Commercial Nursery Management in Cashew

DIRECTORATE OF CASHEW RESEARCH
(Indian Council of Agricultural Research)
Puttur – 574 202, D.K., Karnataka

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Cover Photograph:

Stages of Softwood Grafting

Photo Credit:

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FOREWORD

Cashew (*Anacardium occidentale L.*), a native of North Eastern Brazil, was introduced to India and Mozambique during the 16th century and from there it gradually spread to tropical regions of Africa and Asia. Today, cashews account for 17 percent of global tree nut production, making it the third most popular tree nut after almonds and walnuts. The increasing demand for cashew kernels in the world market led to a doubling of global cashew production between 2000 and 2018. Cashew holds an important place in achieving the sustainable development goal as the sector helps to reduce poverty through employment generation and rural development. India has been witnessing an increased demand for cashew kernels in the domestic and global markets and as a result, our country has emerged as one of the largest importers of raw cashew nuts. In this context, a major thrust is given to increase the domestic production of raw cashew nuts in the country. The production of quality planting material assumes great significance in the light of the above discussions. Since the 8th five-year plan, cashew is commercially propagated through softwood grafting. Several initiatives have been taken by central and state governments and line departments to establish more nurseries and also to upgrade existing nurseries to enhance their production potential to meet the planting material requirements of various cashew-growing states.

Keeping in view of the above facts, this technical bulletin on "Commercial Nursery Management in Cashew" will serve as a guide to the scientific management of cashew nurseries. Efforts have been made to give comprehensive information starting from the establishment of scion banks to nursery accreditation and rating of Cashew nursery.

Place: Puttur – 574 202
Date: 22nd March, 2022

(T.N. RAVIPRASAD)
Director (Acting)

COMMERCIAL NURSERY MANAGEMENT IN CASHEW

INTRODUCTION

Cashew is a polygamo monoecious type i.e. flowers are either bisexual or staminate but both occur intermixed in the same inflorescence. This species is a cross-pollinated crop and plants propagated using seeds do not produce true to type and they exhibit variation in their progenies. The clonal progenies are true-to-type of the mother plant and give relatively more uniform yield and come to bearing earlier than the seedling origin plants. The earlier efforts made on different vegetative propagation techniques (layering, grafting, and budding) at ICAR-Directorate of Cashew Research, different cashew research stations in the country as well as All India Coordinated Research Project on Cashew (AICRP-C) centres have concluded the superiority of the "Softwood grafting" technique over other methods of propagation and hence, this is recommended for commercial reproduction of cashew varieties for large scale spread.

Grafting or graftage is the art of producing plants vegetatively by joining tissues of plants so as to continue their growth together. The upper part of the combined plant is called the scion (bud, bud stick) while the lower part is called the rootstock having a root system (Fig. 1). Various steps involved in the commercial-scale production of cashew varieties by "Softwood grafting", the establishment of scion bank, nursery maintenance, and nursery accreditation are detailed in this technical bulletin.

Fig. 1: Components of a graft (from left to right)

a) The scion stick
b) Rootstock
c) Graft

ESTABLISHMENT AND MAINTENANCE OF SCION BANK

The primary task of establishing of commercial nursery requires the establishment of Scion bank for the desired varieties as per the saleable graft demands.

Production of Scion

Cashew varieties recommended for different cashew growing states should be selected (Table 1). For the production of scion sticks the recommended cashew varieties should be established by adopting closer spacing of 4m X 4m (Fig. 2). The plants should be manured with the recommended dose of NPK (750g N, 125g P2O5, and 125g K2O per plant) fertilizers at the monsoon season to obtain adequate production and continuous supply of scion sticks for commercial multiplication. The scion bank produces tender shoots and needs to be protected against tea mosquito bug and other sucking insect pests by taking up timely sprays of insecticide like acetamiprid (0.5 g per lit.) or λ-cyhalothrin (0.003%) or thiamethoxam (0.2g per lit.). The emergence of inflorescence and flowering is discouraged in the scion bank to maximize the production of lateral shoots and requires pinching the inflorescence. The scion bank should always be maintained at a desirable height hence, detopping is followed by maintaining a height of 1.5m to 2.0m from ground level, and pruning the deadwood is necessary and need to follow annual pruning. The cut ends of shoots should face towards the ground to avoid the entry of rainwater which may lead to decay or attack of pest and disease incidence if the cut ends of shoots after pruning is exposed. The cut ends should be treated with Bordeaux paste (10%) and the plants are sprayed with Bordeaux mixture (1%). The stem borer grubs are to be identified and killed by inserting a gear wire / any other bending metal wire and poking into the tunnel till a slushy sound is heard or white fluid flows out (post grub extraction prophylactic treatment). The excavated portion of the trunk should be swabbed with fipronil (2.0 ml per lit.), and imidacloprid (2.0 ml per lit.). Pruning of trees may be carried out during September/ October months in scion bank (Fig. 2).

