



# The Application of *Osmanthus Fragrans* Cultivars in Campus Space of Jingzhou

Taoze Sun<sup>1</sup>, Tingting Shi<sup>2</sup>, Hongna Mu<sup>3</sup>

<sup>1,2,3</sup>College of Horticulture and Gardening, Yangtze University, No. 88 Jingmi Road, Jingzhou, Hubei 434025, China  
(<sup>1</sup>stz\_001@qq.com, <sup>2</sup>1433088425@qq.com, <sup>3</sup>hongnamu@163.com)

**Abstract-***Osmanthus fragrans* are excellent evergreen trees in China for its attractive ornamental and economic values. It had become the irreplaceable fragrant trees in landscape greening. *O. fragrans* varieties be planted in campus was not so much as total reported varieties. We focused on the variety name, numbers and application status in this campus investigation. Results indicated white and light yellow petal color was the most group, yellow petal group was the second large group, orange and red-orange petal group was fewest among the identified 20 varieties. As the application, single planting, opposite planting and group planting were the most common styles. Regular plant allocation was more than natural plant arranging.

**Keywords-** *Osmanthus Fragrans*, Variety Investigation, Application Style, Jingzhou

## I. INTRODUCTION

*Osmanthus fragrans*, commonly known as sweet osmanthus, is a woody, evergreen species of shrubs and small trees in the Oleaceae family. *O. fragrans* had considerable economic value and cultural significance and ranked the top ten traditional flowers in China. Twenty-four of the thirty-five species in the *Osmanthus* genus are distributed in China, with the mostly highly representative species being *O. fragrans*. To date 200 varieties of *O. fragrans* have been identified and divided into five groups: *O. fragrans* Asiaticus Group, *O. fragrans* Albus Group, *O. fragrans* Luteus Group, *O. fragrans* Aurantiacus Group and *O. fragrans* Color Group [1-9]. The Albus, Luteus and Aurantiacus Group can be characterized as an autumn group, because they bloom in September and October. In contrast, the Asiaticus Group flowers throughout the year with the exception of the hot summer months. The flower color in the Aurantiacus Group ranges from orange to orange-red, while the flower color of other three groups range from ivory to yellow. The attractive character of Color Group is color leaves

*O. fragrans* is widely cultivated throughout China and other countries due to its prominent fragrance, colorful flowers, and medicinal properties. In China, it also has cultural significance and is cultivated extensively both as an ornamental and commercially for its flowers which have high economic value. *O. fragrans* are ubiquitous landscape architecture trees in Asia

[10]. Traditionally, *O. fragrans* has been used as a tea, juice, wine and as a garnish on food. The medicinal value of *O. fragrans* was recognized in Chinese medicinal classics, such as the Compendium of Materia Medica.

Jingzhou city, the capital of Chu Dynasty (existed 740-223 B.C.), located at the east longitude 111° and 114°, the North latitude 29° and 37°, an important highway transportation hub and a port city along the Yangtze River, the total area is 141,000 square kilometers, in which 78.7% are plain lakes, is affiliated to Hubei Province. Jingzhou is a subtropical monsoon climate area. Both sunlight energy and heat are abundant, frost-free period up to 242-263 days. Because of the above geographical and climatic conditions, Jingzhou has a flourishing vegetation. Sweet osmanthus had been planted widespread in all kinds of landscape spaces. The aim was to find out the varieties utilized in Jingzhou city, analysis its application, and propose a few of practicable suggestion for local greening.

## II. MATERIALS AND METHODS

### A. Materials

This study was carried out in West and East campus of Yangtze University, Arts and Sciences College of Yangtze University, Engineering Vocational and Technical College of Yangtze University, College of Traditional Chinese Medicine, and Jingzhou Institute of Technology, six typical investigation sites considering the campus size, popularity, Vegetation coverage and the numbers of sweet osmanthus trees.

### B. Method of Variety Survey

Prepare variety investigation record card according to the illustrated monograph of the sweet osmanthus varieties<sup>[1]</sup>. The major items of natural environment condition were listed and described in table 1.

