Successful Apple Growing in Tropical Indonesia

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Introduction

Apple growing is usually restricted to the temperate zones and to some highlands of subtropical and tropical countries. The main reason why apples are not grown in warmer climates is their high chilling requirement, and being genetically determined this results in slow growth and low and irregular cropping under warmer conditions.

Yet, there are some places in tropical Indonesia where apple varieties are grown successfully even at rather low altitudes of 800-1200 m, where temperatures seldom drop below +16°C and are rather uniform throughout the year. The main variety is 'Rome Beauty', and another variety is 'Princess Noble', a green apple, less known and grown only to a smaller extent. Other varieties, like 'Cox Orange Pippin' and 'Belle de Boskoop' are only grown for trial. Apples there are harvested nearly twice a year at a predetermined time to suit the grower. The main place in Indonesia where apples are grown is the region around Batu in East Java. From Batu apple growing has spread to other places with similar conditions, especially to the island of Timor, but information on these additional places is still very incomplete.

General Facts on Apple Growing at Batu

Batu is a small town near Malang, East Java, at about 7°58′ S and 112°38′ E. The first apple trees were planted in Batu in 1936 by the Dutch RUYTER DE WILT. The number of trees in the Batu area, including young plantings, is estimated to be about 200,000. Total yields are estimated to be about 200 metric tons per year, and may increase to 600 metric tons in 1974. This increase of apple production is due to the good quality of the apples in Batu. The grower's profit is about 0.25 to 0.5 US-$ per kg.

Most trees are cultivated in rather small orchards, the largest ones not exceeding 5 acres. The optimum yields per full grown tree are about 60 to 100 lbs.

The climatological data at Batu, records a minimum temperature at 7:00 a.m. (1 hour after sunrise) and the maximum temperature at 12:00 noon at 915 m altitude as shown in Table 1. The real minimum temperature may differ for not more than 1°C, and the real maximum not more than 2°C, according to the Agrometeorological Office in Djakarta. The data on temperature and sunshine are means of 1963-1968, obtained from the Horticultural Research Station in Malang. The data on rainfall are means from 1895-1941, collected at Batu at 877 m altitude.

Methods of Apple Growing

Defoliation

The main technique which enables cultivation of apple trees is to defoliate the trees 1.5 years after planting and then again when fruiting has started, within 4 weeks after each harvest.

The trees will flower again without any chilling after about 4 weeks, and 5 months after flowering they are harvested. In this way, the trees fruit nearly twice a year. This defoliation is done by hand, at any time the grower wants. Because the flowers sometimes are severely damaged by rainfalls, resulting in lower fruit set and yields, people tend to avoid de-

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Table 1. Climatological data of Batu/East Java where limited apple growing is now practiced.

Month	Temperature (°C) mean minimum	Temperature (°C) mean maximum	Temperature (°C) daily mean	Sunshine (hours)	Rainfall (mm)
Jan.	19.30	24.55	21.75	80.8	298
Feb.	19.23	24.98	21.83	78.4	302
Mar.	19.16	24.47	21.78	110.5	248
Apr.	18.43	24.73	21.98	121.8	153
May	18.25	25.16	22.05	134.4	80
June	16.96	24.67	21.29	136.8	48
July	16.15	23.55	20.55	141.8	33
Aug.	17.05	22.87	20.79	136.7	20
Sept.	16.81	25.55	21.57	168.7	29
Oct.	18.25	26.27	22.18	138.5	69
Nov.	18.81	25.95	22.23	123.4	164
Dec.	18.95	24.60	21.52	84.4	267
Mean	18.11	24.78	21.63	–	–
Total	–	–	–	1456.2	1711

foliation during the rainy season at the times of highest rainfalls.

For successful defoliation, other factors must be observed.

Pruning

Good yields may be obtained without pruning, but quality is poor because of low color. On the other hand, heavy pruning is much more dangerous, leading to a marked fruit reduction and often to a total loss of yields. Therefore only a few branches are cut back to a side branch. Pruning in general is done a few days after harvest and before defoliation.

Bending

'Rome Beauty' is a variety that does not branch very well especially under tropical conditions. Therefore, defoliation and pruning is accompanied by bending, which counteracts the negative effect of pruning on flowering and enables an even branching. In this way better fruit set is possible throughout the tree.

Fertilization and soil cultivation

Soil analyses are not yet available and fertilizer trials are not complete. Therefore there are many different ideas on the best amount and kind of fertilizers and on the best time of application.

Some of the better apple growers use 60 lbs. N/acre per year during the first years of tree development. Later on this amount is increased to 120 lbs./acre if there is a good fruit set. Most fertilizers are applied as complete fertilizers (15-15-15) called RUSTICA YELLOW. They are applied in two rates, either at the end or at the beginning of the rainy season or shortly after defoliation and pruning. The orchards are weeded in the dry season and mulching is preferred.

Reference

Saure, M. 1971. Beobachtungen über den Apfelanbau im tropischen Indonesien als Beitrag zur Frage der Blütenbildung, des Kältebedürfnisses und des Alterungsprozesses unserer Apfelbäume. Gartenbauwissenschaft 36:71-86.