Quality planting material production in Cashew

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Introduction

Cashew is one of the major dollars earning horticultural crop. In India, cashew is mainly grown in Kerala, Karnataka, Goa and Maharashtra along the west coast, Tamil Nadu, Andhra Pradesh, Odisha and West Bengal along the east coast and also spreading in non-traditional areas like Bastar region of Chattisgarh, Jarkhand, Gujarat and North- Eastern hill region. At global scenario, though India occupied second largest area under cashew cultivation (18.76 %), but contributes only 16.33% in production. India is lagging behind in productivity of raw cashew nuts (761.2 kg/ha) compared to Vietnam (3041.2 kg/ha.) (FAO, 2017). In India, the established processing capacity of raw nuts is around15-20 lakh tones, where the domestic contribution is around 7-8 lakh tones. But presently, domestic requirement also has grown up tremendously besides export earnings. Thus, presently India has been importing raw nuts from African countries to the tune of 9-12 lakh tones to meet the demand of domestic cashew processing industries. Of later, the import possibility from many of the other countries is dwindling, as several countries have setup processing facilities.

Factors for low productivity

The main factors associated with low productivity are non-uniform seedling progenies, cultivation under degraded sites, severe infestation of cashew stem and root borer (CSRB) and tea mosquito bug (TMB). Among these, seedling progenies of non descript origin is one of the prime factors for low productivity in cashew because of their high degree of heterozygosity. Hence, vegetative propagation is considered as suitable method to develop uniform and healthy cashew plantation. Different methods of vegetative propagation namely layering, grafting, and budding have been tried in cashew at Directorate of Cashew Research and various cashew research stations in country. The studies indicated the superiority of softwood grafting over other vegetative propagation methods. Hence, this technique has been recommended for commercial multiplication of quality planting material in cashew. As a result of area expansion, the demand for quality planting material is gaining in linear phase

which required to be attended with immediate effect. The ICAR- Directorate of Cashew Research located in Puttur, Karnataka in India has worked a year around for supply of quality softwood grafts to farmers. The present requirement of cashew planting material in the country is around 75-80 lakh grafts per annum.

Advantages of soft wood grafts

- Soft wood grafts are true to type in nature but seed propagated plants are highly heterozygous in nature
- Soft wood grafts are precocious and early bearing over seedlings
- Use of grafted plants helps to develop uniform shape and size to plantations
- Helps to induce dwarfness
- Helps to establish uniform orchards
- Responds well for package of practices

Establishment of scion bank

Scion bank should be established with recommended cashew varieties adapting a closer spacing of 3 × 3 m in order to get continues supply of scion sticks. The plant should be manured with recommended dose of NPK (750 g N, P_2O_5 – 125 g and K_2O- 120g per plant) fertilizers during monsoon season to get adequate number of scion sticks. The tender shoots should be protected from Tea Mosquito Bug and other sucking pest by giving timely spray of insecticides. The canopy of plants in scion bank should be maintained at a reachable height by regular pruning and purity of the variety is verified by allowing a branch to flower and fruit in each plant in the initial year for verification. The pruning of trees may be carried out in scion bank during September-October. Establishment of nursery requires resources such as nursery area, water source, minimum nursery implements and most importantly the scion bank (budwood orchard) of elite cashew varieties.

Closer view of Scion bank

Selection of scion and precuring

Non-flowered lateral shoots of current season growth (3-5 months old) which should be about 10-12 cm long, straight with pencil thickness, brown coloured dormant plumpy terminal buds can be selected as scion stick. The selected shoots are precured a week before by clipping of leaves leaving behind petiole stubs. The pre cured scions should be detached from mother tree before terminal bud sprouts and collection should be done early in the morning to avoid desiccation.

3-4 months old scion shoot Pre cured scion shoot

Production of healthy rootstocks for grafting

Seed nuts selection

Seed nuts are collected during the peak harvesting period (March and April). The seed nuts of 6-7 g can be selected and sun dried for 2-3 days. Preferably seed nuts can be collected from a single variety and floaters be separated out. Such graded seed nuts can be stored for 4-6 months in gunny bags under ambient condition without much exposure to heat and cold.

Sowing of seeds

Seed nuts should be soaked in water for 12-24 hours before sowing in order to get better and uniform germination. The soaked seed nut are sown in poly bags sized 25 X 15 cm size containing pot mixture of red soil, sand and FYM at 1:1:1. The seed nut is dibbled in friable pot mixture facing stalk-end upwards. During summer, mulching with paddy straw may be done till germination takes place. Watering should be done regularly during summer months and alternate days at rainy days to maintain sufficient soil moisture. Seed nuts usually germinate after 10-15 days of sowing depending on season. About 2-3 months old, 25-30cm height seedlings can be selected as rootstock for grafting.

