

Propagation and Plant Production in Taiwan

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INTRODUCTION

The development of Taiwan in the past 30 years has been remarkable. It has changed from an agrarian to a highly sophisticated industrial society which now has probably the highest foreign reserves of any country in the world. It is slowly adjusting to the new GATT conditions which will mean less protection for agricultural and horticultural producers.

The horticultural industry has been very strongly promoted by the Taiwanese Council of Agriculture. They have sent many people to the U.S.A. and Europe to improve their expertise so that the expansion of horticultural production has been nothing short of phenomenal. This is reflected in the figures given in Table 1.

Year	Fruit	Vegetables	Flowers	Total	% of agr. production	Value (%)
1945	18.221	35.319	-	53.539	6.4	11.5
1961	39.873	90.555	-	130.392	8	9.4
1981	138.846	224.383	1.672	364.901	26.1	57.7
1991	226.381	180.812	9.401	416.593	40.2	55.1

Table 1. Development in Horticultural Crops (increase in hectares) in Taiwan since 1945 (Source: Taiwan Agricultural Yearbook 1995).

The following are the main crops (Sources: Taiwan Agricultural Yearbook (1995), Orchid World (1996), Taiwan Flower Industry (1995), Council of Agriculture in Taiwan): Citrus (40.3 ha), *Mangifera indica* (mango) (21.1 ha), *Litchi chinensis* (litchi) and *Dimocarpus longan* (longan) (24.5 ha), Japanese apricot (10.5 ha), *Musa* (banana) (9.0 ha), *Syzygium samarangense* (wax apple) (8731 ha), plum (*Prunus*) (7.8 ha), and *Ananas* (pineapples) (7.5ha).

The main orchids produced are: *Cattleya* (48 ha), *Phalaenopsis* (37.2 ha), *Cymbidium* (16.6 ha), *Dendrobium* (10.8 ha), and *Oncidium* (7.2 ha).

Important ornamental plants are Palmae, *Pachira aquatica*, *Ficus*, *Juniperus*, *Azalea*, *Camellia*, *Dracaena*, *Rosa*, *Hedera*, *Codiaeum* (croton), *Hibiscus*, etc.

Taiwan lies on the Tropic of Cancer which means the climate is tropical and subtropical. On the higher mountains (above 2000 m) many crops requiring cold conditions at certain times of the year are grown. Many vegetable crops such as cabbages can only be successfully grown on the higher mountains in summer—near the coast it is too warm. The vernalisation of many desirable pear cultivars (Oriental or Asian pear) is not possible on the coastline. However, there is a 600 ha production of such pears which is achieved by grafting about 200 flower buds imported from Japan or from the higher hills, each year, into each individual plant!

Attempting to cultivate sweet cherries (*Prunus avium*), even at 2000 m, has been difficult because cultivars have different cold requirements. Also pollination can be a problem because different cultivars flower at different times. Attempts to grow *Forsythia* have been successful on the higher areas but unfortunately they do not flower.

Up to three crops of grapes can be harvested each year. After harvest the plants are cut back making sure to remove all leaves. They re-grow producing a further crop of grapes.

Because of the high temperature in summer many plants lose their attractive colour. *Acer palmatum* 'Atropurpureum', for example, does not look attractive in autumn and only attains a dull green colour. All the leaves are removed by hand and due to the high temperatures re-grow producing fresh red leaves.

On the other hand many foliage plants can be damaged by low temperatures. Even in the south of Taiwan, the winter temperature can decrease for a short period to as low as 15°C which leads to chilling damage in, for example, *Dieffenbachia* and *Philodendron*.

Rainfall is often very heavy and can lead to leaching of nutrients. The high temperatures and humidity also encourage many plant diseases on crops grown in the open or under netting.

The day length can be a problem for propagating and producing some crops. For example, *Fragaria xananassa* (strawberry) cultivars introduced from northern Europe have not been producing runners because of the short days throughout the year. Chrysanthemums which are cultivated in the field have to be given long day treatment to produce vegetative growth. There are at least 400 ha of chrysanthemum production in Tien-wei. This area is also the main tree and shrub nursery area in Taiwan.

PROPAGATION

The propagation of plants in many horticultural enterprises is very traditional. Because of the climatic conditions mosses and liverworts can be a problem in propagation. The success rate depends entirely on the capabilities of the producer. The pressure to rationalise is very high. Labour costs have increased greatly and many migrant workers are employed. Sometimes, physiological problems, such as topophysis are not recognised. The usual method of propagation of roses involves air-layering — rootstocks are unknown. Other plants normally air-layered are lychees and rhododendron. On the other hand, cutting propagation of numerous plants is no different from standard practice in the western world. However, many growers do not grade the cuttings for evenness of product.

Micropropagation is being used, especially for orchids. Some of the most important orchid exporters in the world (e.g. Taida Nurseries) have been exporting millions of micropropagated orchids for years. In Taiwan the prices paid for orchids with special characteristics, such as stripes of different colours, can be very high—orchids appear to be almost a cult plant. In some companies guard dogs are used to protect the stock plants.

Micropropagation is also being used for papaya plant production because of a virus disease. This is the only way to get successful fruit production in Taiwan. The virus-free plants are cultivated in insect-free houses after propagation, before being put out in the fields. They survive to produce a crop for only about 1 year. Thereafter, they must be replaced.

Bonsai plant production is very important. The more gnarled a plant appears the better. Older plants are often hacked back severely. They re-grow very quickly. Sometimes plants such as *Acer* are pruned hard and using side veneer grafts attractive Bonsai plants are produced. Many such plants are exported to Japan, the U.S.A., and Europe.

Only a few growers speak a foreign language and even fewer seem to know or use botanical names. However, quietly, Taiwan has become an important source of horticultural plants which are being sold in Japan, Europe, and the U.S.A. in large numbers.