Model Answers

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE

SEMESTER END EXAMINATION

B.Sc. (Hons.) Horticulture

Semester	:	**V (New)**		**Academic Year** :	**2019-20**
Course No.	:	H/FS 358	Title :	**Plantation crops**	
Credits	:	3 (2+1)			
Day and Date	:		Time :	Total Marks :	80

Note : 1. Solve ANY EIGHT questions from **SECTION 'A'.**
2. All questions from **SECTION 'B'** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION – "A"

Q.1 Explain in brief importance and scope for cultivation of plantation crops in India.

Ans: Scope for plantation crops:

1. **Expansion in non-traditional areas:** As population and spice crops have restricted geographical distribution, the possibility of expansion in the traditional areas is limited. However, there is ample scope for expansion of area in non-traditional regions such as North Eastern States where there is irrigation potential. Due to the development of drip irrigation technology new area/non traditional area under plantation crops is increasing.

2. Export potential: Plantation crops earn foreign exchange.

Eg. Coir based products, Coir export and Coffee.

Main products and by-products not only have export prospects but also have considerable internal demand in several ancillary industry. Earning from export of plantation crops accounts to 27% of total agricultural Commodities and 4.8% of total export.

3. **Employment generation:** Cultivation of plantation crops provide year round gainful employment on the farm and factories.

Eg. Coconut provides for 78 man days/ha/yr. amounting to 70 million man days/year. in Kerala alone.

4. **Crop diversification:** These crops provide ample scope for diversification and there

by it creates sustainable agriculture.

5. **Availability of technology and yield gap:** Considerable information on recent technologies are available on these crops.Eg. CPCRI Kasargod, Kerala. NRC on Cashew, Shantigod, Puttur (D.K). and Various Agril. Universities, Res. Stations etc.

Importance of plantation crops:

1. Export earnings: Plantation crops occupy less than 3 per cent of the total cultivated area (i.e. 1.82 per cent of total crop land – 4 million ha. out of 143.00 million ha. i.e. around 2.3%).

2. Leading position in the world: India is leading in the total production of certain plantation crops in the world.

Eg: Tea, Cashew, Areca nut, Coconut and Rubber.

3. Employment opportunity: Plantation crops provide direct and indirect employment to many people.Eg: Tea- 20 lakhs people,cashew-5 lakhs people

4. Industrial importance: Production industry supports many by-product industries and also many rural industries. Eg: Coconut Fiber (obtained from husk) production in India is about 2.2 lakhs tones.

5. Conserving soil and ecosystem:

Eg: Tea and coffee with shade trees planted on hill slopes Cashew in barren

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Q.2 Describe the cultivation of arecanut on following points.

1. Soil and Climate **2.Propagation and planting**

3. Varieties **4.Mixed cropping**

1. Soil and Climate

Arecanut cultivation is predominant in gravelly laterite soils of red clay type of Southern Kerala and Coastal Karnataka. Arecanut needs deep and well-drained soil preferably not less than 2 meters, for development of root system. Laterite, red loam and alluvial soil are most suitable. The temperature should be a minimum of 4$_o$C (at Mohitnagar in West

Bengal) and a maximum of 40oC (at Vittal in Karnataka and Kannara in Kerala). However, the palm flourishes well within a temperature range of 14oC to 36oC.

2. Propagation and planting

The areca nut planted at the spacing of2. 7 m x 2.7 m is adequate. Square, rectangular, triangular and quincunx system of planting are used. Planting in proper alignment helps prevent sun scorching of the stem. In square system planting, the north-south line should be deflected at an angle of 35 degree towards west. About 12-18 months old seedlings are used for planting. Selected seedlings are removed with a ball of earth for transplanting. If they are raised in polythene bags, transporting can be done straightway to any distance without damage. May-June or the onset of monsoon is best time for planting. Pits of90 crn x 90 cm x 90 cm size are dug and filled with a mixture of top soil, farmyard manure and sand or top soil to a height of 50-60 cm from bottom. The seedlings are planted in the centre of the pit, covered with soil to the collar level and firmly pressed. Where higher water table prevails, seedlings are planted in shallow pits or in extreme cases on mounds raised for the purpose. In such conditions, earthing up is required in subsequent years to prevent exposure of roots.

