b. Irrigate the vineyard @ 1380 Lt/ac/day during no rainfall period.

c. As a part of IPM for mealy bug infestation, carry out following practices during this period.

i. To remove left over population of mealy bugs swab the plants with Dichlorvos 2 ml/l + Neem oil 5 ml/l + Fish oil 2ml/lt.

ii. Remove the bark and apply gum banding to avoid ant as well as crawler movement.

iii. Make 3" to 4" wide ring of insecticide using Malathion or Chlorpyriphos @ 25 kg/ha.

Fig 5a & b: IPM Techniques for Mealy Bug

iv. Spray sulphur fungicide @ 2 g/litre water for the control of powdery mildew during cane maturity.

v. Spray Carbendazim @ 1 g/litre water for the control of anthracnose and also remove the excess new shoot growth.

Water Management

The irrigation water requirements stated under various stages are subject to variation depending upon PAN evaporation reading and local site conditions.

Days after pruning	Growth Stage	Quantity of water (lit/ha) per mm of evaporation
1-40	Shoot growth	4200
41-60	Fruit bud differentiation	1400*
61-120	Fruit bud development & maturity initiation	1400*
121-165	Cane maturity & storage	1400*

* These stages normally coincide with the pre-monsoon rains and/or onset of monsoon season when pruned during the 2nd fortnight of the April month. Some local adjustments will be necessary for increasing or decreasing the irrigation rates keeping in view the rainfall and irrigation water quality.

Fertigation Schedule

Growth Stage	N	P_2O_5	K_2O
	(Quantity per hectare)		
Rest period Harvest - 20D	26.6 (10)	35.5 (10)	26.6 (10)
1-30 DAP	80.0 (30)	-	-
31-60 DAP	-	213.1 (30)	-
61-120 DAP	-	-	80 (30)

* The figures in parenthesis indicate percent distribution of annual dose for newly planted vineyards in bearing. The annual dose is 266.6 N, 355.2 P_2O_5 and 266.6 K_2O kg/ha/yr for calcareous black cotton type soil.

1. Apply well-decomposed FYM 25 ton per ha.
2. About 70 kg/ha of Magnesium sulphate should be applied in 3-4 equal splits.
3. Apply 20 kg Ferrous sulphate, 10 kg Zinc sulphate and 5 kg/ha of Manganese sulphate along with FYM or through cow dung slurry.

Note: Over a period of time, the nutrients tend to accumulate in soil. Hence after few years of fertilizer application, soil and petiole analysis should be carried out before deciding fertilizer doses.

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Compiled and Edited by:

1. Dr. R. G. Somkuwar
2. Dr. A. K. Upadhyay
3. Dr. J. Sharma
4. Dr. S. D. Ramteke
5. Dr. S. D. Sawant
6. Dr. N. S. Kulkarni
7. Dr. P. G. Adsule
8. Mr. P. B. Taware

Published by:

Dr. P. G. Adsule
Director
National Research Centre for Grapes
P. B. No. 3, Manjri Farm Post, Solapur Road,
Pune - 412 307

Price: Rs. 10/- (Rupees Ten only)

For detail information contact:

Director, NRC for Grapes, Pune.

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SOME TIPS ON

CULTURAL PRACTICES AFTER APRIL-PRUNING

ICAR

NATIONAL RESEARCH CENTRE FOR GRAPES

(Indian Council of Agricultural Research)

Manjri Farm Post, Pune - 412 307, India.

April or back pruning is aptly called as 'Foundation Pruning'. The foundation for next crop is laid during this period by developing the fruitful canes and food storage in the vine. About 80% potential of future production is assured during the foundation phase. Hence, the care needs to be taken during the following stages:

I. Pre-pruning practices for better start
II. Pruning and shoot growth
   a. Development of canopy architecture
   b. Fruit bud differentiation
III. Cane Maturity
   a. Fruit bud development
   b. Storage of food in vine.

I. PRE-PRUNING PRACTICES

a. Rest period of about 25-30 days is necessary for vine to recover from the exhaustion out of the previous crop.

b. Immediate flush of root development starts after harvest, which should be supported by application of 10% of total annual fertilizer requirement.

c. Irrigation is continued till pruning @ 4000 Lit. per acre per day (at avg. evaporation of 7.14 mm).

d. Apply Farmyard manure (FYM) @ 10 Ton + Single super phosphate 500 kg per acre, ten days before pruning.

