

‘Zhongyoupanweimei’: A Flat Nectarine Cultivar from the Zhengzhou Fruit Research Institute, Chinese Academy of Agricultural Sciences

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Native to China, peaches [*Prunus persica* (L.) Batsch] have a long cultivation history, rich germplasm resources, and various resource types (Li and Wang 2020). Peaches have an attractive appearance, unique flavor, and pronounced nutritional value, making them an important summer fruit market product (Clark and Sandefur 2013; Ognjanov et al. 2018). The flat peach is a cultivar of common peach; the shape of its fruit is flat and unique, and the fruit is famous for being juicy and delicious. The flat peach has a long history of cultivation in China, but it is mostly limited to small-scale cultivation in certain areas, such as Jiangsu and Zhejiang, which is not a strategy typically used for flat peaches across the country as a whole. The main issues with flat peach varieties are as follows: 1) the top of the fruit is not closed well, 2) the small ones have spots, and 3) the large ones are fragmented. Some cultivars exhibit the phenomenon of cracking, which forms a large hole, resulting in a loss in value. Compared with common peaches, the flat nectarine is larger and has an uneven surface, a thinner pulp, and a lower yield (Rawandoozi et al. 2021).

‘Zhongyoupanweimei’ is a newly selected, small, mid-maturing flat nectarine cultivar with a high edible rate suitable for fresh consumption. The fruit matures in mid-July in Zhengzhou and the fruit development period is ~105 d. The chilling requirement is

~500 to 650 h in Zhengzhou. The fruit are flat and have a pleasant golden-yellow peel with a rosy red blush on the sunny side. The flavor is sweet with a strong aroma, and the soluble solid content is 15.0% to 16.8%. The average fruit weight of ‘Zhongyoupanweimei’ is

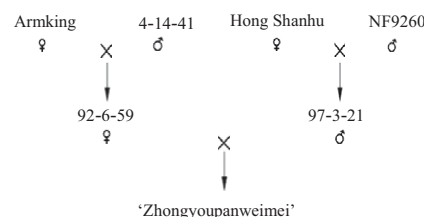


Fig. 1. Pedigrees of the peach cultivar Zhongyoupanweimei.



Fig. 2. Flowers (top) and fruit (bottom) of ‘Zhongyoupanweimei’ flat nectarine.

Origin

In 1992, the American yellow-flesh nectarine cultivar Armking was selected as the female parent, and the early-maturing yellow-flesh nectarine cultivar 4-14-41, which was bred by the Zhengzhou Fruit Research Institute, Chinese Academy of Agricultural Sciences (ZFRI-CAAS), was used as the male parent. The excellent plant ‘92-6-59’ was bred by crossing. In 1997, ‘Hong Shanhu’, a sweet nectarine bred by the Beijing Academy of Agriculture and Forestry Sciences, was selected as the female parent, and ‘NF9260’, a high-quality flat nectarine with yellow meat, was selected as the male parent. The white-flesh flat nectarine ‘97-3-21’ was bred by crossing. In 2004, ‘Zhongyoupanweimei’ was selected from hybrids of the cross between the ‘92-6-59’ peach single plant (female parent) and the ‘97-3-21’ peach single plant (male parent) (Fig. 1).

These parental peaches were hybridized in 2004 at the peach breeding nursery of ZFRI-CAAS. Initially, 177 hybrid seeds were harvested from the cross, with 34 seedlings surviving after germination and transplanting in 2005. Under a conventional management and pest control regime, seedlings started bearing in 2007, and fruit and tree characteristics were investigated. Among these seedlings, hybrid number ‘04-1-91’ was selected as an advanced accession because of its better performance. From 2008 to 2010, further observations of hybrid ‘04-1-91’ were carried out using grafting tests; the fruit quality and economic traits of different replicates were uniform. We applied fruit thinning on fruit with abnormal phenotypes, such as those that were extremely small, malformed, cracked, disease infected, or pest injured. Meanwhile,

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Table 1. Comparison of fruit economic traits between ‘Zhongyoutanweimei’ and ‘97-3-21’ peach.

Cultivar	Sampling years	Flower pattern	Ripening date	Fruit shape	Soluble solid content (%)	Chilling requirement (h)	Fruit cracking rate (%)	Avg wt (g)	Fruit development period (d)
Zhongyoutanweimei	2015–19	Rose	15–23 Jul	Flat	15.9 ± 0.9%	500–650	0	115 ± 9.5	118
97-3-21	2015–19	Rose	15–25 Jul	Flat	10.2 ± 0.8%	500–650	2.7	176 ± 11.5	110

Data were obtained from three replicates, each replicate comprised three uniform fruit, and each is expressed as mean ± SD.

some clones were propagated for subsequent pilot and regional tests in Henan and its neighboring provinces. Investigations conducted from the flowering stage to the mature stage revealed that the minimum temperature of the regional test site was 6 °C, the maximum temperature was 38 °C, and rainfall ranged from 330 to 440 mm. In addition, the soil of the regional test site was sandy loam. In 5 years consecutively from 2012 to 2016, agronomic traits were tested and found to be stable across different clones and regions. Finally, accession ‘04-1-91’ was approved by the Approval Committee for Improved Varieties of Forest Tree of Henan Province, and was named ‘Zhongyoutanweimei’.