3. Varieties: Sumangala, Sreemangala, Mohitnagar,Mangala

4. Mixed Cropping: In Kerla and tamilnadu cocoa is planted as mixed crop along with areca nut. In some areas along with areca nut cardamom and black pepper also taken as mixed cropping and this also fulfilled the requirement of partial shade for cardamom and black pepper cultivation

Q.3 Write in brief about cultivation of oil palm on following points

1. Soil and Climate **2.Propagation and planting**

3. Manuring and fertilizers **4.Oil extraction**

Ans:

1. Soil and Climate: Deep permeable soil rich in humus, Optimum pH 6.5 to 7.5,Oil palm is categorized as a humid tropical palm. It is a sun loving plant, requires bright sunshine of more than 5 hours, temperature of 20° C to 27 ° C.

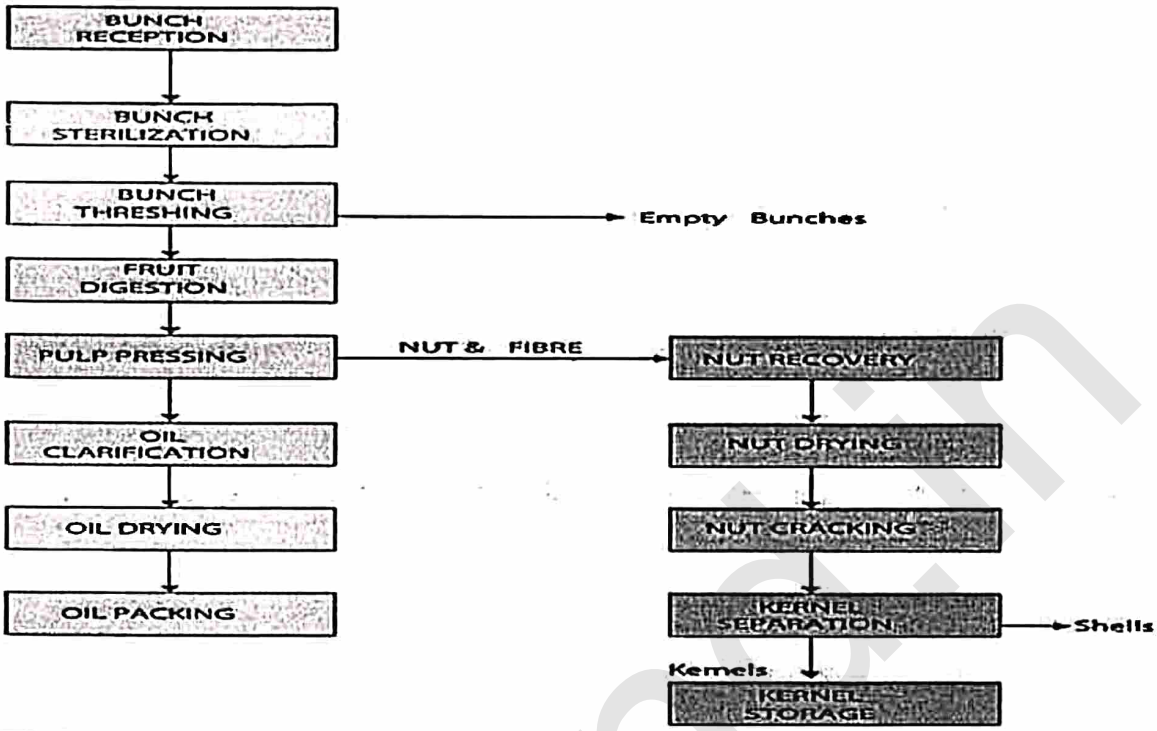
2. Propagation and planting: Oil palm is propagated mainly through seeds. A healthy germinated sprout with well-differentiated plumule and radical should be placed 2.5 cm deep at the centre of the bag. Planting can be done in any reason, preferable during monsoon period. About 10-14 months old seedlings 1-1.3 m height from base and 13 functional leaves with good girth at collar are used for planting. The seedlings are planted in the main field in triangular system at a spacing of 9 x 9m, accommodating 143 palms/ha. Pits of 60 cm x 60 cm x 60 cm size are dug and seed is placed in center of pit.

