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Sapindus mukorossi 'Jiangwanfen': A New Cultivar of Flowering Soapberry Tree

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Sapindus mukorossi Gaertn., commonly referred to as soapberry, soapnut, or Chinese soapberry, is a deciduous tree species within the genus *Sapindus* of the family Sapindaceae. It is predominantly distributed south of the Yangtze River in China and extends to Southeast Asia, India, and Japan (Sun et al. 2018). Known for its appealing morphology and robust root system, soapberry is characterized by summer blossoms, golden autumn foliage, and fruit, making it a preferred species for landscaping and soil and water conservation in tropical and subtropical regions (Zhao et al. 2019).

The incorporation of deciduous broad-leaf trees such as soapberry in tropical and subtropical landscapes offers considerable aesthetic and ecological benefits. Its profuse spring blossoms create vivid floral displays, enhancing seasonal visual appeal. In autumn, the golden foliage contributes striking autumnal colors, and the subsequent leaf shedding introduces a minimalist and natural aesthetic to winter landscapes. These dynamic seasonal changes diversify the predominantly evergreen landscapes, enriching visual heterogeneity and adding temporal variation to gardens and parks.

Soapberry, cultivated primarily as a high-value bioenergy tree species (Liu et al. 2022), is also used extensively in roadside, park, and other landscaping applications, making it a key species for urban greening. However, its high fruit yield poses challenges in urban settings. During the autumn ripening season, fruit frequently detach from the inflorescence and fall to the ground. The fruit pericarp, rich in triterpenoid saponins, and the seeds, ~1 cm in diameter, are hard and dense. Fallen fruit can hinder ground maintenance, contribute to environmental pollution, and create safety hazards. Seeds crushed by vehicles may scatter, increasing the risk of pedestrian injuries or slips caused by debris.

These issues limit the suitability of soapberry for certain urban greening applications. To address this challenge, we introduce a novel cultivar: Jiangwanfen. This cultivar is characterized by prolific flowering, a high proportion of male flowers, and significantly reduced fruit production, and retains its excellent ornamental qualities during the blooming period. These traits make 'Jiangwanfen' an ideal candidate for urban landscaping, combining aesthetic appeal with practical functionality.

Origin

In 2009, Yuanhua Forestry Biotechnology Co., Ltd. established a soapberry plantation in Jianning County, Sanming City, Fujian Province, China (lat. 26.8712°N, long. 116.7855°E). The region has a subtropical marine monsoon climate with an annual average temperature of 16.8 °C, accumulated temperature ranging from 4900 to 5069.7 °C, extreme temperatures ranging from −12.8 to 39.9 °C, and annual precipitation of more than 2000 mm. The seedlings were sourced from Tiantai County, Taizhou City, Zhejiang Province, China (lat. 28.5702°N, long. 120.4124°E), which has a similar subtropical monsoon climate with an average temperature of 17.1 °C and an annual precipitation of 1351.4 mm. The novel cultivar Jiangwanfen was identified in 2015 as a unique individual within this plantation and was propagated through grafting. The parent tree exhibits distinctive traits, including dark-red petioles and partial veins during flowering [Royal Horticultural Society (RHS) gray-purple group 183A], a late flowering period, and a low male-to-female flower ratio.

In Mar 2019, scions from the parent tree were grafted onto local rootstocks, producing 73 successfully grafted plants. Further propagation in 2020 and 2021 yielded an additional 33 plants, resulting in 106 clonal grafts. By the second year, all grafted plants began flowering, with stable retention of key traits: dark-red petioles, late flowering, and a high male-to-female flower ratio (Fig. 1).

Description

'Jiangwanfen' is ideal as a late-flowering pollinator tree and for use in urban landscaping as a result of its vivid ornamental features, abundant male flowers, and minimal fruit litter, reducing environmental and safety concerns. In Fujian's Sanming area, it flowers annually from early to late June, lasting about 23 d, making it suitable for subtropical landscapes.

Compared with the similar cultivar Hongxin, which also features red petioles during flowering, 'Jiangwanfen' exhibits distinct flowering traits. In 'Jiangwanfen', female flowers bloom earlier than male flowers, whereas the reverse occurs in 'Hongxin'. In addition, the male-to-female flower ratio in 'Jiangwanfen' exceeds 42, which is significantly greater than the flower ratio of <13 in 'Hongxin', indicating a much greater abundance of male flowers.

Growth habit. 'Jiangwanfen' is a deciduous tree with an obovate crown and a straight main trunk. The bark is grayish white, the branches are semispreading with moderate density, and young branches are green with minimal pubescence, transitioning to gray-green with sparse lenticels in older branches.

