GrapesIntercultural Operations

Weed Control:

Weeding in the vineyards is generally done mechanically. Frequent weeding is required to allow feeder roots to absorb the nutrients and moisture without any competition. Bullock-drawn or tractor drawn implements can be used for intercultivation and weed control, if sufficient space is provide between the vines. In the vineyards, where close spacing are adopted manual weeding or digging the plots with garden forks and lifting the weeds once in three months is a common practice. Periodical cultivation with disc harrow to turn the soil and push nutrients into the deeper layers is essential. This practice in case of black soils helps to loosen the top 8cm soil to facilitate aeration to the roots. Problematic weeds like *Cyanodon dactylon* and *Cyperus rotundus* are removed manually by digging deep to remove their deep-seated runners. The exposed roots after drying are collected and burnt.

As the manual labour is becoming costly, pre-emergence application of herbicides such as Diuron, Simazine or Atrazine @ 2 kg a.i. /ha and Goal (Oxyfluorfen) @ 1 kg a.i. /ha after pruning is recommended to control most of the weeds. Glyphosate @ 10 ml/litre mixed with 5g of Ammonium Sulphate and detergent, as a post-emergence spray is effective in controlling weeds for a period of 4-6 months.

Pruning:

Removal of any vegetative part in a vine is called pruning. It is a critical operation in grape cultivation. Therefore much care and precision needs to be exercised in pruning a vine. The main objective of pruning of grapevines is to increase productivity, facilitate intercultural operations, and maintain desired vine shape and vitality of the vine for constant productivity.

Pruning is normally done only once in North India during January-February by heading back half of the mature shoots for fruiting and the balance half are pruned for renewal spurs, which develop into fruiting canes in the next year.

In Maharashtra north Karnataka and Andhra Pradesh the vines are forced to undergo rest for about a month immediately after harvest. This helps in storing the food material in the mature parts of the vine. The canes are cut back in April by keeping 1-2 buds which develops into canes in 4-5 months. The dried canes are also removed. Here it is called 'back pruning' or 'growth' pruning. In the month of September-October these canes are pruned for fruiting. This pruning is called 'forward pruning' or winter pruning. Vines, which have attained the age of one year can be subjected to this pruning. The level of forward pruning depends upon the region, variety and vine vigour. Normally the vines start yielding in about 5 months from forward pruning.

In Tamil Nadu pruning is done during November-December for summer crop harvested during March-April. While pruning in May-June results in second crop during August-September. In the south interior Karnataka, the forward pruning is done during October-November for summer crop harvested during February-March and during April-May for the second crop harvested during July-August.

It is important to retain the desirable number of fruiting buds on a vine after pruning for optimum yield and better quality fruiting. Retention of more canes on vine (light pruning) results in a heavy crop, while retention of less canes (severe pruning) results in a light crop. All canes in a vine cannot be equally fruitful. Canes that are away from the trunk are more fruitful than the once nearer to the trunk. Hence the former are pruned lightly than the later.

Shoot Pinching:

Shoot pinching is a part of pruning, mainly done to promote fruitfulness and regulate the current season growth. Shoot pinching is done when the main shoot attains 7-8 leaf stage. During pinching the tip of the mature shoot is pinched by retaining only five nodes. As a result the terminal bud along with 1-2 laterals resumes growth. These laterals are called as sub-canes. Buds up to third node from the base on the sub-cane were found to be invariably fruitful resulting in 2-3 clusters/cane.

Termination of Bud Dormancy:

Under low temperature (<10°C) conditions during winter vines undergo dormancy. Therefore it is necessary to break this dormancy. Under normal conditions in Maharashtra and Karnataka the minimum temperatures normally cross 10°C after pruning and thus buds do not undergo dormancy. However in north India, the temperatures are low after pruning and therefore the bud remain dormant till early spring. Late bud break in early spring delays the ripening and the crop is lost because of rains. Uniform bud break can be achieved by the use of chemicals like Hydrogen Cynamide @1.5% or Thiourea @4%. These chemicals are applied to the buds within 48 hours of pruning in tropical conditions. Only two or three apical buds on a cane are to be treated with these chemicals. When more buds are treated, more number of shoots will emerge reducing the available leaf area per bunch and impairing the berry development.

Growth Regulators:

The use of growth regulators not only enhances the productivity of vines but also helps to produce quality grapes suitable for exports. Choice of growth promoters and regulators to be used depends upon the traits desired in the grapes meant for exports. The effects of various growth regulators and growth promoters are as follows-

Effects of Auxins

Growth Regulators	Concentrations	Time of Application	Effects
NAA	20 ppm	Spraying at berry formation stage.	Controls flower & berry drop
	15-20 ppm	Dipping bunches at sugar formation stage	Improves berry luster
	20-25 ppm	Spraying 10-15 days before harvest.	Prevents berry drop in transit
IBA	1000-1500 ppm	Dipping of cuttings	Promotes rooting of cuttings
4 CPA	10 ppm	1 st spraying when the berry size is 3 mm dia. 2 nd spraying when the berry size is 6 mm dia.	Increases the pedicel thickness

(Source : NRC Grapes)

Effects of GA

Concentrations	Methods of application	Time of application	Effects
10-15 ppm	Spraying	Before flowering	Increases the stalk length of the bunch
		After	
20-25 ppm	Spraying	25% Capfall	
20-25 ppm	Bunch	50% Capfall	Thinning of berries
20-25 ppm	dipping	75% Capfall	Thinning of berries
	Bunch		_
	dipping		
35-40 ppm	Bunch dipping	After fruit setting	Thinning of bunches
30-40 ppm GA + cytokinin	Bunch dipping	At 3-4 mm berry size	Increases the bunch size.
30-40 ppm GA + cytokinin	Bunch dipping	At 6-7 mm berry size	Increases the bunch size.

(Source : NRC Grapes)

Effects of Ethylene

Concentrations	Time of Application	Effects
100 ppm	15 days after bud sprout following April pruning.	Reduces apical shoot growth.
200 ppm	At 15-16 leaf stage following April pruning.	Increases the cane thickness.
1000-1500 ppm	3-4 days before October pruning	Induces leaf drop.
250 ppm	At verasion stage or at sugar formation stage	Increases the Brix %.

(Source : NRC Grapes)
Effects of Cytokinins

Category	Concentrations	Time of application	Effects	
6 BA	10 ppm	15-16 leaf stage after April pruning	Increases fruit setting in the buds.	
	10 ppm	At 3-4 mm berry size along with 30-40 ppm GA after October pruning	Increases the berry size.	
	10 ppm	At 6-7 mm berry size along with 30-40 ppm GA after October pruning	Increases the berry size and shape.	
CPPU	2 ppm	1 st application at 3-4 mm berry size along with GA dipping	berry size, promotes round	
	2 ppm	2 nd application at 6-7 mm berry size.	berry shape and maintains the green colour of the berries.	

(Source : NRC Grapes)