3. Manuring and fertilizers

FYM, 50 kg per palm per year, addition of neem cake @ 5 kg per palm is also beneficial

Full dose for adult palm is 1200g N, 600 g P_2O_5 and 1200 g K_2O per year per palm

4. Oil extraction



Q.4 Write in brief about cultivation of cocoa on following points

1. Soil and Climate **2.Propagation and planting**

3. Cocoa products **4.Harvesting and Yield**

1. Soil and Climate: Deeper and richer soils are favourable. The best soils are forest soils rich in humus. Soil pH 6.5 to 7 is ideal. Cocoa is a tropical crop, Temperature range of 15 to 39° C with a an optimum temperature of 25 ° is considered ideal. Temperature below 10 ° C and annual average temperature is less than 21°C. Cocoa responds well to high temperature (30 °C to 32 °C) than lower temperature.

2. Propagation and planting

Cocoa can be propagated both by seeds or vegetative methods. For raising seedlings, seeds of mature pods are taken from high yielding mother plants. The mother plants selected should yield more than 100 pods/year. The seeds generally lose their viability 7 days after harvesting. **Vegetative propagation**: Superior planting material of cocoa may be produced by budding and grafting. The different budding methods feasible are 'T',

inverted 'T', patch and modified forkert. The new method of micro budding also may be followed. The cocoa planted at the spacing of 2.5 m x 2.5 m to 3.0 m x 3.0 m

3.Cocoa Products : Cocoa powder, cocoa butter,chocolate,chocolate liquor

4. Harvesting and Yield

Harvesting: In cocoa yields started after second year, flowering to pod development takes 140 to 160 days. Under south Indian condition harvesting season is September to January

Yield: 20 to 35 kg ripe pods per tree or 100 - 131 pods per plant. Each pod will have 25-45 beans. Dry beans per plant

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Q.5 Write short notes on (Any two).

1. Plucking in tea 2. Top working in cashew 3. Processing of arecanut

1. Plucking in tea

It consists of collecting the newly grown vegetative shoots i.e., Harvesting in tea involves the regular removal of young shoots comprising an apical bud and 2 or 3 leaves, immediately below it. Tea crop consists of terminal buds and two or three leaves just below with the stalk. The retention of adequate maintenance foliage for the continued health and productivity of the bush is necessary.

Stage/Age of plucking: Plucking stage is attained when tea plant is of 3 to 4 years old. However, plucking stage under ideal management conditions is attained in 18 to 20 months stage.

2. Top working in cashew

As most of the existing cashew plantations are of seedling progenies, the yield level is very low and highly erratic. Hence, top working with improved clones are

suggested now. Trees of 20 to 25 years old are beheaded at a height of 0.5 m from the ground during December-February. A paste, made using 50 g, each of BHC 50 per cent wettable powder and copper oxychloride in a litre of water, should be applied all over the stump to check any infection by invading pathogens and borer insects. Profuse sprouting normally results in but only 10 to 15 healthy shoots and properly spaced on the stumps are alone retained. These shoots are grafted at softwood stage (cleft grafting) when they are about 40 to 50 days old. 7-8 successful grafts may be encouraged to grown and the sprouts should be periodically removed. Top worked trees grown vigorously due to the well established root system and they start yielding about 4kg per tree from the second year of rejuvenation and the yield gradually increases to stabilize at 8 kg from the fourth year of top working

3. Processing of areca nut

I. Ripe nut processing in arecanut (Kottapak) i.e., chali (dried ripe nut) : It is dried ripe whole nut. In *chali* preparation only ripe nuts are harvested. The out turn of *Patora* or Koka (lower grade produce) will be more if unripe nuts are harvested, which will fetch low price in the market. Fully ripe nuts are harvested (more than 9 months stage of maturity depending on the agro climatic conditions) from November to February and are sundried for about 40 to 45 days→ Dried arecanut are dehusked . Proper drying of the nuts is important to prevent fungal infection of the nuts in the drying yard.Chali preparation is mainly in Kerala, Karnataka Assam and Maharashtra

II. Tender nut processing/ Kalipak preparation:

1. **Nuts are harvested at 6 to 7 months stage of maturity.** At this stage the outer skin of the husk is dark green and nuts are soft and finger nails can be pressed into it.
2. **Dehusking:** Separation of husk from kernels
3. **Cutting** of soft nuts into pieces.
4. **Boiling** – Cut pieces of nuts are boiled in water in a container till the water becomes thick syrup. We can also use dilute extract from previous batch of boiling.