TABLE I. GENERAL SITUATION OF NATURAL ENVIRONMENT IN JINGZHOU CITY

Altitude (m)	Annual solar radiation (Kcal/cm <sup>2</sup> )	Annual sunshine (kh)	Average temperature (°C)	Frost-free days	Annual rainfall (mm)
20-50	104-110	1.8-2.0	15.9-16.6	242-263	1100-1300

- The investigation was carried out in autumn of 2017 (from September to October) and spring of 2018 (from March to April) respectively.
- The crown shape, trunk shape, branch shape, trunk color, skin hole density and color, branch density and angle were evaluated.
- Measuring Crown Amplitude, Ground Diameter and Plant Height.
- Investigation practice was carried out on buds, inflorescences, pedicels, stems, flower types, flowering time and pistils from the beginning to the end of flowering.
- The shape, texture, length and width of spring leaves, serrated edges, veins, petioles and fruit stages, shapes and sizes were investigated.
- All the investigated data were analyzed and identified based on *O. fragrans* classification key [6, 11] and an Illustrated Monograph of the Sweet Osmanthus Cultivars in China [1].
- The applicational investigation of *O. fragrans* in campuses was carried out by illustrating ecological habits, principles in art and aesthetics.

### III. RESULTS AND ANALYSIS

#### A. *O. fragrans* Varieties in Campus

- We had made a thorough investigation of campus *O. fragrans* varieties in Jingzhou. 110 were sorted through 166 investigation chart, 20 varieties were identified in total (Table 2 and Fig. 1). The striking disproportion of four Variety Groups was drawn in this data scrutiny. Albus Group take up 45%, Luteus Group was composed of 35%, the rest 20% was Aurantiacus Group.

TABLE II. *OSMANTHUS FRAGRANS* VARIETIES IN SIX CAMPUSES OF JINGZHOU CITY

Albus Group	Luteus Group	Aurantiacus Group
‘Daye Yingui’	‘Daye Huang’	‘Chenghong Dangui’
‘Duanbing Ziyingui’	‘Xiaozi Jin’	‘Zhusha Dangui’
‘Kuanye Ziyingui’	‘Chuihua jingui’	‘Hangzhou Dangui’
‘Yulinglong’	‘Yuhua Huang’	Zhuangyuan Hong’
‘Kuoye Zaoyingui’	‘Yuanban Jingui’	
‘Zaoyingui’	‘Chiye Jingui’	
‘Zaohuang’	‘Taoye Huang’	
‘Yinxing’		
Yuanye Yin’		

