'Reinette Russet' Apple

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Additional index words. *Malus ×domestica*, apple scab resistance, fruit breeding, cider production, winter hardy

'Reinette Russet' is being released as a replacement for 'Golden Russet', which is presently being grown in Eastern Canada for the production of apple cider. This new cultivar produces larger fruit than 'Golden Russet', and is hardier and partially resistant to apple scab [*Venturia inaequalis* (Cke) Wint.]. The fruit has a pleasant flavor and is very sweet, which should give it a market as a specialty item.

'Reinette Russet', tested as X4362, is a bud mutation of 'Reine des Reinettes'. It was first selected in 1979 at the Unité d'Amélioration des Espèces Fruitières et Ornamentales [Fruit and Ornamental Plant Breeding Unit (FOPBU)] of the Institut National de la Recherche Agronomique (INRA), located in Angers (France), and then sent to Quebec in 1990 for further evaluation. 'Reinette Russet' is being released by the Quebec apple breeding program (QAPB) located at the Agriculture and Agri-Food Canada (AAFC) Research Centre in St-Jean-sur-Richelieu (Quebec). The Quebec apple breeding program has been active at the AAFC Frelighsburg substation since 1970. The present goals of the breeding program are the development of hardy and disease-resistant cultivars suitable for eastern Canada (Khanizadeh et al., 2000a) and the development of efficient and winter-hardy rootstocks (Khanizadeh et al., 2000b).

Description

'Reinette Russet' trees are weak to moderately vigorous when grafted on the rootstock M.26, with an upright-spreading shape. The bearing habit is type II, fruit being borne on 2- to 4-year-old shoots (Lespinasse, 1977). 'Reinette Russet' trees are as hardy as 'Nova', 'Goldrush', 'Querina Florina', 'Novamac', and 'Novaspy' at Frelighsburg, Quebec (lat. 45°N; long. 72°W), which has an average winter minimum temperature of –25 °C. Fruits and foliage are resistant to apple scab at Frelighsburg, but there has been some infection in INRA experimental orchards, and for this reason this cultivar is considered only partially resistant in France. No signs of pow-

dery mildew [*Podosphaera leucotricha* (Ell. & Ev.) Salm.] or fire blight [*Erwinia amylovora* (Burr.) Winslow et al.] infection were observed in Frelighsburg since 1993. The leaves are medium-small to medium size and elliptic with serrate to doubly serrate margins. The abaxial surface of the leaves is very hairy; the apex is acuminate to cuspidate; and the base is oblique. The average leaf length to width ratio is 1.6 and the petioles are hairy, 1.7 to 2.9 cm long, with long and thin stipules when young. The surface of the leaves is medium green and weakly glossy.

Flowering starts at the same time as 'McIntosh' and 3 d after 'Golden Russet' in Frelighsburg. Unopened flowers are dark pink [60A; Royal Horticultural Society Colour Chart (RHS), 1995] in full balloon stage and the flowers are single. When fully open, the ovate to oblong petals are touching and are mainly white with dark pink veining (RHS 61B) on the surface. The underside of the petals is similar to the surface except that the veining varies from RHS 61A to 61B. The pedicels are green and red.

'Reinette Russet' fruit mature in early to mid-October in Frelighsburg, ≈1 to 2 weeks before 'Golden Russet', 1 week after 'Cortland' and at least 2 weeks after 'McIntosh'. Fruit size varies from medium-small to medium-large (axial diameter 52 to 62 mm, transverse diameter 63 to 76 mm). Fruit weights range from 117 to 204 g with an overall average of 151 g. The shape can be round-conic, flat-round-conic, or oblate, and the average length to width ratio is 0.81. The outline of the fruit is mainly regular although it can be slightly angular in some samples. The skin is average in thickness and very rough because it is covered by fine to medium russet (Fig. 1). The color is mainly brownish-yellow (RHS 163B) with faded to medium red (RHS 179A) stripes on the sunny side. The large and swollen lenticels are russeted and the bloom is scant. The

Fig. 1. Fruit of 'Reinette Russet' apple.