5. Kali or chogaru coating: Kali is the extract obtained during boiling of tender nut. Usually the same water is used for boiling 3 to 4 times. At this stage the water becomes concentrated called Kali. After boiling the arecanut are given coating with Kali to improve coloring. Kali coating is repeated to get glossy appearance. Kali contains many polyphenols.

6. Drying: It can be dried under sun or in an oven after draining the adhering liquid.

7. Coloring: Faulty drying, exposure to rain or delay in boiling results in bleached appearance to nuts due to lack of proper coloring. Thick syrup of Kali or chogaur is used to colour these dried nuts.

Q.6 Describe the cultivation of coconut on following points.

1. Soil and Climate **2.Propagation and planting**

3. Varieties **4.Harvesting**

1. Soil and climate: Light sandy soils to heavy soils with a pH - 5.2 to 8.0. Proper drainage, good water-holding capacity, presence of water table within 3 m and absence of rock or any hard substratum within 2 m of the surface. Altitude: 600 to 900 m, Rainfall: 200 cm per year.

2. Propagation and planting

Coconut is propagated only through seedlings. Selection of seedlings is an important criterion for obtaining quality planting material. Early germinated nuts having a faster rate of leaf production are correlated with early flowering and high nut production. In India, 9-12 months old seedlings are generally transplanted. Pruning of roots in seedlings up to 12 months does not cause any damage. However, in certain parts of Karnataka and Andhra Pradesh, 2-3 years old seedling are also planted particularly in areas subjected to flooding and poor drainage in soil. However, in such cases, considerable root damage occurs to seedling, resulting

in delayed establishment and early growth retardation. Coconut planted at a spacing of 7.5 m x 7.5 m about. In square system of planting a spacing of7.5 m or 9 m is ideal for tall varieties, accommodating 175 and 124 palms/ha

respectively. In triangular system, a spacing of 9 m accommodates about 140 palms. Hedge system of planting is also adopted particularly in case of establishment of seed gardens with dwarfs and tall planted in alternate rows in different spacing to facilitated easy hybridization.

3. Varities:

Hybrids: VHC1, VHC2 and VHC3

Tall: VPM3, ALR 1, ALR 2 and West Coast Tall

Dwarf (tender coconut): COD, CYD, CGD and MYD

Harvesting:

Stage of harvesting:

a) For getting copra fully matured nuts (Ripen nuts) are harvested.

b) For tender nut purpose: 6 to 7th months stage

Frequency of harvesting coconuts: Once in a month (In well maintained and high yielding plantations bunches are produced regularly and harvesting is done once in a month.) It varies depending upon the yield of the palms.

Number of harvests per year: Usually nuts are harvested 6 to 10 times in a year.

Season of harvesting: Year round harvesting. Inflorescence is produced in every leaf axils (12 to 14 leaves per year) leading to year round harvesting. However, main harvesting season is summer.

Q.7 Write about the cultivation of cashew nut on following points.

1. Soil and Climate **2.Propagation and planting**

3. Varieties **4.Harvesting and yield**

Cashew is very sensitive to water logging and hence heavy clay soils with poor drainage conditions are unsuitable for its cultivation. Excessive alkaline and saline soils also do not support its growth. Otherwise cashew grows in almost all soil types and performs very well in red sandy loams laterite soils and coastal sands. Cashew comes up

well when the soil pH is in acidic range. More than 8 . pH is not suitable for its commercial cultivation. Though cashew is considered , to be very hardy and drought resistant, it grows better where water table is high. Best production is noticed up to the altitude of 400 m with at least 9 hr sunlight/day fromDecember-May, Cashew grows well at reasonably high temperatures and does not tolerate prolonged periods of cold and frost especially

during the juvenile period. However, temperature above 36°C between the flowering and fruiting period could adversely affect the fruit setting and retention. Cashew can adapt very well to dry conditions as it is hardy and drought

resistant. However, it perform very well where at least a minimum of600 mm of rain is received in a year. Prolonged dry spells, frost, foggy weather and heavy rains during flowering and initial fruit setting adversely affect fruit set and

production.