Fig. 2: Scion bank maintained at ICAR-DCR, Puttur

Table 1: Cashew varieties recommended for growing in different states

State	Varieties recommended
Karnataka (Coastal area)	NRCC Selection-2; Bhaskara, Ullal-1; Ullal-3; Ullal-4; UN-50; Vengurla-1; Vengurla-4; Vengurla-7
Karnataka (Plain area)	Chintamani-1; Chintamani-2 and Dhana
Kerala	Madakkathara-1 (BLA 39-4); Madakkathara-2 (NDR2-1); K-22-1; Dhana; Priyanka; Kanaka; Amrutha and VRI-3
Maharashtra	Vengurla-1; Vengurla-4; Vengurla-6; Vengurla-7
Goa	Goa-1; Goa-2; Vengurla-1; Vengurla-4; Vengurla-6 and Vengurla-7
Tamil Nadu	VRI-3 and VRI (CW)-5
Andhra Pradesh	BPP-4; BPP-6; and BPP-8
Orissa	Bhubaneshwar-1; BPP_8 and Dhana
West Bengal	Jhargram-1 and BPP-8

RAISING OF ROOTSTOCK SEEDLINGS

Selection of seed nuts

- Collect the freshly harvested seed nuts (February-April) preferably VTH-174, V-4, MDK-2.
- The seed nuts should be sun-dried for 2-3 days.
- Select medium size nuts (6-7g)
- Every year required to collect the seed nut freshly for raising rootstock
- The seeds gradually lose viability after 8-10 months of storage.

Preparation of potting mixture and filling of polythene bags

- The potting mixture should be prepared in the proportion of 1:1:1 (red soil; coarse river sand: compost) in heavy rainfall areas and 1:1 (red soil: Compost) in low rainfall areas. Rock Phosphate @ 5g/kg of the potting mixture may also be added for getting good root growth of seedlings.
- Polythene bags of 25 cm x 15 cm size and 300 gauge thickness should be used for filling potting mixture.
- In heavy rainfall areas, 30-40 drainage holes of 0.5 cm diameter may be punched uniformly on the polythene bags. In low rainfall areas, the number of drainage holes can be few.
- Potting mixture should be filled up to the brim level (Fig. 3).
- The filled bags should be arranged in beds of 1000 numbers each (100x10).

Fig. 3: Preparation of polybags filled with media and arranged in beds

Sowing of seed nuts

- The cashew seeds should be soaked in water for 12-24 hours before sowing. Seeds need not be pre-soaked during the rainy season.
- The seeds should be dibbled in the center of the polythene bags, stalk-end upwards, and covered with little soil (Fig. 4).
- The depth of the sowing should be not more than 2.5 cm.
- Immediately after sowing and every day after sowing the seedbeds should be watered depending upon the weather conditions.
- During rainy days, if water stagnation is observed, excess water should be removed by pressing the sides of bags.
- During dry months seedbeds may be mulched with paddy straw till the germination takes place. Agro shade nets may also be used for this purpose.
- The seeds will germinate 10-15 days after sowing depending on the weather condition (Fig.5).
- Seeds should be sown at regular intervals (weekly/fortnightly) to get a continuous supply of desired rootstock seedlings for grafting depending upon the number of grafters available.

