

Cultivation of Grapevine in Indonesia

M. Winarno*

Abstract

Approximately 250,000 plants of table grapes (*Vitis vinifera* L.) are grown in East Java, Bali, and Central Sulawesi provinces of Indonesia, at an elevation of 5-300 meters above sea level. Monthly maximum and minimum temperatures range from 31-33°C and 23-25°C. Optimum annual rainfall is 800 mm with a period of 3-4 dry months. Grapes were introduced into Indonesia by Dutch colonists in the 17th century. The major commercial cultivars grown are Bali 1 (= 'Alphonso Lavallee'), and Probolinggo Biru (a land race). They are propagated mostly by cuttings and grown on a trellis 2.5 m in height. These cultivars produce 2-3 crops per year in June, October, and February and yield 50 kg/tree or 25 tons/ha/year. The lack of selected adapted superior varieties such as seedless and powdery mildew-tolerant varieties is one of the constraints on the development of viticulture.

Introduction

Grapes were introduced to Indonesia by Dutch colonists, approximately in the 17th century. In 1682, vines were planted and produced crops in Batavia, former name of Jakarta, the capital of Indonesia. Later, in 1800, planted vines were also reported on Pisang island, West Sumatera. Then, cultivated vines were adopted in the northeastern areas of East Java in 1828. By 1899 table grapes were commercially grown in Probolinggo, Central Coastline of East Java, where two local superior varieties were selected: 'Probolinggo Biru' and 'Probolinggo Putih'. Currently, Probolinggo is still being known as one of the main producing areas of table grapes besides Northwest Bali and Central Sulawesi.

Agroclimate

Grapevines have been grown in the northern coastal areas of East Java and Bali at elevations of about 5-300 meters above sea level. They have just been introduced in Central Sulawesi where they grow well.

The growing areas generally have monthly maximum and minimum temperatures in the range of 31°-33°C and 23°-25°C, respectively. Annual rainfall is 800-1500 mm with a period of at least 3-4 dry months.

Cultivars

The major commercial cultivars are 'Probolinggo Biru 81' and 'Bali 1' (= 'Alphonso Lavallee'). The characteristics of these cultivars are described in Table 1.

A total of 70 varieties were also introduced from several countries, but only 'White Malaga', 'Caroline Black Rose', and 'M. Xamgypt' are promising.

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* Directorate of Horticulture (Jl. Rangunan 9, Pasarminggu, Jakarta Selatan, Kotak Pos 7267 JKSPM Indonesia)

Table 1 Some characteristics of two major adapted cultivars of table grapes in Indonesia

Cultivar	Bunch weight (g)	Color at maturity	Days from pruning to to harvest	No. crops per year	Yield (t/ha/year)
Probolinggo Biru 81	250	Black Red	105	2	25
Bali 1	150	Brown Red	110	2 - 3	20

Propagation

The use of cuttings is a common method for grapevine propagation. Cane cuttings 20-25cm in length are taken from 1 year old twigs, with a brownish bark color, and a diameter of 1 cm carrying 2-3 buds. However, cuttings are usually taken when the vineyard is pruned. Recently, the use of single node cuttings has been introduced. Plant growth regulators such as Rootone are widely used. After 1.5-2 months, cuttings are ready to be transplanted to the field. Propagation through tissue culture has also been initiated.

Planting and training

Planting distances commonly used are 4 × 5m and 3 × 3m. Within 2-3 months after planting the vines will reach a trellis 2-3 m in height. Training is employed to obtain good and evenly distributed shoots over the trellis. The overhead trellis is made of wires forming a horizontal grid supported by wood or cement stakes. Live stakes of *Lannea grandis* have also been widely used by small growers, since they are relatively cheap and provide animal feed. A 2 m trellis is considered more convenient for cultural practices.

Pruning

Pruning is performed to achieve high yield and quality of fruit.

Pruning has two general purposes :

- To promote vigorous vegetative shoots for shaping the vine framework. Canes are pruned just above the vegetative buds. The vigorous vegetative shoots are then expected to produce many vigorous bearing (generative) shoots.
- To promote the development of floral buds.

The bearing (generative) shoots are pruned back to 1-10 buds, depending on the vigor of the shoots. Pruning to promote the development of floral buds can be employed 2-3 times per year. Hence, growers obtain 2-3 crops per year. However, pruning 2 times per year in April and August has been widely recommended and practiced by the growers.

Thinning

Thinning helps to produce fruits with a better quality. Berry thinning is generally preferable to flower or cluster thinning. Berries are thinned manually with small scissors. Berry thinning for 'Bali 1' is less drastic than for 'Probolinggo Biru 81'. Occasionally, dipping of bunches in a gibberellic acid solution results in the increase of cluster and berry size.

Pests and diseases

Downy mildew (*Plasmospora viticola*), leaf rust (*Phakospora vitis*), anthracnose (*Gloeosporium* sp.), leaf beetle (*Apogonia* sp.) are the main diseases and pests of grapes especially during the rainy season. Sprays of pesticides are still the main method of control.

Discussion

Possingham, J. V. (Australia): The variety MS 23-7 is an Australian new variety (maroon and seedless) resulting from a cross between Carolina Black Rose and Beauty Seedless.

Answer: The two promising varieties called MS 23-7 and MU 7-58 were introduced from Australia.

Amnon Erez (Israel): Are you using any chemicals to break the dormancy, especially with the long pruning system? The bunches appear to be very compact. Is it a typical situation? To avoid the rainy season, did you attempt to change the time of the initiation of the second cycle after harvest? Also I noticed that the yield you obtained was very low. Have you tried to use hydrogen cyanamide?

Answer: We do not use chemicals to break the dormancy because we do not have any dormancy problem in a tropical environment. We thin berries manually with small scissors. We do control the pruning times but still obtain lower yields after the second and third prunings than after the first. We could use chemicals as you suggested to increase the yield of the first crop (larger bunches or stimulation of budbreak).

Amnon Erez (Israel): Apples and peaches behave similarly to grapes only that they require cooler climate. This budbreak without exposure to chilling is termed "rest avoidance".

Answer: Stripping off all leaves and pruning may contribute to the mechanism of "rest avoidance".

Uritani, I. (Japan): You mentioned that pruning of grapevine resulted in the promotion of the initiation of the vegetative shoots and floral buds. Could it also affect the function of the root system? In the case of cassava, pruning leads to a promotion of the function of the root system.

Answer: It is possible since every crop is characterized by a certain value of the shoot/root ratio. However, we did not determine how the root system was affected by pruning.

Yamada, M. (JIRCAS): In the tropical zone, there is intense irradiation of sunlight and the temperatures are high. Do such conditions adversely affect vegetative growth of grapes?

Answer: We did not observe any adverse effect. For growing grapes, dry conditions are most important (dry spells) rather than temperature or solar irradiation.

Comment: Gehrmann (Germany): Hydrogen cyanamide (Dormex R) is registered in Indonesia for use for table grapes and apples. Trials conducted in North Bali showed a yield increase of approximately 150 percent for Ribier (Bali 1) under field conditions.

Ravdo, B. B. (Israel): Do you apply fertilizers and irrigate grapes in Indonesia? Are you performing tissue analyses for determining fertilizer needs?

Answer: We apply irrigation at the flowering time and during the young fruit period. We usually apply furrow irrigation.