Propagation and planting

Considerable success has been reported in epicotyl grafting but due to the poor realization of transplantable grafts and mortality in the nursery due to collar rot has made it commercially unproductive method. Soft wood grafting is most successful and commercially viable technique, giving 70% success rate. It is similar to that of epicotyl grafting, except the age of the root stock.

Planting

Planting of soft wood grafts is usually done during monsoon season (July-August) both in the west coast and east coast. A spacing of7.5 m x 7.5 m or 8 m x8 m is recommended for cashew (175 and 156 plants/ha). A closer spacing of 4 m x 4 m (625 plants/ha) in the beginning and thinning out in stage and thereby maintaining spacing of 8 m x 8 m by the tenth year can also be followed. These enable higher returns during the initial years and as the tree grown in volume, the final thinning is done. However, in leveled lands it is advantageous to plant the grafts at a spacing of 10m x 5 m, accommodating 200 plants/ha. Normally cashew grafts are planted in pits of 60 cm x 60

cm x 60 cm size. It is preferable to dig the pits at least 15-20 days before planting and expose them to sun so that the termites and ants. Pits should be completely filled with a mixture of top soil, compost (5 kg) or poultry manure (2. Kg) and rock phosphate (200 g). A small drainage channel of the elevated side of the pit is made to divert the rain water to the sides of the pit in sloppy lands. In such areas, it is preferable to plant the grafts along with the contour. At the top of the pit, especially in the sloppy areas, catch pits should be opened across the slope to trap rainwater and also to prevent soil erosion. Usually, 5-12 months old grafts are used. Immediately after planting, the basin around the grafted should be mulched with green leaves. This suppresses weed growth and conserves soil moisture.

Varieties

About 33 varieties of cashew have been released. Most of them have a mean yield of 8 10 kg/tree or 1.0 tonnes/ha. Cashew varieties recommended for different states.

Andhra Pradesh: BPP 4. BPP 6. BPP 8 and VRI 2

Karnataka :Chintamani I, Selection I, Selection 2, Ullal I, Ullal 2, Ullal 3, Ullal 4

Maharashtra: Vengurla 1 and Vergurla 4, Vengurla 6

Harvesting and Yield

Cashew plants start bearing 3 years after planting. They provide full yield by tenth year and continue giving remunerative yields for a further period of20 years. Cashew nuts are harvested during February-May. Only fully mature nuts should be harvested. Usually, the nuts are picked after they fall off from the trees. Best quality nuts are obtained when freshly fallen fruits are collected. The apples are removed and the nuts are sun dried for 2-3 days to reduce moisture from 25% to below 9%. With proper drying, the kernels retain their quality particularly the flavour. However, if cashew apples are used for processing, it is better to harvest them from the trees without damaging the apples. The mature nuts sink in water while the immature/unfilled ones float. This test could be used

to find out whether the nuts are mature or not. The nuts should be collected at weekly interval in the season. Ripe apple for fresh use should be picked almost daily. The area under trees should be weed free and swept clean to facilitate nut collection. On an average a tree provide 2 kg nuts at the age of 3-5 years, 4 kg (6-10 years) to 5-10 kg at 11-15 years and more than 10 kg at 16-20 years.

Q.8 Write short notes on (Any two).