II. PRUNING AND SHOOT GROWTH

1) Pruning

a. Prune the vines by leaving 1-2 buds of previous year canes on cordon. The vineyard resemble like a framework of cordon with 1-2 buds standing in the field.

b. Dead wood (if any) should be removed and cordon renovation carried out if necessary.

c. Put the pruned material in the pit that can be used in the next season as compost. If the material is infected, destroy the pruned material by burning.

d. Apply Hydrogen cyanamide @ 1.5% (30ml/L) in case of grafted vines and at 1.0% concentration (20ml/L) in case of own-rooted vines to enhance sprouting of buds. Add colour to the solution as an indicator of uniform pasting.

e. Spray Bordeaux mixture 1% (Copper Sulphate 1.0 kg + Lime 0.6 to 0.8 kg in 100 Lt water) within 48 hours of pruning.

f. Apply Urea @ 80 kg + Magnesium Sulphate 8 kg per acre after pruning.

g. Start irrigation @ 12,650 Lit. per acre per day (at average evaporation of 7.53 mm).

Fig 1a: Back Pruning

Fig 1b: Sprouting

2) Bud Sprouting

a. Buds start sprouting within 8 days (Own-rooted vines) or 15 days (Grafted vines) after pruning.

Time required for sprouting depends on previous production phase stress, rest period and the soil conditions i.e. aeration, moisture status and salinity.

b. Infestation of Flea beetle is pre-dominant during this period due hot and dry climate. Spray Carbaryl @ 2 g/l or Imidacloprid @ 0.4 ml/l or Lambda Cyalothrin @ 0.5 ml/l.

3) Five Leaf Stage (7 days after sprouting)

a. After sprouting, shoots grow very fast and attain 5-leaf stage in 7 days.

b. Spray CCC @ 500 ppm at 5-leaf stage to control the vigour.

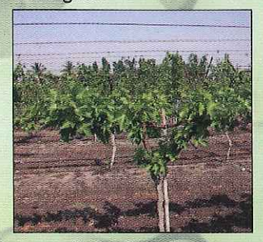

Fig 2 a: 5-leaf stage

b: Pinching for sub cane at 9-leaf stage

c. Shoot thinning is carried out so as to maintain 1 shoot per 1.5 to 2.0 sq.ft. area, uniformly distributed on the cordons.

4) Nine Leaf Stage (10-12 days after sprouting)

a. Pinch the shoot tip along with two leaves to maintain seven eye-buds on main shoot to initiate sub-cane.

b. Apply DAP (18:46:0) @ 180 kg/acre.

c. Continue irrigation @ 12,650 Lt/ac/day (at avg. evaporation of 7.53mm).

Sub-cane technique is a *'stop and go'* method of shoot development, which assures the development of fruitful buds by temporary diversion of food supply to the desired buds on main shoot.

5) Sub-cane Growth (30-50 days after sprouting)

a. At 7+5 leaf stage of sub-cane or 12-leaf stage of straight-cane, spray CCC @ 500-750 ppm to check the further growth.

b. Apply Sulphate of Potash @ 87 kg/ac at 30-35 days after sprouting and Magnesium Sulphate 8 kg/ac after 8-10 days of application of SOP.

Fig 3 a: Sub-cane growth

b: Straight-cane growth

c. At this stage, the differentiation occurs in the buds to form inflorescence primordia.

d. Spray 6-BA @ 10 ppm at 40th & 50th days and Uracil @ 50 ppm at 45th day.

e. Irrigate the vineyard @ 2,650 Lt/ac/day (at avg. evaporation of 4.72 mm).

f. Growth of the shoots is checked at 7+5+3 leaves or at 15-leaf stage by tipping the apical growth. Further growth is arrested by pinching and spraying CCC @ 500-1000 ppm depending on the shoot vigour and weather condition.

Fig 4: Well developed canopy

III. CANE MATURITY

1) Fruit Bud Development (51-80 days after sprouting)

a. After formation of inflorescence primordia the development takes place inside the dormant bud.

b. Apply Sulphate of Potash @ 87 kg/ac after 60 days from sprouting for bunch fixation and magnesium sulphate 12 kg/acre at 80 days.

c. Irrigate the vineyard @ 1,820 Lt/ac/day (at avg. evaporation of 3.25 mm). In case rain exceeds 4-5 mm/day, no irrigation is required.

2) Storage of food in Vine (81-110 days after sprouting)

a. Do not allow young shoots to grow and maintain the leaves in healthy condition.