HEALTH MANAGEMENT OF PATHOGEN-FREE (PF) CITRUS ORCHARDS PLANTING AND PRUNING OF PF CITRUS TREES IN ORCHARDS

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ABSTRACT

Knowledge about the planting and pruning of citrus PF trees is crucial in obtaining good fruit harvests. Planting starts with a thorough knowledge of soil analysis, water sources for irrigation, proper spacing, topography and good seedlings. Pruning, on the other hand, ensures a proper canopy shape and height for the citrus tree to become healthy and productive. This paper discusses in detail the citrus growth and bearing habits, pruning time and methods and the major principles and procedures of pruning.

Keywords: Citrus trees, planting, pruning, pruning practices

INTRODUCTION

Citrus plants are believed to have originated in Southeast Asia. Among its many fruits, the most well-known examples are oranges, lemons, grapefruit and lime. Known for their fragrance and sour and sweet taste, citrus fruits are one of the best sources of natural vitamin C and flavonoids. A thorough knowledge of the proper planting and pruning techniques of citrus, especially the PF (Pathogen Free) type, is very crucial in obtaining good fruit harvests. This paper discusses in detail the proper way to plant and prune PF citrus trees in orchards.

PLANTING

Preparations for planting

Before planting citrus seedlings, farmers should make orchard soil analysis to know soil characters, pH value, and organic matter content. Growers should not only know soil fertility, but also find water sources for irrigation. In tropical and subtropical areas, most of the land for citrus planting is acid, and soil fertility is poor. Therefore, growers should adjust soil pH by adding limestone or dolomite powder and applying organic manure to improve fertility (Fig. 1) for seedling growth.

Planting of PF citrus seedlings

The optimum time for planting citrus seedlings varies according to the kind of seedlings acquired. The root system of potted or container seedlings grows well; therefore, seedlings can be planted at anytime when the planting holes are prepared. The bare root seedlings have better transplant in cold and dry seasons. After the planting holes are prepared and fully watered, PF seedlings can be planted with a bamboo stick beside to support the seedlings. Watering and covering soil with some dried straw could prevent evaporation from the soil.

In the early two or three years of planting, there is still some space between young citrus trees.
Table 1. Planting space of citrus. M.

<table>
<thead>
<tr>
<th>species</th>
<th>pomelos</th>
<th>grape-fruits</th>
<th>oranges, mandarins, lemons</th>
<th>fortunella limes</th>
</tr>
</thead>
<tbody>
<tr>
<td>space</td>
<td>7 × 6</td>
<td>6 × 5</td>
<td>6 × 4, 5 × 5</td>
<td>4 × 3</td>
</tr>
</tbody>
</table>

Fig. 2. One of the objectives of citrus plant pruning is to increase the total effective leaf area and bearing surface of the fruit tree.
Growers can plant legume crops, such as peanuts or soybeans, to get some income and improve soil fertility.

**PRUNING**

**The objectives of citrus pruning**

Citrus trees are perennial evergreen fruit crops. As long as they remain healthy, they can flower and bear fruit for more than forty (40) years. For a citrus tree to become healthy and productive, a proper canopy shape and height should be maintained by pruning.

There are four main objectives of citrus pruning.

a. To increase the total effective leaf area and bearing surface. (Fig. 2);
b. To control tree shape and height for efficient cultural practices, such as soil management, fertilization, pest spray and harvest operation;
c. To control tree vigor and maintain the most efficient balance between vegetative growth and fruitfulness;
d. To keep orchard sanitation by removing diseased or infected branches and fruits.

**Citrus growth and bearing habits**

Citrus species are evergreen trees. There are three to five new flush growths every year in tropical or subtropical regions. Plant hormones in citrus trees affect growth and fruiting. The apical dominance of terminal bud suppresses lateral bud growth (Fig. 3). Without pruning and training, the citrus trees will grow very tall and bear fruit only on the surface of the canopy. Spring flushes are good fruiting mother twigs in subtropical areas. Winter pruning helps produce good fruiting mother twigs for the next year.

**The model structure of a citrus tree**

When citrus trees are being trained and pruned, citrus farmers must consider the distribution and arrangement of branches. (Fig. 4 and Fig. 5).

**Pruning time and methods**

In main citrus producing areas, pruning time is divided into two periods. One is summer pruning; the other is winter pruning. Citrus trees are evergreens and they do not have a true dormancy period. Growers should select the correct time for pruning. In subtropical areas, winter pruning is conducted after harvest and before flowering. Summer pruning is conducted during summer time. Trees are lightly pruned. There are two methods of pruning. One is heading back and the other is thinning out. Farmers cut back too vigorous shoots or too long branches and thin out crowded shoots or branches. (Fig. 6).

In order to control the shape and height of
Figs. 4 and 5. Experts say farmers must consider the distribution and arrangement of branches when citrus trees are pruned.

Fig. 6. Farmers are cautioned not to cut back vigorous shoots or too long branches and also not to thin out crowded shoots or branches when pruning.
Fig. 7. When pruning young trees, it is advised that it should be done lightly - just enough to establish a desirable framework and to avoid stimulating excessive vegetative growth.

Fig. 8. Growers must keep in mind that pruning should be conducted from top to bottom and from the outside to the inside of canopy.
citrus trees, farmers not only prune branches and shoots but also pitch new shoots, bend branches, girdle branches and thin fruit.

**Principles and procedures of pruning**

**Young tree pruning practices**

Usually, most young citrus trees need no pruning or a very light pruning is conducted for the first few years, except for the removal of sprouts on the trunk and suckers from rootstock. When a citrus tree is three or four years old, branches that are too closely spaced or that are crossed and entangled should be removed. Young tree pruning should be light, just sufficient to establish a desirable framework and to avoid stimulating excessive vegetative growth. (Fig. 7).

**Mature tree pruning practices**

Citrus trees require little pruning until they grow to full size. For citrus trees to grow well, farmers should focus on the tree shape and height to allow the sunlight to penetrate into the inner canopy and get the highest benefit of photosynthesis from the trees. The first pruning procedure is to study the structure of each tree and then prune undesirable shoots or branches. Farmers prune wrong-positioned and wrong-directioned branches such as mechanically injured branches, disease-infected shoots, inwardly-growing branches, entangled branches, overcrowded branches, too long and dropping branches, and water sprouts. The citrus trees are evergreens and photosynthesized products are stored in leaves and branches so growers should be careful never to remove more than 15-20% of the total shoots. Growers must keep it in mind that the pruning should be conducted from top to bottom and from outside to the inside of canopy. (Fig. 8).

After pruning, the brushes should be collected and moved outside the orchard to maintain field sanitation.

**Rejuvenated or deformed pruning of old trees**

An old citrus tree is likely to lose its vigor and yield, and its canopy may become overgrown. In this situation, the tree requires rejuvenated pruning or deformed pruning. Heavy pruning of old citrus trees induces tree decline, so it is better to conduct pruning in three or four years instead of once a year. (Fig. 9).

**CONCLUSION**

There are many different citrus species, which have different growth and fruiting habits. The citrus growers should first consider and evaluate which shoots or twigs are the best for fruiting. Secondly, they should focus on the tree shape and tree height which will secure good light interception for photosynthesis and easy practices. Thirdly, farmers prune undesirable branches, wrong-positioned branches and wrong-directioned branches to keep the trees healthy and productive.