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Fruit Pruning in Grapes

- *Do's & Don'ts*

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NRCG

National Research Centre for Grapes, Pune

Fruit Pruning in Grapes

- *Do's & Don'ts*

National Research Centre for Grapes

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Fruit Pruning in Grapes - Do's & Don'ts

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Preface

Grape is one of the major important fruit crops of the country grown in an area of 1,11,000 ha with an annual production of 12,35,000 tones. Prior to 1990's, the grapevines grown on own roots of commercial varieties were performing well since most of the grape growing regions were free from soil, water salinity and water scarcity. However, with the introduction of rootstock in grape cultivation, the changes in management practices became need of the hour to overcome these adverse situations. The major area under grape cultivation falls under semi arid tropical region where the vine impart continuous vegetative growth. Use of rootstock also induces more vigor to the scion. This may lead to excess vigour with reduced or no fruitfulness. Hence, double pruning and single cropping pattern is followed under this region.

Since the initial cost involved in vineyard establishment is very high compared to all other fruit crops, the efficient utilization of available resources and timely cultural operations to produce better quality grapes is highly essential. The yield in grapevine is dependent on fruitful canes developed during foundation pruning. Hence, the yield is decided based on the canopy management practices followed after foundation pruning to facilitate better fruit bud differentiation, optimize carbohydrate nitrogen ratio and also cane maturity.

Based on the fruitfulness achieved during the last season (after foundation pruning), the cultural practices are to be followed properly right from fruit pruning till harvesting to obtain better quality fruits. The quality fruits can be obtained only after all the technical knowhow is applied in the vineyard in timely manner. The grape is more amenable to cultural practices followed during growth stage. However, to achieve this, grower should be attentive

right from the fruit pruning. Deviation from any steps may result into major loss by means of reduction in yield through reduction in number of bunches and yield per vine, increase in pest and disease incidence, etc.

This bulletin deals in depth about the steps to be followed and its benefits to be obtained from fruit pruning till harvest of crop. In addition to this, the information on delay in following these practices or performing faulty practices which may result in losses by various means is illustrated through photographs. All the information has been substantiated through technical/ scientific explanation corresponding to particular operation as shown in the respective photographs.

The information given in the bulletin will serve as guidelines for the grape growers to follow the cultural practices after fruit pruning. Further, the bulletin is also handy for the growers as well as for the researchers and the students engaged in the research and development activities of grape.

Place : Manjri, Pune
Date : 03.03.2013

P. G. Adsule
(Director)

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1. Introduction

Grape (*Vitis vinifera* L.) is one of the major important fruit crops grown on an area of 1,11,000 ha with an annual production of 12,35,000 tones. Maharashtra is a leading state in area, production and also in quality accounting 60% of the total area under the crop in the country. Earlier, the vineyards were grown on their own roots since, the soil and water used for grapevine cultivation had no problem. However, with the introduction of rootstock in grape cultivation due to these adverse problems, the changes in cultural practices for the production of quality grapes became necessary.

Since the grape imparts more vigour under the tropical condition, the utilization of available resources becomes mandatory for the production of quality grapes. Hence, double pruning and single cropping pattern is followed in this region. The grapevine is amenable to the cultural practices followed during its life cycle. Considering the higher cost involved in vineyard establishment, meticulous management through cultural means should be given priority. Though the fruitful cane is developed during foundation pruning (back pruning) only, production of quality grape bunch is totally dependent on how much efforts have been put by the grape grower after fruit pruning. After fruit pruning, the vine passes through three different stages i.e. flowering stage, berry development stage and fruit maturity stage. To produce the quality grape bunch, the cultural practices are to be followed right from the pruning.

Using the scientific information at each stage it is possible to produce better quality grapes. The grape bunch fulfilling exportable quality requirement is as below.

Requirement for export quality bunch

Bunch weight – 400 to 500 g
Berry weight – 3.5 to 5.0 g
Berry diameter – 18 mm and above
Berry colour – Uniform green colour
Bunch appearance – Fresh, loose and shiny
Bunch – Should be free from pest and diseases and residue
Bunch – Should have more shelf life

Export quality bunch

To fulfil the requirement of quality bunch, the grape growers should be attentive at each growth stage from the fruit pruning. Deviating from any steps may lead to losses or reduction in the yield. In this bulletin, the information is given on what is to be done and what should not be done during fruit pruning so as to achieve the quality bunch. The information on headwise is substantiated through photographs.

