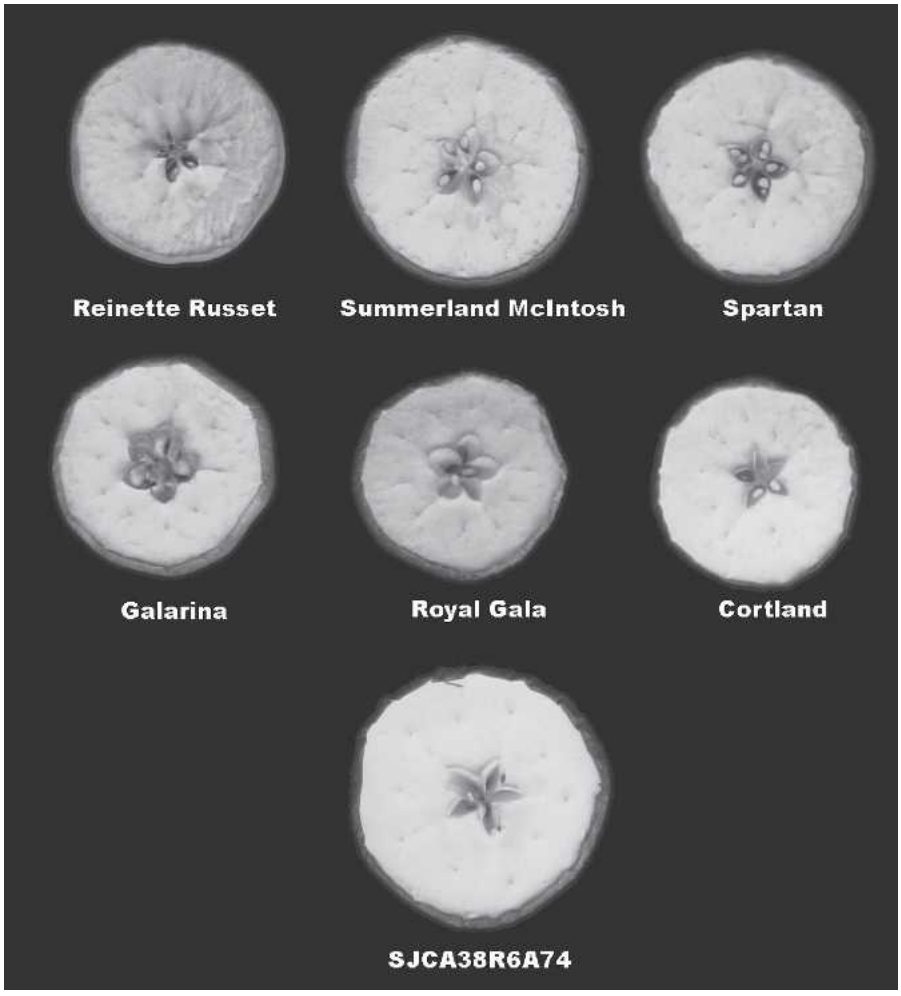

Fig. 4. Susceptibility of selected cultivars versus 'SJCA38R6A74' to browning 4 d after cutting at room temperature.

Table 1. Total phenolic content of 'SJCA38A6A74' compared with six cultivars.

Cultivar	Flesh total phenols[z] (µg GAE/mL)
Reinette Russet	403
Summerland McIntosh	142
Spartan	134
Galarina	130
Royal Gala	118
Cortland	81
SJCA38R6A74	50
LSD 0.05%	34

[z]Values are means of three to four replicate measurements.
[z]Total phenols expressed as µg gallic acid equivalent (GAE) mL^{-1} (Rekika et al., 2005, Tsao et al., 2005).