1. Tapping and preservation of rubber 2. Wet method of coffee processing

3. Tipping and harvesting of tea

Ans

1. Tapping and preservation of rubber

Latex produced in the bark tissue is harvested through a process called tapping. Tapping is a controlled wounding process during which thin shavings of bark are removed. During tapping latex containing laticiferous vessels which are concentrated in the soft bark and arranged in a series of concentric rings of interconnecting vessel is cut open. Tapping is initiated when about 70% of the trees in a plantation attain tappable girth. A budded tree is regarded as tappable when it attains a girth of 50cm at a height of 125cm from the bud union. It usually takes 7 years for a rubber plant to attain tappable girth. Thus tapping is a highly skilled operation. The tapping panel is usually made as a spiral around the trunk covering half of the girth. Tapping is generally done once in 3 days. Tapping is done early in the morning using a special knife. On an average, a tapper can tap about 300-400 trees/day. During rainy seasons tapping can be done by fixing suitable polythene shades as rain guard over the tapping panel. During extreme climate such as drought and severe winter tapping rest is commended for a couple of weeks to avoid stress to the trees. The national average yield is 1.6tonneslha/ year. The average yield of a well-managed plantation of RRII 105 is *2.4tonneslhal* year which can be still higher in better plantations. Latex contains on an average 32% dry rubber content. After tapping, latex drips for 1-2 hr are collected in small cups. Once the dripping is over, the latex is collected from the cups and processed into crepe rubber, sheet rubber, preserved latex, latex concentrate or block rubber.

2. Wet method of coffee processing

Harvest only just ripe fruits for processing.

⇩

Use mats during harvesting to prevent gleanings.

⇩

Sort out over ripe and green fruits before pulping.

⇩

Pulping should preferably be done soon after harvesting.

⇩

Wherever possible follow natural fermentation and manual washing for removing mucilage.

⇩

Use clean water for washing of parchment

⇩

Soaking of washed parchment under water for 4-6 hours would help in upgrading the quality of beans.

⇩

Sort out unpulped fruits, fruit skin and other extraneous matter before drying of parchment.

⇩

Drying of wet parchment initially on wire mesh trays for 1 to 2 days and then on tiled/concrete yards should be adopted for maintaining the quality.

⇩

In small holdings where pucca drying yards are not available, polythene sheets or tarpaulins may be used for drying of coffee

⇩

Do not dry the coffee on mud/ cow dung plastered surfaces

⇩

Dry the parchment slowly by spreading up to desired thickness

3.Tipping and harvesting of tea

Tipping: It is the first round of harvesting of young shoots. Good frames could be developed with correct tipping. The first plucking of recovering bushes is called tipping. The objective of tipping is to establish a level plucking surface, to provide adequate maintenance foliage for the quick production of secondary branches.

Harvesting of tea : Harvesting in tea involves the regular removal of young shoots comprising an apical bud and 2 or 3 leaves, immediately below it. Tea crop consists of terminal buds and two or three leaves just below with the stalk. The retention of adequate maintenance foliage for the continued health and productivity of the bush is necessary.

Stage/Age of plucking: Plucking stage is attained when tea plant is of 3 to 4 yeas old. However, plucking stage under ideal management conditions is attained in 18 to 20 months stage. Young leaves with more of **tannins and polyphenols** produces better quality tea than old leaves with less tannin content. Maximum yields (stable/economical stage of yield) are obtained in 6th or 7th year and there after the yields remains constant.

Q.9 Describe in short the cultivation of beetel vine on following points

1. Soil and Climate **2.Propagation and planting**
3. Training of vines **4.Yield**

1. **Soil and climate:** Well drained fertile clay loams are suitable. It does not tolerate saline and alkaline conditions. Betelvine require a cool shade, considerable humidity and regular supply of moisture in the soil.
2. **Propagation and planting:** The vines are propagated by terminal stem cuttings or sets about 30 – 45 cm long. Sets obtained from the top portions of the vines are easy to root and hence best for planting. Number of sets 1,00,000/ha. Sets with vigorous apical buds and nodal adventitious roots are selected and planted at the base of the live supports, which are to be planted 4 to 5 months earlier. The crop is planted in two rows in beds of 180 cm width on Agathi plants with a spacing of 45 cm between plants in the row.

3. Training of vines

Training of the live Standards: Before the establishment of vines the side branches of Agathi trees upto a height of 2 m are removed for early creeping of the vines.

Training of the vines: Training is done by fixing the vine at intervals of 15 to 20 cm along the standards loosely with the help of banana fibre. Training is done every 15 - 20 days depending upon the growth of vines.