Fig. 4: Seed sowing and mulching

Maintenance of seedlings in the nursery

- The seedlings should be watered daily depending upon the weather conditions.
- During monsoon season, if water stagnation is observed, the polythene bags may be pressed from sides, so that the excess water drains out of the bags. This reduces the incidence of collar rot/damping-off of seedlings.
- During the rainy season, the seedlings should be sprayed with Bordeaux mixture (1%) at 10 days intervals to control collar rot/damping-off of seedlings.
- The seedlings may be sprayed with systemic insecticides such as acetamiprid (0.5 g per lit.) or λ-cyhalothrin (0.003%) or thiamethoxam (0.2g per lit.) to control tea mosquitoes and other pests at regular intervals.
- The side shoots arising from the axils of leaves should be removed frequently in order to get vigorous seedlings with a single main stem.

Fig. 5: Germinated seedlings

SOFTWOOD GRAFTING TECHNIQUE

Selection of scion sticks and precuring

- Avoid selection of thin and short scion sticks
- Scion shoots free from pest damage should be selected

- Avoid collection of scions from shade areas/canopy
- Select non-flowered lateral shoots of the current season's growth (3-5 months old)
- The leaves are to be removed using a secateur (precuring or defoliation) 10 days in advance of grafting (Fig. 6).
- The selected shoots should be 10-12 cm long, straight, uniform round with brown coloration, and of pencil thickness.
- The precured scions should be separated from the mother tree well before they sprout.

Fig. 6: Process of precuring scion

Collection of scions

- The scion sticks should be separated from the mother tree preferably during morning hours.
- The precured scion sticks should be collected from the mother trees before the terminal buds sprout.
- The length of the scion should be 10-12cm.
- The detached scion sticks may be dipped in cold water and then placed in a polythene bag of 100-gauge thickness and brought to the grafting shed and utilized for grafting.
- For distance transport of scion requires the use of sphagnum mass for packing the scions and icebox for transport is desired during hot days.

Preparing the rootstock seedling for grafting

- The grafting operation should be carried out under the shade either in a grafting shed or makeshift shelters.

- About two-month-old seedlings (of 25-30 cm height) are selected as rootstocks. The girth of the seedling should be about 1cm at the place of grafting.
- On selected rootstock seedling, two pairs of bottom leaves are retained and the other leaves are removed with a sharp grafting knife.
- Then the terminal shoot is decapitated at a height of 15 cm (where the softwood portion is available for grafting).
- A cleft of 6-7 cm deep is made on the decapitated stem.
- From the inner sides of the cleft a little portion of the wood is removed at the tip.
- Preparing the scion stick for grafting
- If the scion stick is longer, then it should be reduced to a length of 10-12 cm by cutting off the excess portion at the bottom.
- Very short scion sticks should be discarded.
- The scion stick should be carefully mended into a wedge shape of 6-7 cm long. However, care must be taken to retain the bark on either side of the wedge.
- The cut surface should be smooth and it should not be soiled at the time of preparing the wedge.

Grafting technique

- The wedge of the scion is inserted carefully into the cleft of the rootstock. If the scion is thicker in girth, then care must be taken to match the cambial layers of both rootstock and scion at least on one side with the help of a finger.
- Then the graft joint is secured firmly with a polythene strip (2.0 cm wide, 30 cm long, and 100 gauge thickness).
- Then a long and narrow white polythene cap (20 cm x 4 cm size and 200 gauge thickness) is inserted on the grafted plant.
- After 3 weeks, the polythene caps are removed gently and the grafts are shifted to an open area in the nursery.
- At the time of removing the caps, about 70-80 percent of the grafts show sprouting.

SEASON OF GRAFTING: The grafts in cashew can be produced almost throughout the year with a mean graft success of 65-70 percent. Grafting may be suspended from December to January as there will be poor graft success in winter.

