'Belmac' Apple

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'Belmac' is an excellent, attractive, and desirably flavored late-season red apple (*Malus domestica* Borkh.) with field immunity to apple scab caused by *Venturia inaequalis* (Cke.) Wint. 'Belmac' is being released by the Agriculture and Agri-Food Canada, Horticultural Research and Development Centre, St-Jean-sur-Richelieu, Quebec, as a high-quality, disease-resistant, cold-hardy apple for wholesale or roadside markets. The cultivar was patented as 'Belmac' and given the registration number 95-550.

Origin

The seedling originated in Ontario at the Ottawa Research Station in 1968 in a program on apple improvement, directed by Lloyd P.S. Spangelo. The original seedling tree of 'Belmac' was transferred to Frelighsburg, Quebec, in 1971 where an apple-breeding program had been initiated. 'Belmac' originated from crossing the scab-immune selection Ottawa 521 ('Melba' x PRI 11-151) by 'Spartan' (Fig. 1). In 1985, the seedling was selected from a progeny of 495 trees on the basis of good pomological characteristics and was given the designation 68-10 (1968, cross 10) in our breeding records. Propagated trees on MM.106 rootstock were tested as FAR11T13 (Frelighsburg, section A, row 11, tree 13) and later as QAS (Quebec apple selection) #13 at Frelighsburg. The name "Belmac" was chosen to refer to its attractiveness (Bel) and to the fact that 'McIntosh' (Mac) is part of its ancestry: the fruit of 'Belmac' resemble 'McIntosh' in terms of finish, color, size, and shape.

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Description and performance

'Belmac' fruit are of good commercial size. In Frelighsburg, fruit of 'Belmac' averaged 140 g, which was similar to that of 'McIntosh' (130 g) (Granger et al., 1994). The skin is glossy and its color at harvest is up to 90% cardinal red, slightly striped over a char-treuse green undercolor (Fig. 2; Granger et al., 1995a, p. 661).

The flesh color is white. At their optimal harvest date and in air storage, 'Belmac' fruit are similar in firmness to those of 'McIntosh'. Experienced taste panelists have consistently ranked fruit of 'Belmac' higher than 'McIntosh', both at harvest and after 15 weeks in air storage at 1 °C on the basis of crispness and flavor (Granger et al., 1994). At climacteric, the soluble solids concentration (SSC) of 'Belmac' fruit (11.93%) was similar to that of 'McIntosh' (11.68%), but was 2% higher after 140 days in controlled-atmosphere (CA) storage. The flesh has a well-balanced sugar : acid ratio of 2.0% to 2.2% as defined by the SSC : titratable acidity (mg malic acid/L equivalent) ratio. These apples produce an attractive rosy juice that is classified as very good in terms of quality and flavor. After 15 weeks in air storage at 1 °C, the eating quality of the 'Belmac' apples was not rated significantly different from 'Spartan' in sensory evaluation tests (Granger et al., 1994). Similar to 'Liberty', 'Belmac' apples stored during 150 days under CA (2.5% CO₂ and 2.5% O₂) conditions displayed from 0% to 5% core flush after being held at 20 °C for 1 week.

'Belmac' trees have medium vigor, somewhat less than that of 'McIntosh', and are cold hardy under the climatic conditions of Frelighsburg, with an average winter mini-

Fig. 1. Pedigree of 'Belmac' apple.

Fig. 2. Fruit of 'Belmac' apple.

mum of -25 °C. 'Belmac' has been a successful parent in various crosses and thus appears to be a good pollinizer. 'Belmac' scions have proven to be compatible with MM.106, Ottawa 3, and M.26 rootstocks. 'Belmac' trees have been precocious, annual bearers, and very productive (Granger et al., 1990, 1994). The fruit are borne mainly on 2-year-old wood and are well-distributed throughout the tree canopy. 'Belmac' trees have been tolerant to powdery mildew [*Podosphaera leucotricha* (Ell. & Ev.) Salm.] and frog-eye leaf spot [*Botryosphaeria obtusa* (Schwein.) Shoemaker] under field testing. Their resistance to fire blight [*Erwinia amylovora* (Burr.) Winsl. et al.] is not known (Granger et al., 1994, 1995b).

The following detailed description of 'Belmac' is based on Zielinski (1955) and uses color designations in accordance with the *Royal Horticultural Colour Chart* (1938, 1941).

FLOWER

Corolla: 47 mm in diameter at anthesis.
 Petals: 14 × 22 mm.
 Anthers: Much larger than 'McIntosh' anthers.
 Color: Tyrian rose 24/2 fading to white tinged with magenta rose 27/2 (open flowers).

FRUIT

Shape: Round to oblate.
 Size: Above medium, axial diameter, 62 to 66 mm; transverse diameter 70 to 75 mm; length : width ratio = 0.87. Fairly uniform with average weight of 140 g at harvest.

Color: Chartreuse green 663/2 (p. 90) undercolor; 90% cardinal red 822/2 overcolor fading to pale crimson 22/2 when shaded; slightly striped to striped when the undercolor becomes visible.
 Skin: Smooth and glossy, moderately tough, medium thick; bloom is scant and the fruit does not become waxy in storage; conspicuous, smooth, round, white to beige dots.
 Stem: Long, medium thick.
 Cavity: Acuminate, deep, medium width; slight to moderate russet.
 Basin: Medium in depth, slightly furrowed, wide in breadth.
 Calyx: Closed, lobes separated at the base and recurved; persistent, erect.
 Calyx tube: Short, cone-shaped.
 Stamen remnants: Median.
 Core: Median.
 Core lines: Clasping.
 Carpels: Emarginate; cells are symmetrical; smooth.
 Seeds: Acuminate, plump, not tufted.
 Maturity: One week after 'McIntosh'.
 Keeping quality: Excellent, retains quality and texture for ≤15 weeks in refrigerated storage at 1 °C; may develop core flush when stored in CA at 2.5% CO₂ and 2.5% O₂.
 Use: Late maturity, long air storage, dessert apple. Excellent juice high in SSC.

FLESH

Texture: Medium to coarse, crisp, breaking, firm.
 Quality: Sweet, mild subacid, rich aromatic flavor, excellent dessert quality.
 Color: White with a tinge of pale green.
 Aroma: Pleasant but hardly detectable.

TREE

Tree: Medium, upright to semierect, precocious, very productive, annual bearer.
 Leaves: Elliptic; serrate; length : width ratio, 2.15; petiole from 2 to 3 cm long with tiny, almost inconspicuous ligules.

Availability

Limited quantities of nonindexed budwood are available for research purposes from R.L.G. and S.K. with a written request.

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