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'Liaofu', A New Early Apple

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Many early apple (*Malus ×domestica* Borkh.) cultivars exist, including 'Yellow Transparent' and 'Red Astrachan', both with fruit growth periods (FGP) of 70 d. However, both yield poorly and the fruits are very sour. 'Summer Green' from Japan has an FGP of ≈80 d, and has good fruit quality. 'Geneva Early' from the United States ripens in 67 to 70 d, but produces small fruit that ripen unevenly and tend to drop heavily near harvest (Qiao et al., 1980; Yang et al., 1987). Since 1950, Chinese apple breeders have developed many early cultivars that are better than 'Yellow Transparent'. Of these, 'Liaofu' is the best, has the shortest FGP (60 d), and combines disease resistance with good quality. We believe it to be superior to other commercial, early-ripening cultivars, and the best choice for both marketing and breeding.

Origin

The seedling was derived from a cross of 'Lodi' x 'Summer Pearmain' made in 1956 at Xiongyue, Liaoning, by Li Ronghuan and Yang Bin. The original seedling was planted in 1957, was selected from a progeny of 123 trees as '1-93' in 1964, and was planted in test orchards in Gansu, Henan, Zhejiang, and Anhui Provinces in 1966 (Liu, 1986; Ming, 1986; Qiao et al., 1980; Zhang and Yang, 1984). In 1979, it was examined and approved by the Committee of Crop Variety in Liaoning Province, and named 'Liaofu', meaning "summer apple of Liaoning."

Description and performance

The skin color at harvest is yellow-green with a dark red blush (Fig. 1). The flesh color is yellowish-white. At the optimum harvest date, 'Liaofu' fruit are crisp and they maintain firmness better than 'Lodi' in common refrigerated storage. Fruit can be stored for 30 d at 50 °C. Soluble solids content (11%) is medium high, and total acidity is low (0.25%). Fruit ripen in early July in Xiongyue, and in early- to mid-June in Hubei, 7 to 10 d before 'Yellow Transparent', 'Geneva Early', and 'Summer Green' (Ming, 1986; Qiao et al., 1980).

The corolla is 4.5 cm in diameter at anthesis, and the petals are crimson, fading to white, The fruit is oblate, averaging 7 cm in diameter and weighting 100 g. The cavity is medium in depth and width, and the basin narrow and shallow. The calyx is medium in depth and width, and the basin narrow and shallow. The calyx is persistent and medium-open, the calyx tube medium-long and conical. The surface color is a dark red blush overlying a yellow-green ground color. The skin is smooth and thin, with inconspicuous, smooth, round, light-green lenticels. The stem is short and medium-thick. The core is small and closed, and the core line clasping and distinct. The mature flesh is yellowish-white, crisp, sweet, and slightly spicy.

'Liaofu' trees are of medium vigor and semi-spreading. Flowering occurs in early May at Xiongyue, Liaoning, coinciding with that of 'Summer Pearmain'. Cross-pollination is required, and fruit set tends to be heavy; thinning is required to achieve optimum fruit size. Both 'Yellow Transparent' and 'Golden Delicious' can serve as pollinizers (Zhang et al., 1989). Trees propagated on Siberian crabapple [*Malus baccata* (L.) Borkh.] are precocious and productive; compatibility is excellent, both on this stock and on plum-leaf crabapple [*Malus prunifolia* (Willd.) Borkh.]. Flowers develop both terminally on spurs and laterally on shoots, and fruit are well distributed throughout the tree canopy. 'Liaofu' has field immunity to apple scab [*Venturia inaequalis* (Cooke) G. Wint.], and was resistant to brown spot (*Marssonina mali* Henn), powdery mildew [*Podosphaera leucotricha* (Ellis & Everh.) E.S. Salman], and fruit canker (*Physalospora piricola* Nose) (Ming, 1986). 'Liaofu' is resistant to anthracnose of apple (*Glomerella cingulata* Spauld et Sch.), and its early ripening season reduces injury from insects.

Availability

Budwood of 'Liaofu' is available for test purposes only. It can be obtained by contacting Yi Kai, Liaoning Institute of Pomology, Xiongyue, Gaizhou City, Liaoning Province, 115214, P.R. China. Importation of apple scionwood to the United States must be coordinated through the U.S. Dept. of Agriculture, Agricultural Research Service, National Plant Germplasm Quarantine Office, Beltsville, Md.

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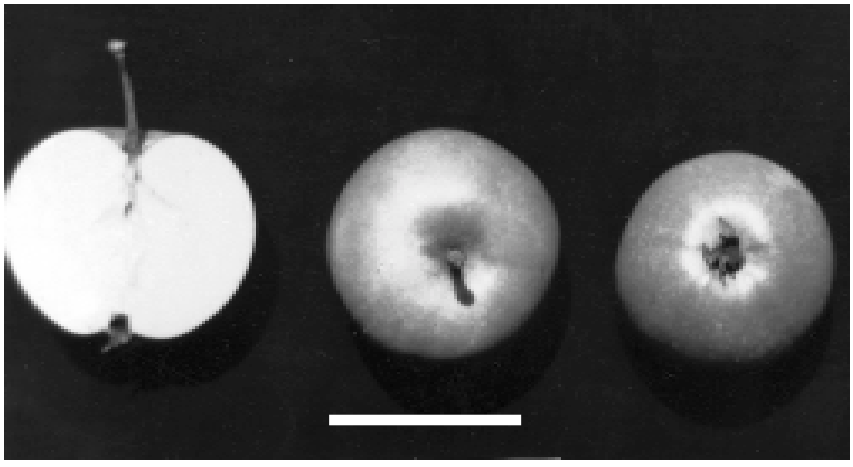

Fig. 1. Fruits of 'Liaofu' apple. The bar is 7 cm long.

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