MANAGEMENT OF GRAFTS IN THE NURSERY: The Cashew grafts produced in the monsoon season (June- November) are to be maintained at the nursery till the next planting season (July-August). Consequently, the following points should be considered:

- In the nursery, the grafts should be arranged in beds after spreading black polythene sheets on the ground to prevent the grafts from striking roots into the ground. Otherwise, frequent shifting of grafts from one place to another place is required which is labor-intensive.
- The grafts should be watered daily depending upon the prevailing weather conditions. During the heavy rainy season, if water stagnation is observed in the polybags, then the excess water must be removed by pressing the sides of the bags.
- During the summer months, the grafts should be provided with partial shade by erecting pandal and covering with agro shade nets (35-50% shading). As soon as the monsoon starts, the shade should be removed. Complete shading should be avoided as it results in lanky and weak growth of grafts. Laminated shade nets (35% shading) can also be used.
- During the rainy season, the grafts may be sprayed with Bordeaux mixture (1%) at 10-15 days intervals. Spraying should be done when the weather is clear.
- The grafts may be sprayed with systemic insecticides such as monocrotophos (1.5 ml/liter) or acetamiprid (0.5 g per lit.) or λ-cyhalothrin (0.003%) or thiamethoxam (0.2g per lit.) to control insect pests such as tea mosquitoes, leaf minor, leaf-eating caterpillars, etc.
- Frequent removal of side shoots arising from the rootstock portion of the grafts should be carried out. The flower panicles if any from the grafts in the nursery should be removed frequently.
- Practice of removing polythene strip should be followed from the graft joint after 4-5 months of grafting. If not, there will be girdling at the graft joint. However, the polythene strip should be removed before selling the grafts.
- After three-four months of grafting, the bottom leaves on the rootstock portion of the graft should be removed.

ESTIMATED COST OF GRAFT PRODUCTION

- On average 65-70 percent of saleable grafts can be realized on a commercial scale. The estimated cost of production depends upon the cost of inputs (cost of materials and labor), for producing about 50,000 saleable grafts, and the estimated amount required at Puttur, In Dakshina Kannada, Karnataka is given in Table 2.

Table 2: Material and labour required for producing 50,000 saleable cashew grafts and estimated cost of graft production

Total graft to be produced: 72,000 Nos.

Material	Quantity	Rate (Rs)	Amount (Rs)
1. Seeds	600 kg	150	90,000
2. Bags			
a) 25 cm x 15 cm (black); 300 gauge	500 kg	140	70,000
b) 30 cm x 30 cm; 100 gauge (Binding graft and scion)	25 kg	180	4,500
c) 20 cm x 4 cm; 200 gauge (Capping of graft union)	57 kg	180	10,260
3. Black sheet 300 gauge (2m width) (120 kg for grafts; 80 kg for seedlings)	200 kg	150	30,000
4. Potting mixture			
a) Soil	15 loads @ 200 cft/load	1550	23,250
b) Sand	13 loads @ 200 cft/load	10,000	1,30,000
c) Compost/Cattle manure	13 loads @ 200 cft/load	17,400	2,26,200
d) Rock phosphate @5g/bag	360 kg	6.66	2,397.6
5. Chemicals			
a) Copper Sulphate	20 kg	240	4,800
b) Lime	20 kg	30	600
c) Chlorpyriphos	1.5 litres	400	600
6. Scion sticks	72,000 nos.	2	1,44,000
7. Miscellaneous (Shade nets 18 nos. Sillpauline 5 nos. etc.)	---	---	76,100
Total cost of materials	---	---	**Rs.8,12,707.6**

Labour	Mandays	Rate	Amount
1. Potting mixture preparation and bag filling	170	500	85,000
2. Sowing/maintenance of seedlings	320	500	1,60,000
3. Precuring/ scion collection	144	500	72,000
4. Grafting (@2.50 Rs./graft)			1,80,000
5. Maintenance of grafts in Nursery for 10 months	660	500	3,30,000
Total cost of labour	-	-	**Rs. 8,27,000**
Total input cost	-	-	**Rs.16,39,707.6**

GRAFT PRODUCTION UNDER LOW-COST POLYHOUSES

- By employing low-cost poly houses, softwood grafts can be produced almost throughout the year. Low-cost poly houses prepared from casuarina poles/areaca reapers etc. and covered with Silpaulin brand plastic film (natural color) of convenient dimensions (preferably 11 m long and 6 m wide sheets with eyelets at a regular distance) may be utilized for grafts production. The height of the poly house in the centre should be 2.0-2.25 m and the height in the sides should be 1.0 m. Depending upon the cost of material (Silpaulin sheet, poles, GI wire ,etc.) and labour, each poly house may cost about Rs. 3000/-. Each poly house may accommodate about 4000 filled bags of 25 cm x 15 cm size and about 6000 filled bags of 20 cm x 12.5 cm size.