2. Pre pruning operations

Trench opening and application of fertilizer

Do's

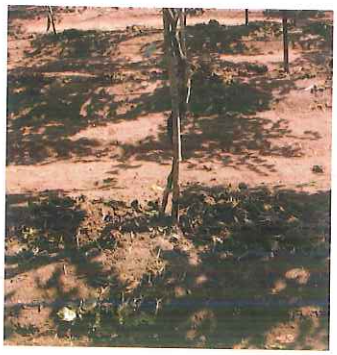
Application of fertilizer should be completed 15 days before fruit pruning. This will help to produce efficient white roots required for absorption of nutrient and water to nourish new growth. During this time, root cutting should not exceed 10%.

Don'ts

Exposure of more roots and also late trench opening may result into drying of roots and delayed white and new root formation. This stage does not match with the sprouting of new leaf and thus the balance between white root formation and shoot growth get disturbed.

Preparation of bund

Do's



After application of FYM and recommended fertilizers in the opened trench, the trench should be covered with soil. This will increase aeration in root zone and thus help in formation of new roots.

Don'ts



Under the condition of compact soil, there will not be proper feeder root formation required for nourishment of bunch after fruit pruning. The aerial root formation will also be experienced in the vineyard.

3. Leaf removal

Do's

Leaf removal should be carried out either by chemical or manually depending on condition available. In grafted vines, the leaf removal to be done 12-14 days before fruit pruning as compared to 6-8 days in own rooted vines. This helps in early and uniform sprouting of buds.

Don'ts

Fruit pruning without leaf removal in advance may result in delayed and irregular bud sprout. This also result into reduced bunch emergence.

4. Bud testing

Do's

Canes from different category (different diameter, sub cane and straight canes) are to be collected randomly from the plot. These canes are brought to the laboratory immediately after cutting to know the position of fruitful buds on a cane.

Don'ts

Pruning the canes without bud testing may result into loss of fruitful buds. There will be less bunches per vine. The yield per vine may also be reduced under the situation of severe pruning.

5. Pruning

Do's

Based on the bud testing result, pruning should be done. Under the situation of non availability of facility, pruning in sub cane to be done just above the knot whereas in straight canes, pruning at 6-7th bud position or at the place where the internodal distance is less.

Don'ts

If the proper pruning position is not followed, we may either loose the important bud or even in some cases, the fruitful bud do not sprout thus loosing the crop in that season.

Pruning position on sub cane

Do's



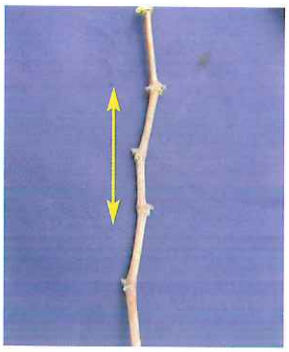
Prune the cane just near the knot. This helps to sprout the tiger bud that carries healthy bunch.

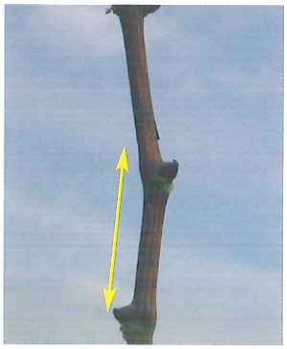
Don'ts


Leaving 2-3 buds above knot reduces the chances of sprouting of tiger bud. Sometimes, irregular bud sprout and also delay in sprouting is experienced in a vineyard.

Pruning position on straight cane

Do's





For straight canes, fruit pruning to be done at narrow internode position. This zone contains assured fruitful buds.

Don'ts

Pruning on straight cane without utilizing proper fruitful zone may lead to yield loss. Sprouting of unwanted buds may lead to severe exhaustion of vines.

6. Pasting with bud breaking chemical

Do's

Pasting with bud breaking chemical on apical 2-3 buds is desirable to reduce sprouting of unwanted buds.

Don'ts

Pasting all the buds on a cane may result into sprouting of all unwanted buds with loss of nutrients and crowding of canopy and also results in more disease incidence. It also adds to labour cost for removing excess shoots.

7. Removal of infected material

Do's

Immediately after the fruit pruning, remove all the infeted leaves from the canes, cordons and also from the trunk. This will help to remove the disease inoculum load thus minimizing the disease incidence during fruting season.

Don'ts

The infected portion if left on the canes or on cordon may promote the early disease infection at 3 leaf stage which is considered as the most sensitive stage for downey mildew incidence.

8. Bud sprouting and after care

Do's

Application of hydrogen cyanamide at proper concentration and also leaf removal before fruit pruning helps in proper and uniform bud sprout.

Don'ts

Sprouting of all the buds results into losses of reserve food material in the cane. This also lead to fillage formation.

9. Control of fillages

Do's



Clear weather and reduction in the moisture during bud swelling to sprouting stage helps to obtain enough inflorescence on a vine.

