

‘Luokeye Nüshi’ Crabapple

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Crabapple is a common name for *Malus domestica*, which has a small diameter fruit (<5 cm), a range of beautiful flower colors (white, pink, red), and has been called a “national beauty.” In addition, crabapple is often valued for its diverse growth habits (columnar, fastigate, upright, spreading, drooping, weeping), beautiful flowers (single, semi-double, and double forms with diverse colors, such as purple, red, pink, and white), and rich fruit colors (primarily green, pink, red, yellow, orange, and purple) (International Union for the Protection of New Varieties of Plants, 2003; Wymann, 1955). Together with peony, plum, and orchid, they are called “the four must-sees of spring flowers” in China (Wang, 2010; Wang et al., 2015). Through long-term breeding, selection, and improvement, a large number of new cultivars of ornamental crabapples have been introduced. However, stable, beautifully colored, double cultivars are extremely scarce. There are hundreds of cultivars of crabapple recorded in *Flowering Crabapples* (Fiala, 1994), but fewer than 5% of them are semi-double or double flowers, such as the outstanding ‘Van Eseltine’ (pink doubles), ‘Kelsey’ (red doubles), and ‘Sparkler’ (red–purple semi-doubles). During the past 20 years, seven new cultivars of crabapple have been published in the American market, including ‘Spring Bride’ (Sponberg, 1996), ‘Jarmin’ (Jarmin, 2003), ‘Fenghong Nichang’ (Fan et al., 2019), ‘Fen Balei’ (Zhou et al., 2019), ‘Zi Dieer’ (Zhou et al., 2020), ‘Yangzhi Yu’ (Jiang et al., 2020), and ‘Xiang He’ (Hu et al., 2021).

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Origin

Malus ‘Luokeye Nüshi’ is a new cultivar of crabapple bred by offspring after free pollination of *M.* ‘Purple Prince’ crabapple. In Fall 2011, at the Crabapples Germplasm Resources Nursery of Nanjing Forestry University (Jiangdu, Yangzhou), a batch of seeds of *M.* ‘Purple Prince’ crabapple were collected (Yangzhou City, Jiangsu Province, China). They were sown in Spring 2012, and a specific single plant was selected in Spring 2014. The single plant had abundant bright purple flowers with a diameter larger than 5.0 cm. The flowers of semi-double petals have a deep cup pattern similar to the hemline on a skirt. It was temporarily named ‘Luokeye Nüshi’. In Fall 2014, more than 50 plants were bud-grafted to *M. hupehensis* seedling rootstocks. Subsequently, three consecutive years of observation showed that the plants were stable and met the requirements of specificity, consistency, and stability. Furthermore, they were well adaptable to high temperature in the summer, with low occurrence rates of diseases and pests. In Apr. 2018, they were approved as a new cultivar by the National Forestry and Grassland Administration and formally named ‘Luokeye Nüshi’.

Description

Compared with its maternal parent *M.* ‘Purple Prince’, ‘Luokeye Nüshi’ is a semi-double flower with stable color; the *M.* ‘Purple Prince’ is a single flower with color that fades easily (Table 1). The distinguishing characteristics of ‘Luokeye Nüshi’ are semi-double and nonfading red–purple flowers.

The edge of the petals is reddish purple (64D), the central front color is reddish purple (N66D) (Fig. 1A), the base color is white (N155D), and the back color is reddish purple (68B) (Royal Horticultural Society, 2007). The specific characteristics of ‘Luokeye Nüshi’ are described here.

Habit. In the growth habit of the plant, the form of the tree is open, with reddish brown branches (Fig. 1D).

Flowers. The inflorescence type is umbellate, with reddish purple buds, semi-double (10 petals), and a larger diameter (≥ 5.0 cm). The flower has a deep cup pattern with overlapping oval petals and prominent veins. The initial flowering is early, and the flowering period is long (8–10 d).

Foliage. The new leaves are brownish red, 8.0 to 9.0 cm long, and 4.0 to 5.0 cm wide. They have a length-to-width ratio ≈ 2.0 and short petioles (2.0–2.5 cm); there is no auricle. The leaf margin is crenate, and the leaf surface has moderate luster and a dark green color. There is a moderate degree of anthocyanin coloring (Fig. 1C).

Fruit. The fruit is tapered and has a long pedicel. There is no fruit powder. Sometimes this is a calyx. The fruit set is moderate, and the fruit size is small. The fruit is lustrous. The dominant fruit color is red and the flesh is white.

Cultivation

The subtropical and temperate zones are suitable for cultivation. *M. hupehensis* was selected as a suitable rootstock for the southern region because of its tolerance to a warm climate and its salt resistance. In contrast, *M. Baccata* was selected as a suitable rootstock for the northern region because of its cold tolerance and because the ground diameter of the rootstock was larger than 0.7 cm. Damage to young shoots and leaves caused by apple aphids, spider mites, and apple rust is rare. Spraying the leaf surface with 50% Pimiricarb wettable powder (Kesheng, Yancheng, Jiangsu) at 2000 \times dilution can be performed to control apple aphids. Furthermore, spraying the leaf surface with 1.8% Abamectin emulsion (Kesheng, Yancheng, Jiangsu) at 1000 \times dilution can prevent spider mites. The leaf surface can be sprayed with 20% Triadimefon emulsion (New Sun, Chengdu, Sichuan) at 2000 \times dilution to prevent apple rust as well. For cultivation, good lighting and ventilation conditions are required. Furthermore, loose fertile soil and sandy loam of good drainage are preferred. Generally, the heading height for the small open trees is 0.8

Table 1. Comparisons of flower and fruit traits of *Malus* ‘Luokeye Nüshi’ and its maternal parent *M.* ‘Purple Prince’.

Taxa	<i>M.</i> ‘Luokeye Nüshi’	<i>M.</i> ‘Purple Prince’
Petals/flower	10	5
Flower bud color	Purplish red	Purplish red
Petal color	Reddish purple (64D)	Dark pink (61B)
Corolla shape	Deep cup	Cup
Petal shape	Elliptical	Ovate
Fruit color	Red	Reddish brown



Fig. 1. The flower morphological and color characteristics of 'Luokeye Nüshi' (A, B), the leaf morphological and color characteristics (C), and the tree growth habit (D).

to 1.5 m, with three to five lateral branches reserved for directional culture. Shaping is performed during the dormant period and early spring growth period.

Availability

'Luokeye Nüshi' is available through Nanjing Forestry University and Yangzhou

Crabapple Horticulture Limited Company (<http://flowering-crabapple.njfu.edu.cn>).

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