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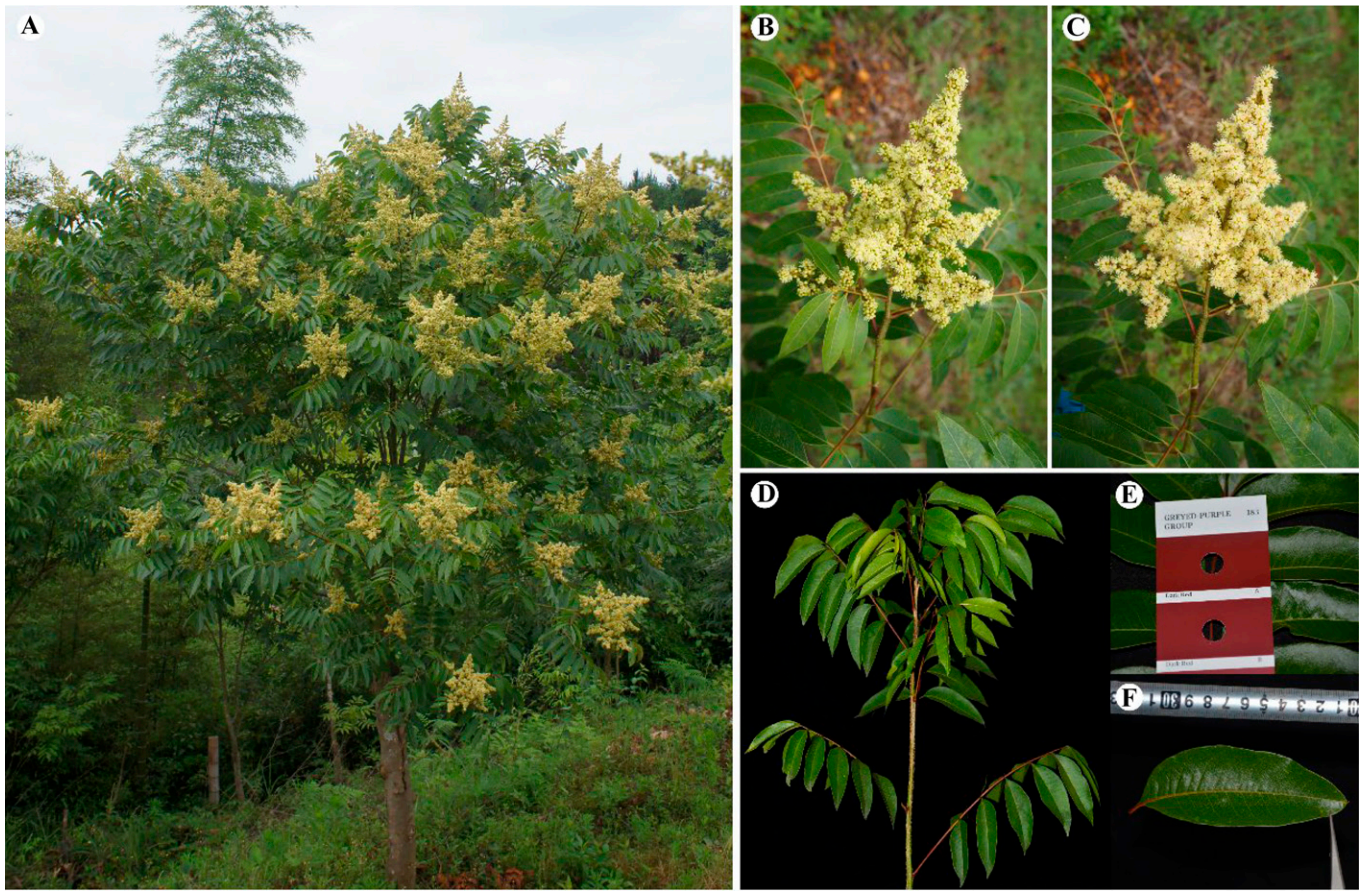

Fig. 1. Phenotypic characteristics of 'Jiangwanfen'. (**A**) The growth habit during full bloom. (**B**) Flowering branch with male flowers at the early bloom stage. (**C**) Flowering branch with male flowers at the full bloom stage. (**D–F**) Annual branches and leaves showing dark-red petioles and veins.

Leaves. Leaves are paripinnate compound with five to seven pairs of narrowly lanceolate and thick, papery leaflets. Leaflets are arranged alternately or oppositely, asymmetrical at the base, wedge shaped, and taper to an acute apex. Immature leaves are green, turning yellow in autumn. During flowering, petioles and veins appear dark red (RHS gray-purple group 183A), reverting to light green afterward.

Inflorescence. The compact panicle averages 32.72 ± 0.55 cm in length and 34.70 ± 2.76 cm in width, with about 29 primary branches on the yellow-green main axis. Flowers are radially symmetric, with five pale-yellow lanceolate petals covered sparsely with trichomes on the abaxial surface. The floral disk is disk shaped.

Propagation and Cultivation

The cultivar Jiangwanfen is a sun-loving, deep-rooted tree known for its strong wind resistance and drought tolerance. Although it thrives in well-drained, fertile soils, it is not tolerant of waterlogging. The preferred soil types include sandy loam, light loam, or medium loam, with a slightly acidic to mildly alkaline pH. This cultivar is well suited for cultivation in subtropical regions, including Fujian, Zhejiang, Guangdong, Jiangxi, and Hunan provinces.

Grafting is the primary method of propagating 'Jiangwanfen', typically performed in spring using soapberry rootstocks. Single-bud branch grafting is recommended, with prompt removal of basal shoots to control the vigorous sprouting of the rootstocks. For large-seedling cultivation, a planting density of 4 × 4 m (~630 trees/ha) is recommended. Large seedlings are typically transplanted in winter or early spring to minimize root system damage. Large planting pits should be used, and deep fertilization is advised to support healthy growth.

Availability

The cultivar Jiangwanfen was authorized by the National Forestry and Grassland Administration in China on 25 Dec 2024, with Plant Variety Rights registration no. 20240572. The propagation rights for this cultivar are held jointly by Beijing Forestry University and Yuanhua Forestry Biotechnology Co., Ltd., Fujian. Growers interested in obtaining propagation materials or detailed information can contact the corresponding author via e-mail at jlm@bjfu.edu.cn.

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