Description

Tree characteristics. The tree of ‘Zhongyoutanweimei’ has considerable vigor, exhibits a semiopen canopy, and has a medium sprouting ability and branch formation rate. The trunk is thick and gray-brown. Perennial shoots are gray, and 1-year-old shoots are thick, strong, and green, with smooth surfaces and a lack of pubescence. The internode is ~2.2 ± 0.2 cm long. The lenticels are great in number, medium in size, gray, and nearly round. The vegetative growth of the tree lasts ≈ 240 d. The chilling requirement is ~500 to 650 h in Zhengzhou.

Leaf characteristics. The leaves are glossy and are green on the front; yellowish green on the back; and are oval lanceolate with sharp, shaped bases; a short and acuminate apex; and crenate margins. They are 16.5 ± 0.2 cm in length, 4.2 ± 0.2 cm in width, and 0.03 ± 0.01 cm thick. The cross section of the leaves is horizontal. The petioles are dark green and 1.0 ± 0.2 cm in length. There are two to three reniform leaf glands, which are medium in size and kidney shaped.

In Zhengzhou, Henan Province, the leaf buds begin to sprout in late February and leaves start expanding in early April. The leaves start falling in early November and defoliation ends in mid-November.

Flower characteristics. The flowers comprise five pink petals, one pistil, and 35 to 41

stamens. ‘Zhongyoutanweimei’ exhibits strong floral bud formation. The floral buds break out in early March, start flowering in late March, and are in full bloom at the end of March, with flowering lasting 6 to 8 d, with showy flowers displayed.

Fruit characteristics. The fruit development period of ‘Zhongyoutanweimei’ is ~118 d, and maturity occurs around mid-July. The fruit shape is flat and beautiful in appearance (Fig. 2). ‘Zhongyoutanweimei’ fruit are extremely small; the average fruit weight is 80 to 130 g and the maximum fruit weight is 160 g (Table 1). The fruit ground color is golden yellow, and rosy red on the sunny side, and the percentage of fruit blush is ~40% to 65%. However, the peel turns golden yellow after bagging. The peel is of medium thickness and lacks pubescence. The peel cannot be separated easily from the pulp. The flesh is yellow, thick, and delicate in texture, with a low fiber content, and the edible rate can reach up to 95.3%. ‘Zhongyoutanweimei’ is an attractive fruit with abundant juice, pleasant sweetness and sourness, and an intense, fruity aroma. The soluble solids content is ~15.0% to 16.8%. The peach is a clingstone variety, with a flat stone. The average dry stone is light brown, with a little grain and groove on the surface. No stone cracking is exhibited.

Growth and fruiting habits. In Zhengzhou, 4-year-old trees are ~3.04 m in height, with a 3.28-m canopy diameter and a 13.9-cm trunk diameter. The average length and diameter of annual shoots is 58.6 cm and 0.75 cm, respectively. The fruit are borne mainly on medium and long fruiting branches in young trees. After the fruiting stage, the potential of the tree eases a little, and all types of fruiting branches can bear fruit steadily, with a fruiting rate that can reach 43.9%. For grafted seedlings of ‘Zhongyoutanweimei’ in spring, flowering starts during the second year, and the high-yield period comes during the fourth year after grafting. The yield of 5-year-old trees is more than 18 kg/tree. The average yield is estimated to be 1800 kg/666.7 m²

during the full fruit period. The fruit of ‘Zhongyoutanweimei’ soften after full ripening and have a shelf life of only 5 to 7 d when stored at room temperature. In addition, ‘Zhongyoutanweimei’ showed good cultivation adaptability in the main peach planting areas in Henan Province, and no obvious flower bud freezing injury was observed, so a high and stable yield could be achieved. However, this cultivar is not anticipated to differ in its susceptibility to aphids compared to most other peach cultivars.

In conclusion, ‘Zhongyoutanweimei’ is a mid-maturing cultivar with small fruit. It exhibits strong suitability to adverse circumstances. It is highly and stably productive, yielding high-quality fruit, which make it a strong performer in the fruit market. It can be cultivated in the Yellow and Huaihe River basins, and in the areas north of Qinling Mountain in China.

Availability

‘Zhongyoutanweimei’ is the property of ZFRI-CAAS. Limited quantities of budwood are available upon request for all trial and research purposes, and for commercial propagation.

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