- Raising of rootstock seedlings, grafting of rootstocks, and further maintenance of grafts can be done inside the poly house. This will save the labour required for supplying rootstock seedlings from the nursery area to the grafting shed and the shifting of grafts from the grafting shed to the nursery area. The poly houses will also give protection to the seedlings and grafts during the heavy rainy season and reduce mortality due to fungal diseases. The plants may be watered using a hosepipe fitted with a fine rose. Misting units may also be fitted at suitable points and switched on for about 5-10 min at an interval of 2 hours from 10 AM to 6 PM during the summer months. This reduces the temperature build-up inside the poly houses. During the summer months, the Silpaulin sheet has to be removed and a shade net (35-50% shade) is to be used.

MANAGEMENT OF CARRY OVER GRAFTS IN THE NURSERY (ADVANCED NURSERY)

- The unsold grafts in the nursery require maintenance and need to adopt regular nursery practices, unlike the fresh grafts.
- Grafts should be arranged in beds after spreading black polythene sheets on the ground to prevent the grafts from striking roots into the ground.
- Partial shade (35-50%) should be provided in the summer months
- The grafts are to be watered daily
- Rebagging is essential and should be carried out carefully without disturbing the ball of earth with polybags (26cm x16cm).

- Rebagging must be done well before the onset of severe summer.
- Before rebagging, the grafts should be watered to ensure the ball of earth is wet and the root systems are not disturbed.

SEASONAL INFLUENCE ON GRAFT SUCCESS

- Higher success in the case of softwood grafting is achieved in the seasons in which fluctuation in the day and night temperatures are minimum and high humidity is prevalent throughout the day. This type of weather condition is prevalent during the monsoon season (June-November) on the West Coast. During other seasons, the graft success is slightly reduced due to the non-availability of proper scion sticks and unfavorable weather conditions. However, grafts can be produced almost throughout the year with a mean success of 65-70 percent.

GRAFT STANDARDS FOR SALE

- More than 5-month-old grafts are ideal for planting in the field.
- The height of the grafted plant should be more than 30cm.
- The grafted plant should have at least 4-5 fully matured leaves.
- The graft joint should be at a height of 15-20cm from the collar region.
- The graft should be healthy and erect growing.
- The graft joint should be perfect without any girdling or constriction.
- The polythene strip should be removed from the graft joint before the sale.
- Side shoots arising from the rootstock portion should be removed before sale.
- The polythene bag should be intact, not a tome.

IMPORTANT DO'S AND DON'TS

- The length of the scion should be 10-12 cm with pencil thickness.
- Very short scions and very thin scions should not be collected for grafting.
- For raising uniform and vigorous rootstocks, always collect seeds from a single variety block and use graded seeds (medium size and dense seeds).

- Application of good quality compost/cattle manure is a must to raise healthy and vigorous seedlings with proper stem girth.
- Pre-soaking of seeds for 12-24 hours helps in quicker and good germination.
- Seeds should be sown at weekly/fortnightly intervals to get a continuous supply of desired rootstock seedlings.
- To control the collar rot incidence in the germinating seeds and young seedlings of less than one month old, spraying of Bordeaux mixture (1%) during the rainy season at 10-15 days intervals is to be done.
- At the time of grafting two pairs of the bottom, leaves should be retained on the rootstock and a cleft of 6-7 cm deep is to be made at a height of 15-20 cm.
- The scion should be mended into a wedge shape of 6-7 cm in length.
- The cut surfaces of the wedge should be smooth and they should not be soiled or disturbed by touching with fingers.
- At the time of grafting, the cambial layers of both rootstock and scion should be aligned at least on one side with the help of a finger.
- The graft joint should be secured firmly with a polythene strip of 2.0 cm width and 30 cm length and 100 gauge thickness. Thicker gauge strips should not be used, as this results in loose tying and failure of graft joint to heal. Moisture may also enter through the graft joint resulting in rotting at the graft joint.
- The grafted plants should not be allowed to strike their roots into the ground. In order to overcome this problem, arrange the grafts on a black polythene sheet (300 gauge thickness) in the nursery.
- During summer months the grafts should be provided with partial shade (< 50% shade) using agro shade nets/coconut fronds. Complete shading should be avoided. Shade nets should be removed when once the monsoon sets in.
- The suckers arising from the rootstock portion of the graft, and flower panicles arising from scion should be removed.
- The polythene strip from the graft joint should be removed after five months of grafting, before girdling takes place at the graft joint.
- Before sale, the grafts in the nursery are to be hardened by withholding water or watering on alternate days.