Lowering of vines: Under normal cultivation, the vines grow to height of 3 m in one year period. When they reach this height their vigour to produce normal size leaf are reduced and they need rejuvenation by lowering during March - April. After the vine is lowered a number of tillers spring up from the nodes at the bends of the coiled vines at the ground level and produce many primary vines. After each lowering, irrigation should be given.

4.Yield: 75 to 100 lakhs leaves/ha/year.

Q.10 Describe the cultivation of palmyrah palm on following points.

1. Soil and Climate **2.Propagation and planting**

3. Yield **4. Tapping methods**

1. Soil and Climate

It prefers deep, sandy and loamy soils, through can come up on varied types of soils.

The most congenial situations for its favorable development are Low sandy plains.The Palmyrah can come up well in dry areas having moderate to low rainfall. It grows from sea level up to an altitude of 750m.

2. Propagation and Planting:

Palmyrah is propagated by seed nuts, nursery raised seedling and self sown seedlings are used for propagation. Seed nuts are collected from middle aged tree of 30-40 years old plants

Planting: Planting will be done at spacing 3m x 3m, If triangular system of planting is adopted it accommodates 500 trees per ha.

3. Yield: Only in female palms 50 to 200 fruits in 6 to 12 bunches per tree per year

4. Tapping

The extraction of sap from the inflorescence is called tapping which is the most important use of this palm. Tapping varies with the age and sex of the palm. Only Neera is obtained female palms. It yields 30 to 50 per cent more sap than male palms. Age at first tapping : 10 to 12 years after planting if properly managed otherwise it is about 15 years.

Economical life /Yielding age : The trees continue to yield for 30 to 40 years. The spadices of palmyrah, on tapping yield a delicious sugary sap, known as the sweet toddy Neera on fermentation gives toddy Palmyrah is extensively tapped for the sweet sap which is fermented into country liquor (toddy) or boiled into raw sugar. Trees of both sexes are tapped though the female palms are yielding 35 to 50 per cent more sap than male palms

Tapping methods

1. Aripanai Method: In male palm sheath of young inflorescence (using 2 weeks old inflorescence) is removed and allowed to dry for three days. The end is cut every time and pot is tied to the inflorescence. It is practiced for 1 to 1 ½ months.

2. Vellupanai: (Using comparatively old inflorescence of one month) Here also male palms are selected but inflorescences are of one month old. Each male spike (bearing sessile flowers) is pre-treated by pressing and stroking .Three to six such spikes are brought together, wrapped with leaves and fitted to a pot. Female palm: The tissues of young female inflorescence are softened by hitting the main axis of the inflorescence with iron rod and the fork is used to press the regions from which the fruits develop. Thus in cases of female palms the fruiting branches are tapped when the drupes are still very small.

SECTION 'B'

Q11. State True or False

1. Coconut is a monoecious crop.: **True**
2. Coffee belongs to family Rubiaceae : **True**
3. Cashew apple is rich source of vit-c.: **True**
4. Skiffing is practiced in Tea.: **True**
5. Collar pruning is practiced in coconut : **False**
6. Pink disease is observed in Rubber plantation : **True**
7. Chilling temperature for flowering is compulsory for Plantation crops : **False**
8. Rhinoceros beetle pest observed in coconut: **True**

Q.12 Give examples of each

1. Betelvine variety: **Kapoori, Bangla**
2. Coffee variety: **Sln 795, Sln 7, Sln 9, Sln 10**
3. Pest of tea: **Tea mosquito**
4. Palmyrah palm belongs to family: **Palmae**
5 Central Plantation Crop Research Institute is located at : **Kasaragod,Kerla**
6. Cashew varieties evolved at RFRS, Vengurla: **Vengurla 1, Vengurla4 and 6**
7. Cocoa belongs to family: **Sterculiaceae**
8. Rubber belongs to family: **Euphorbiaceae**

Signature of Course Instructor
Name : Dr. Prashant.S.Joshi
Mobile no:8830907723

Signature of Head,
Department of Fruit Science
Name: Dr.S.G.Bharad
Mobile No.:9657725711

Head,
Department of Fruit Science
Dr. P.D.K.V., Akola