basal position. The cavity is acute and sometimes slightly russeted with medium depth and width. The stem is uniform with medium to long length and clubbed on some apples. The core is in distal position and usually closed. The carpels are 30 mm in height and 25 mm in width. Fruit skin has an average thickness, the overcolor of skin is dark red (RHS 185A), and the type of overcolor of skin is washed out (faded) and solid over greenish-yellow ground color. Lenticel count is low near the stem but very high near the basin. The flesh is juicy, firm, crisp, yet melting with a fine white texture. The fruit resists bruising discoloration, and flesh resists browning compared with other tested cultivars, including 'Macspur' (Fig. 3). No browning occurred for several hours after being cut with a stainless steel knife and it remained white until completely dried at room temperature (Fig. 4) as a result of its low level of phenolic compounds (Table 1) as previously reported for several other apple cultivars (Amiot et al., 1992). Slight browning may occur in slices when stored for 3 months and then cut and handled under conditions that simulate commercial fresh-cut processing (Table 2). This may be the result of cell deterioration and loss of membrane integrity over 3 months of air storage. It is known that apples with weak membranes have greater cut-edge browning when converted to slices (Toivonen, 2004). The flavor is very aromatic, sweet, and acidic at optimum maturity, which is at the end of September, 1 week after 'McIntosh'. The new cultivar is recommended for fresh eating, fruit salad, and processing (dried apple chips). The fruit maintain firmness, juiciness, and flavor very well in standard cold storage for 4 to 5 months.

The yield is very similar to 'Macspur' but does not drop at maturity (Table 3) and remains on the tree several weeks after, even at –20 °C (Fig. 5), which suggests that it could be a good candidate for 'Ice Cider' production.

Availability

A Canadian Plant Breeder's Right and a U.S. Patent has been issued (www.inspection.gc.ca/english/plaveg/pbrpov/cropreport/app/app00005085e.shtm; USPA20060053517)

Table 2. Flesh browning of slices made with 'SJCA38R6A74' and 'Delicious' apples grown in British Columbia in 2004.

Cultivar	Province grown	Time in storage (mo.)	Browning of flesh (1–3 scale)[z]
Delicious	British Columbia	0	2.9 d[y]
SJCA38R6A74	British Columbia	0	1.0 a
SJCA38R6A74	British Columbia	3	1.7 c

[z]Scale: 1 = no browning, 2 = slight browning, and 3 = moderate to severe browning in localized areas or over the whole slice.
[y]Means followed by a different letter are significantly different as tested with a Duncan's multiple range test ($P = 0.05$).

Table 3. Performance of 'SJCA38R6A74' compared with 'MacSpur'.

	Cultivar	
Variable	SJCA38R6A74	Macspur
Yield (kg)[z]		
2000	3.7	0.5
2001	7.3	4.1[y]
2003	22.4	15.4[y]
2004	33.6	38.9
2005	26.2	26.0
Cumulative	93.2	84.9
Yield efficiency index (kg/cm^2)	5.9	3.1[y]
Average fruit weight, 2005 (g)	141.0	126.0[y]

[z]The values are the average of four replicates.
[y]Significant at 0.05 level using least significant difference.