Received for publication: 18 Dec. 2001. Accepted for publication 4 June 2002. Agriculture and Agri-Food Canada, St-Jean-sur-Richelieu, Contribution No. 335/2002.12.01R.

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stem is short (1 cm), pubescent, olive-green to reddish-brown, and average in diameter. The cavity is acuminate to acute, russeted, with a medium depth and width. The basin is medium to slightly deep, medium width to wide, and the slightly downy surface is smooth to a bit wavy. The medium-size to large calyx is persistent with erect lobes, open, and the calyx tube is funnel-shaped; the stamens are in median position. The closed to partly open core is medium size and is located in median position with prominent clasping core lines. The carpels are ovate and may be cracked, but there is no tufting present. The distal end of the carpels is emarginate and the cells are symmetrical and axile. The seeds are large, flattened on one side, not tufted, and have an acute to obtuse tip. At harvest the flesh is greenish-white, juicy, breaking, firm (8.1 kg as measured by a EPT-1 pressure tester made by Lake City Technical Products, Kelona, B.C., Canada), and browns quickly after cutting. The flesh is high in soluble solids (14.9%) and acidity (1.0% malic acid). The flavor is very sweet and good. The fruit have a tendency to develop water core after long storage (4 to 5 months in air at 2 to 4 °C). After 4.5 months in air at 2 to 4 °C, the flesh is still fairly firm (6.7 kg), the acidity is average (0.53%), and the soluble solids are still high (16.1%). The juice produced from stored apples is golden honey yellow. Long storage in CA is not recommended since 30% to 40% of the fruits suffer from senescence during extended storage.

'Reinette Russet' was planted in several locations and compared to other known cultivars at the growers' field and also at

Frelighsburg (Quebec) using M26 as rootstocks and trained as vertical axis. Five trees of each cultivar were planted 2 m apart with 4-m spacing between the rows in 1995. 'Redfree' had higher cumulative yield than other cultivars, but it was nonsignificant. Cumulative yields (1998–2000) were 42.0 ± 2.3 kg/tree for 'Reinette Russet' compared with 'Redfree' (50.0 ± 6.7 kg/tree), 'NovaSpy' (46.0 ± 1.8 kg/tree), and 'McIntosh' (48 ± 3.5 kg/tree).

Ciders produced from 'Reinette Russet' and 'McIntosh' apples were evaluated by a panel of expert judges from the Wine Judges Commission of Ontario, an affiliate of the Amateur Winemakers of Ontario. Single-variety ciders (alcoholic) were produced from juice that had been extracted from apples at harvest and frozen for 8 months. 'Reinette Russet' apples produced a dark yellow cider with rich, baked apple, clove, and cinnamon aromas. The cider had complex apple flavors with a pleasant tannin level but a low acid level, which resulted in a short finish. The high sugar content of the fruit may have been responsible for the short finish. 'Reinette Russet' apples are recommended for use in the production of cider and fruit wine due to the complexity of the flavors. They are not recommended for the production of sparkling cider. In contrast, cider produced from 'McIntosh' apples was pale green with cardamon, ginger, candy, and caramel aromas. It had simple, clean, and sweet apple flavors and light tannin levels. The acid balance was slightly better than for 'Reinette Russet' and had a long finish. The sugar level was high almost to the point of unacceptability. 'McIntosh' apples are recommended for the

production of sparking apple cider, and the addition of a bitter wine might help round out flavors and balance the sugar level. Overall, both types of cider were considered acceptable, although judges preferring a complex cider flavor favored 'Reinette Russet' while those preferring a simple cider flavor preferred 'McIntosh'.

Availability

A trademark is pending for 'Reinette Russet'. Limited quantities of nonindexed budwood are available for research purposes (universities and research stations) from Shahrokh Khanizadeh (North America) or from François Laurens (Europe) with a written request. Trees and/or budwood may be obtained from Brandt's Fruit Trees in the United States and Canada. Nurseries may inquire about "non-exclusive sub-licenses" directly to Brandt's Fruit Trees.

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