View of poly bags covered with paddy straw

Healthy rootstocks ready for grafting

Softwood grafting technique

Top portion of the selected root stocks are decapitated at the height of 15-20cm from ground level, retaining four bottom leaves. A cleft of 6-7cm deep is to be made in the middle of decapitated portion. A scion stick of 10cm length, matching with root stock thickness can be selected and given a wedge shape cut of 6-7cm length at the cut end of the scion. The wedge of the scion is inserted into the cleft of root stocks and the graft joint is firmly tied with 30 X 2cm, 100 gauge polythene strips.

The grafts are capped with 20 X 4cm, 200 gauges thick polythene tubes to avoid drying of scion portion. After 2-3 weeks the polythene caps are removed gently and the grafts are moved to open condition for hardening. The grafts with success of 70-80% can be obtained after 3-4 weeks of hardening.

Sequential steps in softwood grafting

After Care/ Management of cashew grafts in Nursery

- Grafts should be watered daily during dry periods and excess watering should notbe done during rainy season.
- During summer months (March-May) grafted plants should be protected from scorching sun by providing partial shade (35-50%) with the help of shade nets.
- During heavy rains excess water should be drained out.
- Need based bordeaux mixture spray (1%) or carbendazium 0.1% may be done during rainy season as a prophylactic spray to control fungal diseases.
- Shoots arising from leaf axils on the rootstock (below the graft union) should be removed regularly.
- The polythene strip should be removed from graft union after 3-4 months after grafting to avoid girdling.
- Grafts produce flower panicles during flowering season (November-December) irrespective of age. Such panicles should be removed as and when observed.

Overview of cashew grafts hardening in the nursery

Plant protection measures

- The germinated seed nuts are attracted by rodents and birds. Prophylactic application of 5% malathion dust or 0.05% chlorpyriphos spray can solve this problem.
- Heavy watering during rainy season results in collar rot or damping off of seedlings. This can be overcome by need based drenching the soil with 1% Bordeaux mixture or 0.1% carbendizim. Covering the poly bags with laminated shade nets before rainy season.

- Tender and newly emerge shoots are highly susceptible to tea mosquito bug, leaf eating caterpillars and other sucking pests. Quinolphos or monocrotophos at 0.15% spray at shoot emergence stage can reduce this infestation.

Graft standards for sale

- More than 5 months old grafts are ideal for field planting
- The height of grafted should be more than 45 cm
- The grafted plant should have at least 4-5 fully matured leaves
- The grafted union should be at a height of 15-20 cm from the collar region
- Grafts should be healthy and erect growing
- The polythene strip should be removed from graft union before sale
- The graft joint should be perfect without any girdling or constriction
- The side shoots arising from rootstock should be removed before sale

Varieties recommended for different states

State	Suitable varieties
Tamil Nadu	Vridhachalam-3, Vridhachalam-5
Kerala	Dhana, Kanaka, Madakkathara-2 , Priyanka, Vridhachalam-3
Andhra Pradesh	BPP-4, BPP-8, Dhana, VRI-3
Karnataka	Chintamani-1,NRCC-2, Ullal-1, Ullal-3, Ullal-4, UN-50, Bhaskara, Vengurla-4, Vengurla-7, Vridhachalam-3, Madakkathara-2
Maharashtra	Vengurla-4,Vengurla-7, Vengurla-9
Goa	Goa-1, Goa-2, Vengurla-4,Vengurla-7
Odisha	Bhubaneswar-1, Bhubaneswar-2, Dhana, BPP-8
West Bengal	Jhargram-1, BPP-8
NEH region	Priyanka, Ullal-4, NRCC-2, Vengurla-4

Role of ICAR-DCR in cashew research

ICAR-Directorate of Cashew Research, Puttur is pioneer institute for cashew research. The institute was identified as National active germplasm site (NAGS) for maintaining more than 539 different accessions collected from various parts the country. The organization has a

tremendous role in production and supply of elite planting material. Every year around 2-5 lakhs cashew grafts are produced and distributed to different cashew growing states. Training programmes on nursery management, production technology, pest and disease management and post-harvest, value addition and processing are conducted to different group of beneficiaries.

List of approved cashew nurseries in Karnataka

The demand for planting material is rising up every planting season due to attractive prices of raw cashew nuts in recent years. In Karnataka and kerala many of the rubber growers are replacing the rubber plantations with cashew. In the recent years, stipulate for elite planting material has crossed several lakhs. With the increasing demand of cashew grafts, many of the government and private firms have came up in taking the action of quality planting material production and the list is furnished below.

1. ICAR-Directorate of Cashew Research, Puttur, Karnataka
2. Agricultural Research Station, Chinthamani
3. Horticultural Research Station, Ullal, Mangaluru
4. Karnataka Cashew development corporation Ltd., Lady Hills, Mangaluru
5. Regional Research Station, Brahmavar

Besides, several cashew nurseries in plantation corporations, state horticulture departments, agricultural and horticultural universities and several DCCD, Kochi recognized nurseries in the private sector are also producing planting material for local need.

Conclusion: Application of standardized nursery techniques will help for rapid multiplication of genuine quality planting material in cashew. Use of quality softwood grafts from certified nurseries will helps the farmers to establishment of uniform orchards with early and precocious bearing, which leads to higher the productivity.

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