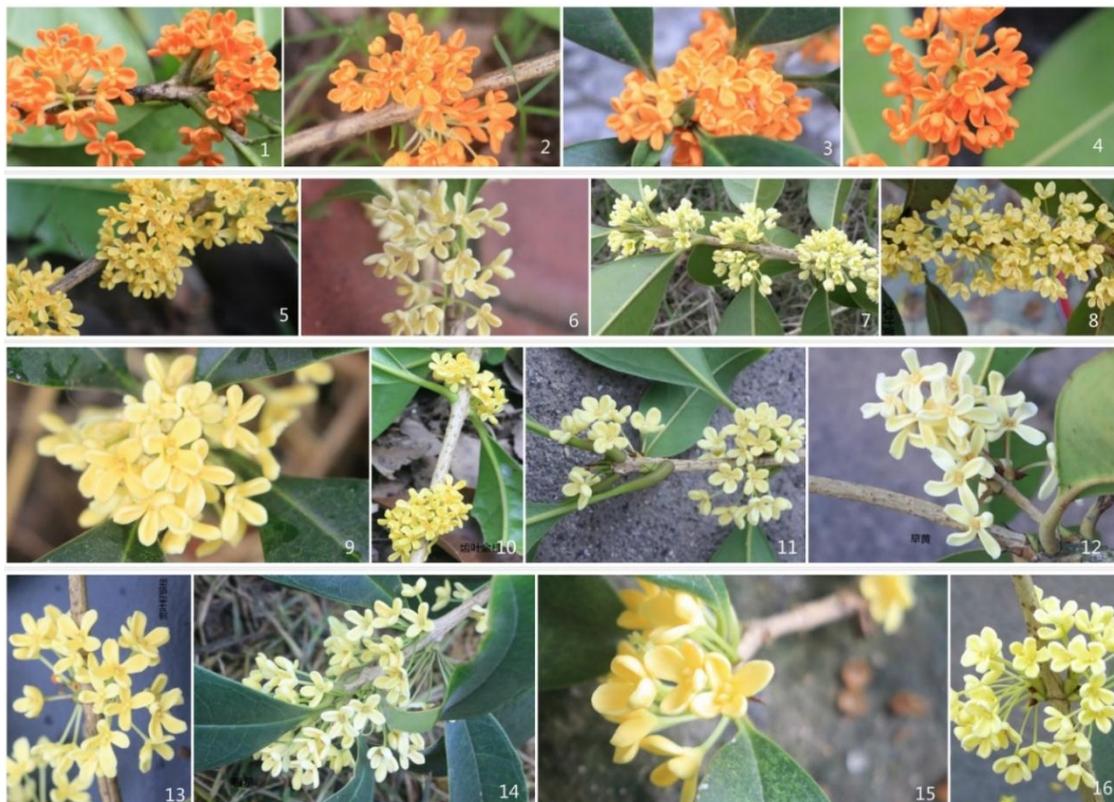


Figure 1. The identified *O. fragrans* varieties in campuses of Jingzhou. 1 to 16 indicate ‘Chenghong Dangui’, ‘Zhusha Dangui’, ‘Hangzhou Dangui’, Zhuangyuan Hong’, ‘Yuhua Huang’, ‘Chuihua jingui’, ‘Taoye Huang’, ‘Daye Huang’, ‘Xiaozi Jin’, ‘Chiye Jingui’, ‘Yuanban Jingui’, ‘Zaohuang’, ‘Kuanye Ziyingui’, ‘Yinxing’, ‘Zaoyingui’, ‘Kuoye Zaoyingui’ respectively

- As for petal color, white, light yellow and golden was the top two groups in local campus. While orange and red-orange color was less than the top two.
- Considering the blossoming season, the fewest one was Aurantiacus Group. Autumn blossomed groups were the common varieties. No Asiaticus Group at all in campus greening which result was different with city park greening in Jingzhou [12]. Generally, there are fewer varieties of Asiaticus Group in Jingzhou's green space system

### B. Application Status Analysis

The landscape arrange methods of *O. fragrans* in campus included independent (single) planting, opposite planting, group planting (Fig. 2). Most of the planting methods were good. A few cases didn't consider the natural environment condition factors.

- Less distance between the planting site and the tallest evergreen trees for examples. At first, the *O. fragrans* tree

were under the shade of the taller or tallest one longtime, and sunshine could not meet the demanding criteria. Finally caused crown asymmetry and Crown self-thinning for less photosynthetic product and less sunshine. Secondly, improper distance between *O. fragrans* trees (Fig. 2). Emergence of high or unreasonable density was a bit popular in campus, because of problematic design and lagging maintenance management.

- Lacking aesthetic principles in some cases. University campus greening need not only focuses on greening tree' numbers, but also pay more attention on landscape plants arranging principle and basic aesthetic principles. Scatter planting were rarely presented in those investigated campuses. Scatter planting belongs to natural design. Its reasonable application can reappear the classical garden style in modern campus and can be relaxed and be pleasant for people in natural landscape. Most of planting style was regular (Fig. 2). Campus atmosphere should be freedom and vivacious, then natural design is needed in campus greening practice.



Figure 2. Main application styles of *O. fragrans* in campuses of Jingzhou. 1 and 2 indicate opposite planting, 3 and 4 indicate single planting 5 and 6 indicate group planting

#### IV. CONCLUSIONS

- The most popular *O. fragrans* was Albus Group, which had white or light yellow petal, in the 20 identified varieties. Luteus Group ranked top two. Orange and red-orange petal's was the fewest Group. No continuous flowering varieties yet in those investigated region.
- Three planting styles, viz, single planting, opposite planting and Group planting, presented commonly. It was not rich at all to the distribution of *O. fragrans* in local campus, considering its planting style. For constructing beautiful and pleasant campus, more different petal color and blossoming season even varieties of colorful leaves should be introduced to.
- Plant maintenance is vital after completing the greening engineering. Firstly, Pruning and thinning is necessary as the trees grow bigger and bigger. Secondly, once high canopy density appeared, unnecessary trees should be dug out, in order to keeping reasonable density.

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**Taoze SUN** was born in 1979 in Zhumadian City, Henan Province, China. He graduated in 2007 from Central South University of Forestry and Technology, Changsha City, Hunan Province, China, with a degree in Agronomy. He majored in landscape plants and ornamental horticulture. mainly studies on landscape plants and its applications, Landscape engineering and so on. He participated in compiling many textbooks. Editor, Heredity and Breeding of Landscape Plants, China Water & Power Press, April 2013. Vice Editor, Landscape Dendrology, China Water & Power Press, July 2013. Editor, Landscape Flower, China Water & Power Press, February 2014.

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