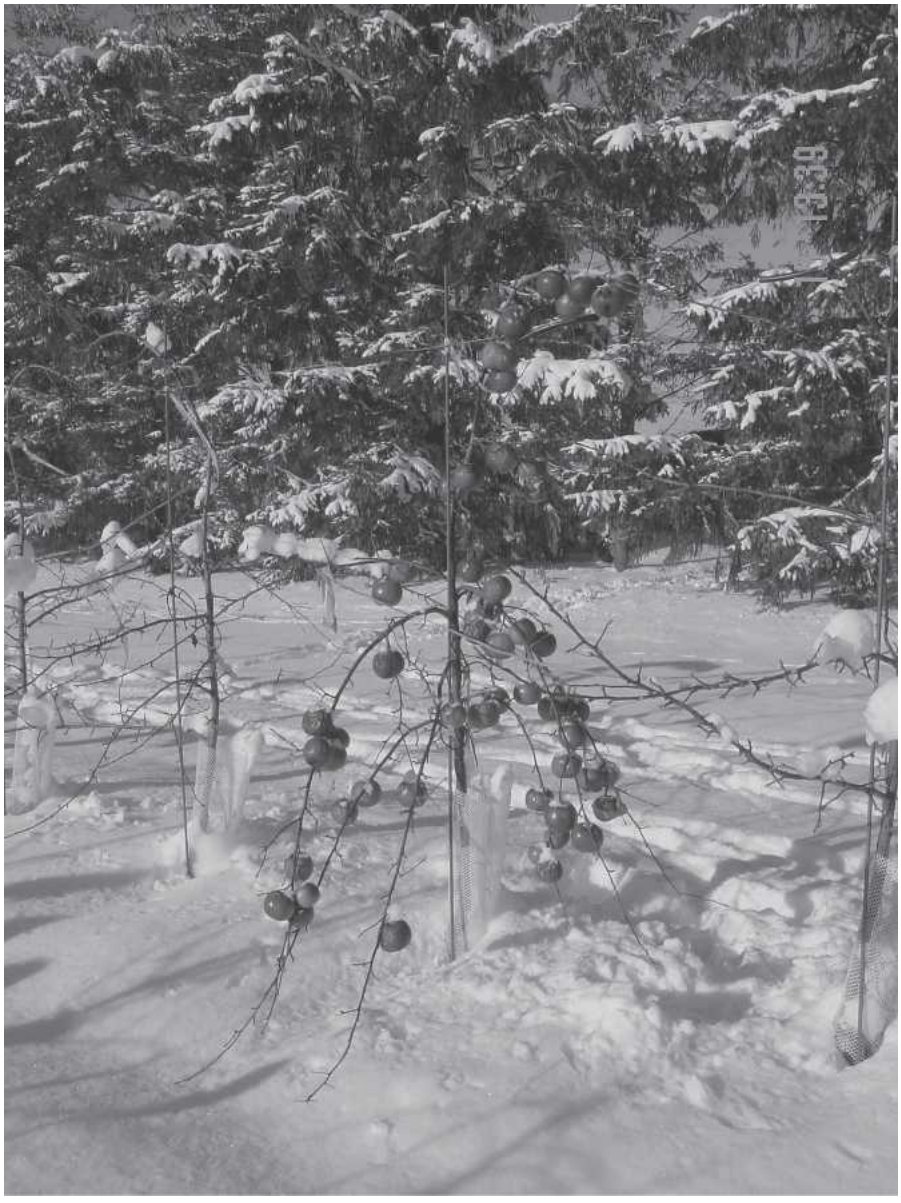

Fig. 5. Persistence of SJCA38R6A74 fruit at maturity; photo taken on 15 Dec. 2004.

for 'SJCA38R6A74'. The virus free bud wood is available from Canadian Food Inspection Agency (CFIA, Sidney Laboratory, CFIA, 8801 East Saanich Road, Sidney, BC, Canada, V8L 1H3) and nonexclusive multiplication licenses can be obtained from AAFC at Saint-Jean-sur-Richelieu. European nurseries may obtain a multiplication license from Meiosis (Bradbourne House, Stable Block, East Malling, Kent ME19 6DZ). A limited number of plants are available for research purposes from the author (S.K.) after signing a nonpropagation agreement.

Literature Cited

Amiot, M.J., M. Tacchini, S. Aubert, and J. Nicholas. 1992. Phenolic composition and browning susceptibility of various apple cultivars at maturity. J. Food Sci. 57:958–962.

Rekika, D., S. Khanizadeh, M. Deschênes, A. Levasseur, M.T. Charles, R. Tsao, and R. Yang. 2005. Antioxidant capacity and phenolic content of selected strawberry genotypes. HortScience 40:1777–1781.

Royal Horticultural Society Colour Chart. 1995. Royal Horticultural Society, London, U.K.

Toivonen, P.M.A. 2004. Postharvest storage procedures and oxidative stress. HortScience 39:938–942.

Tsao, R., R. Yang, E. Sockovie, and S. Khanizadeh. 2005. Which polyphenolic compounds contribute to the total antioxidant activities of apple? J. Agr. Food Chem. 53:4989–4995.