Don'ts



Do not allow water to stagnate in the field. This leads to conversion of fruitful buds into tendril. This condition is called as fillage.

10. Control of pest and disease

Do's

Spray of recommended insecticide during bud sprouting stage helps to control flea beetle and encourages better sprouting.

Don'ts

During the bud swelling stage, flea beetle becomes serious pest damaging the sprouting bud. This results in loss of shoot growth and also the reduction in number of bunches/vine.

11. Uniform sprouting

Do's

Uniform cane thickness as well as proper concentration of hydrogen cyanamide in addition to leaf removal in advance helps in uniform bud sprout.

Don'ts

Irregular cane size and also lower dose of hydrogen cyanamide may result in erratic sprouting and irregular bunch emergence.

12. Removal of excess shoots

Stage of shoot removal

Do's

Excess shoots are to be removed immediately after the bunches are visible. This will help to avoid the losses and also to utilize the reserve food material properly.

Don'ts

Late removal of excess shoots may result into loss of nutrients, increase in relative humidity in the canopy and also build up of disease inoculums.

Retention of number of shoots

Do's

Based on the cane diameter and also the spacing alloted to each vine, the shoots are to be retained. This helps in optimum sunlight harvest required for better photosynthesis and use of source to develop good bunch (the sink).

Don'ts

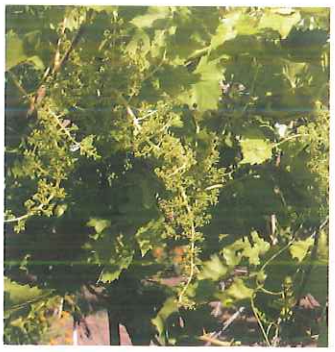
Retention of all the shoots will create the competition for food material required during bunch development. The lower layer of leaves will become yellow due to the lack of sunlight.

13. Removal of excess bunches

Do's

Based on spacing allotted to each vine and the purpose (local market vs. export), the bunches per vine should be retained and the excess bunches are to be removed during pre-bloom stage. This helps to avoid competition for food material in the vine.

Don'ts



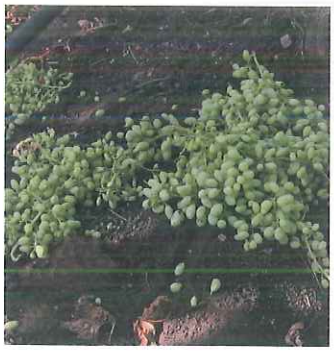
Heavy bunch load disturb the source : sink balance and thus the quality gets reduced. The target of quality bunch cannot be achieved.

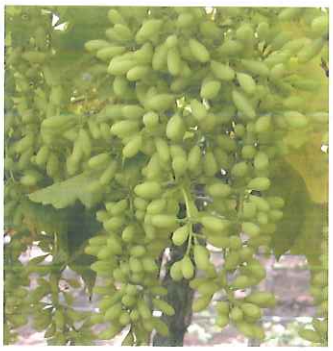
14. Stage of bunch removal

Do's

The excess bunches are removed during the pre-bloom stage only. This will help to utilize the source properly and increase berry size of all bunches uniformly.

Don'ts





Late bunch removal will lead to loss of nutrient and reserve food material from the vine. Due to competition among the bunches, the berry size will remain small resulting into reduced bunch quality.

15. Bunch retention based on cane diameter

Do's


Retention of single bunch for cane with 6-8 mm, 2 bunches on 8-10 mm diameter will help to develop the bunch properly.

Don'ts


Retention of all bunches on a cane than its capacity to supply food material will reduce berry weight and berry diameter. This will affect the berry quality.

16. Vigor of vine

Do's

Application of nitrogenous fertilizer to be restricted to discourage more leaves on shoots. Only 10-12 leaves above bunch is sufficient to nourish one bunch on a cane with 8-10 mm diameter.

Don'ts

Application of more fertilizer to the vine either through drip or foliar spray may disturb the source: sink ratio. Under such situation, only vegetative growth will be seen and the bunch size will either be small or even may result in fillage.

17. Application of growth regulators

First spray of gibberelic acid (GA_3)

Do's

Spraying of GA_3 @ 10 ppm at parrot green color stage of bunch results in proper bunch elongation during pre bloom stage. This helps to reduce the cost of berry thinning.

Don'ts

Use of excess dose of GA_3 result into thickening of bunch rachis and in severe cases, coiling of rachis also been observed.

Second spray of GA_3

Do's



Second spray of GA_3 @15-20 ppm at 5-6 days after the first spray will result in production of loose bunches with proper bunch elongation.

