Ornamental Teaoil Camellia Cultivars and Their Hypocotyl Graft Propagation

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Significance to Industry: Many popular ornamental plants can be derived from other crop commodities, such as ornamental peaches derived from fruit peach breeding. Teaoil camellia (*Camellia oleifera* Abel) has been used for thousands of years in China for edible oil production and has potential for ornamental production. Together with many other outstanding ornamental camellias, it plays an important role in the field of ornamental horticulture, especially breeding for cold hardy camellia cultivars. The US National arboretum has released more than a dozen cold hardy ornamental camellia cultivars with *C. oleifera* in their parentage. In China, for the past 60 years, much breeding work had been conducted on teaoil to improve oil quality and yield which has also resulted in several cultivars that have very attractive ornamental features. This paper is to introduce new teaoil cultivars to our nursery industry with an associated hypocotyl grafting technique. The hypocotyl grafting technique may also have potential to improve propagation of other ornamental plants with similar seed characteristics.

Nature of Work: Teaoil camellia (*Camellia oleifera*) is native to China from 18°21' to 34°34' North latitude, and grows in acidic soils where January mean temperatures do not drop below 35.6F. It is a promising crop (edible oil and ornamentals) for US agricultural industries (Shanan and Ying, 1982). The U.S. National Arboretum (2007) used *C. oleifera* 'Lu Shan Snow' as a parent and produced more than a dozen ornamental camellia hybrids with improved cold tolerance (Ackerman, 1981; Ackerman and Egolf, 1981, 1991, 1992). During the long history of this crop's cultivation, many elite cultivars have been introduced. Work in Hunan Province alone has resulted in selection of 88 elite cultivars in recent years, and more than 100 superior clones are cultivated by the Hunan Oil Tea Growers (Chen and Wang, 2001). In the past three years, we have focused

our selection on its ornamental potential. Based on habit and fruit features, four cultivars from Hunan and Jiangxi plantations have been evaluated for use as ornamentals. Hypocotyl grafting, a popular camellia propagation technique in China, is also discussed.

Selected Cultivars: *Camellia oleifera* has been cultivated in China for thousands of years for its edible oil production. Although it is not common in ornamental gardens, the plant is one of the most cold hardy camellia species and usually hybridized with its close relatives, such as *C. sasanqua*. It is an evergreen shrub or small tress, which can reach 6 meters tall. Flowers are white to pink, usually bloom from October to January when few other plants are flowering. Fruits mature from October to December (Dirr, 1998). Flowering and fruiting overlap, which provides a very attractive winter display. Based on habit and fruit characteristics, four cultivars with better ornamental potential have been selected for introduction. These plants should grow well in USDA cold hardiness zones 6-9.

'Changlin': A selection, from open pollination in the Subtropical Forestry Research Center orchard, is a fastigiated shrub, to 1.5 × 3 m^2 in five years. The unique features are red fruits that have four distinguished "buttons" at apex. New growth flushes usually change from red to green.

'Hongqiu': Selected by Hunan Academy of Forestry for high yield of seeds. This plant has open canopy and is 2 × 2.5 m^2 in four years. It is different from other plants by its maroon fruits and long narrow leaves.

'Hunan Dome': Bred by Hunan Academy of Forestry from local high yield clones. The plant is rounded and the canopy is 2 × 2 m^2 from the ground. The distinguishing features are rounded habit with green new growth and capsules.

'Ninglin': This cultivar was selected from seedling populations in Jiangxi Province for better quality of edible oil production. Ornamental features include its columnar habit, usually one meter wide and three meters tall. The fruits are red with pubescences and the new growth is red.

Propagation: For clonal production, these cultivars can be propagated from cuttings (Ackerman, 2002). Studies on cutting propagation have focus on the hormonal responses and the season to collect cuttings. These plants can also be budded or grafted to other cultivars or common seedlings in early spring. In our production, hypocotyl grafting has been employed.

Hypocotyl Grafting: The uniqueness of hypocotyl grafting is to graft a mature hardwood scion (one-year-old node with a leaf) to a just-differentiated tender young stock (underground hypocotyl). The procedure can be described in six steps:

1. Seed germination (as rootstocks): Seeds are collected in October to December, and then stored in moist sand over winter with mean temperature around 5º. In late March or April (the mean temperature usually is higher than 15ºC), seeds germinate in the sand. Before hypocotyl reaches the sand surface (about 5-7 cm in length), the whole plant is removed from the sand bed.
2. Preparation of Rootstock: Both hypocotyl and radicle are trimmed to 4-7 cm long and split hypocotyl for grafting.
3. Preparation of Scion: One year old branches are collected from mature plants (usually 3-6 years old), then cut both sides of stem and make an one-node scion with an attached leaf.
4. Grafting: Gently insert the scion into the split rootstock.
5. Grafting Wrap: Prepare heavy aluminum foil strips (2-3 cm long and 0.3-0.6 cm wide), then gently wrapped around grafted unions;
6. Transplanting: Grafted seedlings are immediately transplanted into raised field beds, and then covered with plastic (plastic tunnel). The plastic tunnels should then be covered with shade cloth (30-60%) about one meter above the tunnel.

Hypocotyl grafting is a popular clonal propagation technique for teaoil camellia in China. The grafted unions completely join within 40 days. The survival rates are generally more than 95% in the past three years.

Availability: Hypocotyl grafted plants are available from Silviculture Programs at Central South University of Forestry and Technology or Economic Plant Programs of Hunan Academy of Forestry in Changsha, Hunan 41004, China. Cutting propagated plants will be available after year 2008 from the above institutions.

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Supporting Online Material:

http://www.umaine.edu/maineplants/PubDZ/SNA07Teaoil.pdf

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Figure 1. *Camellia oleifera* 'Changlin'

Figure 2. *Camellia oleifera* 'Hongqiu'

Figure 3. *Camellia oleifera* ‘Hunan Dome’

Figure 4. *Camellia oleifera* ‘Ninglin’