The Conservation and Cultivation of Yellow Camellia Species

Chinmei Hung, Shihlin Lee

1 Dr. Cecilia Koo Botanic Conservation and Environment Protection Foundation
2 Guangdong Camellia Germplasm Bank of Research Institute of Forestry of Foshan City

Abstract: There are 62 Yellow Camellia species that have been described in the world and growth is restricted to an area from southern Guangxi to northern Vietnam. However, habitat destruction seriously threatens the Yellow Camellia population in the field. Thus, the conservation of the Yellow Camellia becomes an important issue. Here we propose that the Yellow Camellia should be properly cultivated in an artificial environment in Cecilia Koo Botanic Conservation Center (KBCC) in Taiwan.

Key words: Yellow Camellia, conservation, cultivation.

Introduction

Plants are very important resources for human beings. In recent decades, there has been increasing awareness of the sustainability of ecosystems and wildlife conservation. The plant populations in the field have decreased rapidly and disappeared because of habitat destruction caused by natural disasters, such as drought, storms, landslides or earthquakes. Artificial deforestation and illegal denudation has also increased the speed of species extinction. Now, the protection of species and the avoidance of extinction stress has become an important topic and therefore the concepts of plant conservation are getting more attention.

The main strategies of plant conservation include three different treatments:

1. In-situ conservation of endangered plant species: the establishment of protected areas or natural parks.
2. The establishment of refrigerated storage facilities equipment to keep seeds, such as seed banks.
3. The collection of wild plant species, and the selection of the appropriate region to establish greenhouses in which to grow these on.

The different methods have their advantages and disadvantages. Theoretically, in-situ conservation is the best method to avoid habitat destruction and maintain population in the wild naturally. However, the speed of habitat loss is much higher than the rate of protection. Therefore, during past five years, KBCC has adapted the third strategy to conserve plants, has improved cultivation techniques, and shared the results of this work.

The distribution of Yellow Camellia

There are 62 kinds of Yellow Camellia species (including variants and those not yet officially published): 22 in Vietnam, 36 in Guangxi, 2 in Guizhou, 1 in Yunnan and 1 in Sichuan (Chang, 1981; Chang and Ren, 1981; Min, 2000; Liang and Lu, 2005; Kao, 2005). These are distributed from the southern Guangxi to Vietnam. Moreover, Nanning to Hanoi is the most intensive area of distribution where there are high temperatures, high humidity, and low photo-intense environment. The largest number of species appear at low altitude (50 to 800 meters). However, in Maguan Yunnan, they can be found at altitudes from 300m to 1800m, and it is in this area that new species are being discovered.

A Yellow Camellia Individual Plant at Xiashi wild stand (Left: Mr. Li Zhihui, Mid: Mr. Huang Liandong)

From observations in the field from Fusui, Pingxiang, Longzhou to Vietnam Lang Son, Taiyuan, and Tomdao, we found Yellow Camellia...
seedlings growing out from the gaps between rocks. These seedlings are slender and appear to have a low population density, not like other Camellia Section and Theopsis Section plants that have stout branches and are more densely distributed.

The Conservation Centre is actively involved in promoting the project for the off-site protection of Yellow Camellias. The Yellow Camellia is an understory plant, so that it is feasible to plant the Yellow Camellia under the canopy without any adverse effect on the original trees, and this is a win-win situation both for conservation and forest economy.

The Yellow Camellia populations are small and limited to a few areas due to environmental restrictions, therefore, the conservation of Yellow Camellia is not only necessary but must be carried out immediately. Sudden changes in the natural environment will cause several more species to disappear; therefore, we should restrict deforestation and the illegal destruction of vegetation, and also forbid trading in wild plants. Furthermore, we should educate farmers to harvest seeds from wild trees or adapt to taking cuttings for propagation.

Recently, there have been many gene banks established, but these are different from a conservation center: The requirement for a conservation center or germplasm bank has continually been revised in recent years; currently, more than 100-200 saplings of each species are required to qualify as an effective conservation center (or germplasm bank). Saplings from seeds are preferred to achieve seed production and gene diversity, since grafted plants and cuttings have a high risk of developing incomplete fruit. A site that has only three to five individuals of each species is merely a garden or a botanical garden. Insufficient numbers of plants lead to ineffective seeds or hybrids, and are unable to maintain seeds with the original species characteristics: such cases have occurred in the early established botanical gardens.
Foshan Institute of Forestry is a successful case, where more than 2600 *Camellia nitidissima* are under the forest canopy and are growing well. As a result of good flower and fruit production, the germination rate of harvested seeds is more than 90%.

All Theaceae species are under the protection of the Conservation Center.

**The management of Yellow Camellia cultivation**

The Yellow Camellia is the first species that we found under cultivation in the Conservation Center, and its low mortality and fast rate of growth surprised us. The survival rate of cutting propagation has reached 99% under greenhouse conditions. The length of time to root depends on the health of the stock plant. We sowed a few Yellow Camellia seeds at the Conservation Center in December 2010: now the height of these plants ranges from the shortest at 80 cm to the tallest at 120 cm in height. This is a satisfactory performance.

Yellow Camellias grow well in a greenhouse environment providing that conditions of warmth and humidity remain satisfactory. Computer-controlled spray equipment maintains humidity at 85-90% while the temperature is maintained at 20 to 26C during the day; between 5 and 10C lower during the night. In this environment, the Yellow Camellias develop a strong root system, the plants are healthy, and produce buds two or three times a year when they reach a height of 30 to 40 cm. In the Conservation Center, there are two hybrid saplings called ‘Ki-no-Senrits’ which were propagated from cuttings: they have grown to a height of 4m in five years. It can be seen from this that Yellow Camellias, in the appropriate environment, regardless of whether they are native species or hybrids, seedlings from seeds or cuttings, can grow quickly and healthily.

In their natural environment, Yellow Camellias grow on two different type of soil: one is Tsuchiyama, a brick-red acidic soil; the other is Rock Hill limestone, a calcareous alkaline soil. Each species does not grow on the two different soil types at the same time, but both can be used for cultivation in an artificial environment. According to the result of research carried out in the Conservation Center during the past few years, we found that Akadama soil (made in Japan) is the appropriate substrate for Yellow Camellias. This is granular in form and watering does not make it solidify into lumps. The Akadama soil together with a little organic fertilizer performs well. The Akadama soil is like that of Fusui and Nonggang. Yellow Camellia roots require moisture and good ventilation.
Insects are less of a problem in greenhouse cultivation than in the natural environment. Aphids, thrips, spider mites, and scale insect are the common insect pests of Yellow Camellias. Some diseases of Yellow Camellias, such as ash coal disease, anthracnose, and algae blotch disease, require regular spraying with pesticide to control them. In addition, plants cultivated in greenhouses should be acclimitised before placing outdoors.

**Summary**

The purpose of conservation is not only to protect the plant species to avoid extinction but also to provide material for academic research: the Yellow Camellia has proven medical and health benefits. However, Yellow Camellias are not widely distributed and are rarely seen as understory saplings, so that the populations are now almost faced with extinction. But fortunately, it is easy to cultivate them in an artificial environment. Therefore, the project in which Yellow Camellia species populations are propagated in an artificial environment is practicable and should be actively implemented.

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