Don'ts

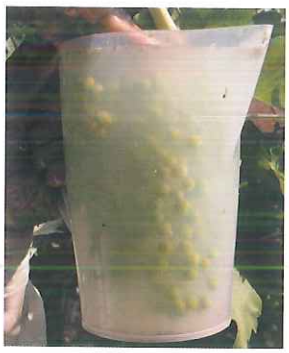

Either avoiding the second spray or delay in spraying GA_3 may result into small bunch and early flowering.

Dipping with GA_3

Do's

After the berry set, the bunches should be dipped in GA_3 @ 40 ppm + 6BA @ 10 ppm at 3-4 mm berry size only. All the berries of a bunch should be dipped in the solution to ensure uniform berry development.

Don'ts



Bunch dipping with GA_3 either in lower concentration or late application may result into reduced berry size.

18. Defects of bunch dipping

Do's

Dip the bunch in growth regulator solution with minimum concentration of stickers and shake it immediately after dipping. This helps in better elongations and berry size with good luster.

Don'ts

Use of excess concentration of stickers in growth regulators solution during bunch dipping may result in spots on berries. Those spots do not go even at the stage of harvest, thus spoiling the berry quality.

19. Berry thinning

Do's



Berry thinning should be done immediately after the first dip of GA_3. This helps in utilization of source in better way so as to achieve the berry diameter which is considered as important quality parameter.

Don'ts


Berry thinning at late stage does not help in improving the berry development as expected. The competition for food material among the berries in a bunch leads to smaller berry size at the time of harvest.

20. Girdling

Do's

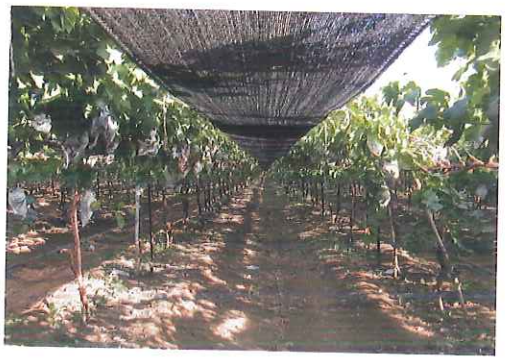
The girdling performed at proper berry development stage helps to achieve expected berry size of exportable standards. In Thompson Seedless, girdling should be performed at 4-6 mm berry size stage while in Sharad Sedless, it should be at 8-10 mm berry development stage.

Don'ts

Girdling at late stage and also during heavy crop load put the vine under stress in the next season. The increase in berry size cannot be achieved.

21. Use of shade net and bunch covering

Do's



Under the situation of reduced canopy and also shortage of water, the vine should be protected with shade nets. This helps in reducing the transpiration rate and also the uniform colour of bunches are maintained.

Don'ts

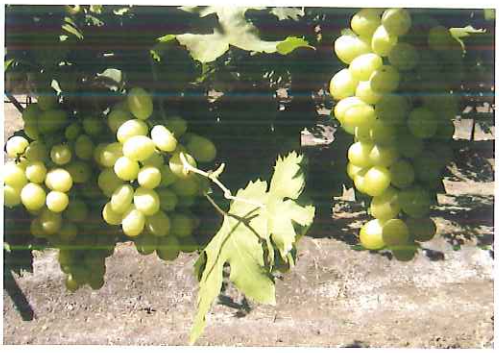
Under the situation of reduced canopy and also high temperature, the bunches shows the sun burn effect. The dessication rate in this bunches are higher than the shaded bunches. This type of bunches are not accepeted by the consumers.

22. Use of mulching in vineyard

Do's

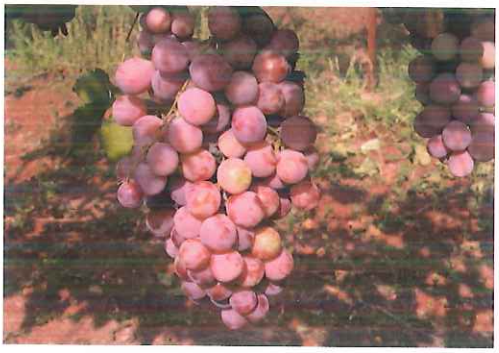
Under the condition of reduced irrigation water and high temperature, use of mulching helps to control the transpiration rate. This practice helps in saving the water and increase the efficiency of roots by activation of feeder roots.

Don'ts

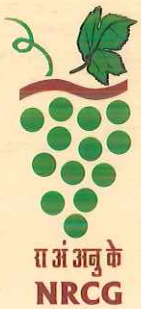


Without mulching, its adverse effect can be seen on berry development. Due to compactness in the bund, the active feeder roots development gets hampered. This reduces the berry development.

23. The bunches at harvest stage



Following all the recommended cultural practices, it is possible to achieve better quality grapes as shown in the photographs.



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