'Co-op 43' (Juliet™) Apple

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'Co-op 43' is a highly productive, late season red apple (*Malus ×domestica* Borkh.) that ripens 2 weeks after 'Delicious'. It has outstanding fruit quality, and a very good storage life. The tree is moderately vigorous, spreading, semi-spur type, with a desirable bearing habit, and crops annually. In addition, the tree has sturdy wood with little blind wood.

Fruits are 60% to 90% medium red (striped) with a yellow-green background at harvest, up to 76 mm (3 inches) in diameter, attractive, and is round-oblate in shape (Fig. 1). The skin is smooth, waxy, and moderately thick. The fruit is full-flavored, sub-acid to mild. Quality is excellent and fruit maintains firmness and crisp texture in refrigerated storage for over 1 year at 1 °C, although flavor can become bland after 9 months in storage. It generates low levels of ethylene in storage (Goffreda et al., 1994). The fruit does not fall prematurely off the tree.

'Co-op 43' is the 15th apple cultivar developed by the cooperative breeding program of the Illinois, New Jersey, and Indiana experiment stations (Goffreda et al., 1995). This high-quality dessert apple will be sold under the name 'Juliet™'.

'Co-op 43' carries the Vf gene derived from *Malus floribunda* Sieb. clone 821 that provides a high level of resistance to apple scab incited by the fungal pathogen *Venturia inaequalis* (Cke.) Wint. (Goffreda et al., 1995). Resistance to apple scab (races 1 to 5) was first evaluated by controlled greenhouse inoculation of young seedlings, followed by over 30 years of field observations under natural conditions for infection in orchards in Urbana, Ill., Cream Ridge, N.J., West Lafayette, Ind., and in trials at sites in the United States, France, and Italy. Based on field observations, this selection is moderately susceptible to cedar-apple rust incited by the fungal pathogen *Gymnosporangium juniperi-virginianae* (Schw.), and appears to be resistant to both powdery mildew, caused by

Podosphaera leucotricha (Ell. & Ev.) Salm., and fire blight, caused by *Erwinia amylovora* (Burr.) Winslow et al. Bitter pit has been observed in some years.

Origin

The original seedling was produced from a cross made at the Univ. of Illinois in 1970 between the selection PRI 1018-101 as the seed parent and 'Viking' as the pollen parent. Although 'Viking' is a PRI selection (PRI 1033-5), it does not carry the Vf gene (Goffreda et al., 1995). The complete pedigree is shown in Fig. 2. The seedling was screened for scab at Purdue Univ., and was then planted in a permanent field location in 1971 at the Pomology Research Farm in Urbana, Ill., where it was designated PAR14T238. The seedling was selected in 1977 by D.F. Dayton and carried the progeny designation PRI 2597-103 in our breeding records. It was released for testing as 'Co-op 43' in 1995 (Goffreda et al., 1995).

Description

The following is a detailed description of the flowers, fruit, tree, and leaves based on Zielinski (1955) with color designations according to the 1966 Horticultural Colour Chart issued by the Royal Horticultural Society of London. Quantitative data are based on at least 10–12 observations, unless stated otherwise.

FLOWER

Corolla: Width averages 4.3 cm.

Petals: Length averages 2.0 cm; width averages 1.7 cm, number is five.

Color: Flower buds are light Chrome Yellow (Plate 158B) with 50% to 70% Orient Pink to Shell Pink blush (Plates 36A–37D) completely fading to pale Chrome Yellow (Plate 158D) at anthesis.

Season: Early season; 1–2 days ahead of 'Pris-tine'; ≈2–10 days ahead of 'Golden Delicious', depending on the year.

FRUIT

Shape: Round-oblate, regular; slightly variable.

Size: Averages 64 to 76 mm in diameter; length: width ratio is 0.88.

Color: Undercolor is Green (Plate 145B) to Sap Green (Plate 62) fading to Chartreuse Green (Plate 154B); washed overcolor 60% to 90% Turkey Red (Plate 46C) to Delft Rose (Plate 47C); pattern is striped to washed.

Skin: Smooth, waxy with inconspicuous slightly russeted round lenticels; little tendency for russet, medium thick; semi-glossy.

Stem: Average length of 20 to 23 mm; thin.

Cavity: Obtuse, medium to shallow depth, medium width, smooth to russeted surface.

Basin: Medium depth, medium breadth, rounded sides, smooth surface.

Calyx: Persistent, narrowly lanceolate.

Calyx tube: Conical shaped.

Stamens: Basal.

Core lines: Claspings.

Fig. 1. Fruit of 'Co-op 43' apple.

Fig. 2. Pedigree of 'Co-op 43' apple.

Core: Open, medium.
 Carpels: Round, ridged.
 Seeds: Full complement, acute, non-tufted.
 Flesh:
 Texture: Very fine texture, firm, crisp, and breaking.
 Quality: Full-flavored, fruity, sweet, mild-subacid, excellent, maintains firmness and crisp texture. Mean fruit soluble solids (Brix) at harvest and after 6 weeks following storage is 14.7 and 15.1, respectively.
 Color: Primrose yellow (Plate 4D).
 Maturity season: 2–3 weeks after 'Delicious'.
 Keeping quality: Maintains firmness, texture, and flavor for 9 months to 1 year at 1 °C. Fruit firmness measured at harvest and after 5 months of cold storage averages 9.4 and 8.3 Kg·cm⁻², respectively.
 Use: Dessert apple, also excellent for cooking.

TREE

Vigor: Moderate.
 Shape: Spreading.

Bearing habit: Semi-spur type; fruit hangs well on tree, annual heavy bearing habit.
 Branch angle: 45° to 90°.
 Pruning/training requirements: Moderate annual pruning.
 Productivity: Heavy annual crops. Based on single trees (3-year-old trees propagated on M-26 rootstock) in a randomized block design with a total of six replications, yield for 'Juliet' was 21 kg/tree, which was significantly higher (LSD=6.5; *P*=0.05) than that for both 'Liberty' (10.5 kg/tree) and 'Empire' (9.2 kg/tree).
 Thinning: Light thinning is recommended.
 Bark type and color: Current growth is pubescent. The basal portion of the current growth is Copper Brown (Plate 175D) if the pubescence is removed. Mature bark is a grayed-green color (Plate 197B-C) just prior to exfoliation.
 Shoots: Current-year shoots are pubescent, with moderately conspicuous lenticels, tan, and up to 1.2 mm in diameter.

LEAVES

Shape: Ovate with acute apices, and serrate margins.

Availability

Budwood is available for test purposes to federal and state experiment stations from Univ. of Illinois, Rutgers Univ., and Purdue Univ. The Purdue Research Foundation will apply for a plant patent under the name 'Co-op 43'. Trees are currently available for sale from licensed nurseries under the name 'Juliet™'.

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