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'Applethorpe Earlidel' Apple

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'Applethorpe Earlidel' is the first apple (*Malus domestica* Borkh.) cultivar to be released from a breeding program aimed at producing early maturing, fresh-market, red dessert cultivars suited to production in the warm temperate Granite Belt region of Queensland, Australia. It is similar in appearance to stripey 'Red Delicious', but matures 4 to 6 weeks earlier. This cultivar matures before the earliest of the cultivars currently grown commercially on the Granite Belt and is of superior appearance and quality.

Origin

'Applethorpe Earlidel' originated from a cross between 'Delicious' and 'Early McIntosh' made at the Granite Belt Horticultural Research Station in 1968 by C.W. Winks. This cross aimed to combine the fruit appearance and internal characteristics of the commercially important 'Delicious' with the earliness of 'Early McIntosh'. The seedling was selected in 1981 and propagated on MM. 106 rootstock in 1982. 'Applethorpe Earlidel' was released to the industry for commercial evaluation in 1985 as GB155.

Description and performance

Trees of 'Applethorpe Earlidel' are medium in size, larger than 'Delicious', but smaller than 'Granny Smith'. Growth is more upright than that of 'Delicious'. It is compatible with and well-suited to propagation on the semi-dwarfing clonal rootstock MM.106, 'Northern Spy', and the more vigorous M.778. Leaves are 7 to 10 cm long and 5 to 7 cm wide, ovate to elliptical, with serrulate margins, acuminate tips, and oblique bases. The bearing habit is similar to that of 'Delicious', with fruit borne on spurs and terminals. 'Applethorpe Earlidel' trees are precocious and no obvious tendency towards biennial bearing has been observed.

Flowering is regular, early, and overlaps with 'Granny Smith', which is the recommended pollenizer under Granite Belt conditions.

Fruit mature 4 to 6 weeks before 'Delicious', 2 to 3 weeks before 'Abas' and 'Earliblaze', and 7 to 10 days before 'Gravenstein'. They are medium in size (65 to 70 mm average diameter) and globose conical to oblate (Watkins and Smith, 1982), often with 'Delicious'-like lobes (Fig. 1). The stem cavity is wide, deep, and regular, with pedicels of medium (2 to 3 cm) length. The calyx basin is wide, moderately deep, with

a tendency for the calyx tube to be open. Fruit is 80% to 90% medium to cherry red (Red Group 46A) with deep red and purple (Greyed Purple Group 187B) over stripes (Royal Horticultural Society, 1966). The skin is smooth and of medium thickness, with small but conspicuous white lenticels. A small amount of russet (< 4 cm²/fruit) is observed in the stem cavity of some fruit.

Flesh is creamy white, of medium to coarse texture, firm, juicy, sweet (13% to 16% total soluble solids content), and sub-acid (0.21% to 0.25% titratable acid). Fruit aroma is not obvious and the flavor is mild but pleasant. The shelf life of 'Applethorpe-Earlidel' fruit is ≈ 10 days at 25C.

Comparative mean fruit and flesh ratings as determined by us, for 'Applethorpe Earlidel', 'Hi-early Delicious', and three early

Fig. 1. Fruit of 'Applethorpe Earlidel' apple.

Table 1. Mean fruit and flesh ratings for 'Applethorpe Earlidel', 'Hi-early Delicious', and three early commercial cultivars at Applethorpe, Queensland (1982-88).

Cultivar	Fruit			Flesh quality			
	Diam (mm)	Shape ¹	Portion red (%)	Firm	Texture	Taste	Color
Applethorpe Earlidel	65-70	3	85	3	4	4	4
Abas	65-75	2	55	4	3	3	4
Earliblaze	65-75	3	70	2	2	3	3
Hi-early Delicious	70-80	4	75	3	4	4	4
Gravenstein	65-75	2	20	2	4	3	5

¹Rated on a 1 to 5 scale, where 5 is most desirable.

²Rated on a 1 to 5 scale, where 1 is flat and 5 is conical (Watkins and Smith, 1982).

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commercial cultivars are given in Table 1.

Each year, a small percentage of 'Applethorpe Earldel' fruit (<5%) is observed with infection of dry moldy core (*Alternaria* spp.), but this cultivar is not as susceptible as 'Delicious' (25% infection).

'Applethorpe Earldel' has moderate resistance to apple scab [*Venturia inaequalis* (Cke.) Wint.] and powdery mildew [*Podosphaera leucotricha* (En. and Ev.) Salm.], and infection has been observed only under conditions of high disease pressure. The sus-

ceptibility to firelight [*Erwinia amylovora* (Burr.) Winslow et al.] is unknown as this disease does not occur in Australia.

Availability

Limited quantities of budwood are available for testing and commercial propagation from the Queensland Department of Primary Industries, Granite Belt Horticultural Research Station, Applethorpe, 4378, Queensland, Australia. 'Applethorpe Earldel' is not

a patented cultivar. Budwood source trees have not been virus-indexed, but were propagated from the original seedling using virus-tested clonal MM. 106 and 'Northern Spy' rootstock.

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CU-R89: Red Kidney Bean Breeding Line Resistant to Bean Yellow Mosaic Virus

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Bean yellow mosaic virus (BYMV) is one of the most important virus diseases of beans in New York State. Susceptible plants exhibit symptoms including yellow mosaic, leaf malformation, and stunting. CU-R89 resulted from a breeding program conducted to incorporate BYMV resistance into 'Ruddy' (Sandsted, 1982), a light red kidney bean. Resistance was developed using the single

dominant gene *By-2* that was first transferred into *Phaseolus vulgaris* L. through an interspecific cross with a scarlet runner bean (*Phaseolus coccineus* L.) (Dickson and Natti, 1968). As daily mean temperatures rise above 30C, the *By-2* gene can cause infected plants to develop systemic 'necrosis'. This breeding line is intended for use in Central and North American breeding programs, or wherever BYMV occurs.

Origin

The backcross method was used to develop CU-R89, with 'Ruddy' as the recurrent parent and B-21 as the donor parent providing the *By-2* gene (Fig.1). B-21 is a black bean breeding line developed from a series of backcrosses, with 'Black Turtle-1' as the recurrent parent and crossed with the progeny of a *P. vulgaris* L. × *P. coccineus* L. cross (Dickson and Natti, 1968; Provvidenti, 1983; Provvidenti et al., 1989). 'Ruddy' was the female parent for three generations, but failed as the female parent when crossed in the BC-2 generation (Fig. 1). In the BC-3 generation, 'Ruddy' was again used as the female, and the progenies from each pollination were bulked in BC-4. In each

backcross generation, 20 or more plants were mechanically inoculated with BYMV (Strain #1) (Hagedorn and Walker, 1950) at the primary leaf stage to identify progeny with the *By-2* gene. At the end of the crossing scheme, a progeny test identified the homozygous genotypes in BC-4F₃; resistance was confirmed in BC-4F₄. CU-R89 is derived from progeny of the BC-4F₃.

Description

In the environment of northern New York, CU-R89 is a multiple-stemmed plant with a determinate growth habit. Plants are bushy, 40 to 50 cm high, less upright than 'Red-kloud', and commonly develop six to eight main-stem nodes. The time to maturity is 85 to 95 days, the same as 'Ruddy', and plants naturally defoliate at maturity. Flowers are pale lavender to rose-purple, but the stems and petioles lack this pigment. The pods are up to 15 cm long, fibrous and indehiscent with four to eight seeds. Pods dry to a tan color. The seedcoat color is an excellent light

Fig. 1. Pedigree of CU-R89.

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