GUIDELINES FOR NURSERY ACCREDITATION AND RATING OF CASHEW NURSERY

- Availability of true-to-type, quality planting material is crucial for the success of commercial horticulture. This necessitates having a network of horticulture nurseries that confirm model nursery standards in terms of infrastructure, quality of seed and planting materials, and adoption of nursery management practices. The state government ensures the supply of quality planting materials for fruit crops by enactment of the fruit nursery (Regulation) Act and enforcement of its provisions through licensing of horticulture nurseries.
- As per the information available in the report of the working group on horticulture for XI five-year plan, at present only 8 states have adopted the nursery act and in 9 states system of registration/monitoring exists for nurseries. Whereas in 13 states there is no nursery act present.
- National Horticulture Mission has taken the initiative to specify the nursery standards by specifying the Infrastructure, required for setting up of model horticulture nurseries, etc. ICAR has recently come out with technical specifications of horticulture planting material and its production procedure.
- A recognized model horticulture nursery should function as a reliable source of supply of quality planting materials.

Scope

- To establish a network of quality nurseries across the country for the purpose of propagation and distribution of quality planting materials.
- The recognition shall be accorded to the nurseries for;
- Production of quality planting material of one or more specified crops by adopting good nursery management practices.
- Nursery premise only where the sale of specific quality planting material of recognized source is being carried out by creating necessary infrastructure facilities and proper record keeping.
- The recognition shall be accorded to the nurseries for the crops specified in the document of recognition.

- The recognition shall be accorded to the nurseries for the crops specified in the document of recognition.
- Recognition shall be granted as such after up-gradation as per the requirement.
- Nursery farms licensed under the state act by the competent authority shall be given provisional recognition for a period of one year under the purview of this scheme but their financial recognition will be subjected to assessment by a technical committee.
- Recognition of the nursery with NHB shall be period specific.

Procedure for Nursery Recognition and renewal of recognition

- The nursery seeking NHB recognition shall apply in form-1 to NHB HQ at Gurgaon. Each such application shall be accompanied by the layout of the nursery showing location of infrastructure components and land utilization plan, details of technically qualified staff in the nursery, major farm pieces of machinery, and operational manual prepared by the nursery for selection and maintenance of mother plants, a process followed for the production of planting material and management of the inventory of planting material.
- The nursery shall submit the details regarding the source of mother plants used for propagation of horticulture plants in a prescribed form (FORM-1) and also maintain the register for the sale of plants.
- The application form duly filled and completer along with necessary enclosures shall be submitted to NHB, Head Office at Gurgaon.
- Each application will be considered by NHB based on the criteria specified for recognition of nursery
- The recognition of nursery by NHB shall generally be considered product wise/aspect-wise.
- On receipt of an application for recognition assessment would be done by the agency identified by NHB with the help of the technical committee.
- Agency shall submit its assessment report to NHB along with recommendations.
- On the basis of the assessment report, NHB shall decide whether to register the nursery with or without up-gradation
- The decision of NHB shall be conveyed to the concerned nursery. In the case of recognition, the period of validity of recognition with other terms and conditions shall be indicated. In case of any deficiency, the nursery shall be given a time frame for compliance failing which

the application shall be rejected. In case of requiring additional assessment, visits may be undertaken.

Criteria for Nursery assessment

- The criteria have been aligned with the infrastructural requirement of the model nursery and product-specific technical requirements and adoption of good nursery practices for propagation of good quality planting material as detailed below:
- Product-specific criteria to assess the capability and competence of nursery follow technical program for specific crop as laid down in Handbook of seed and planting material testing manual for horticulture crops prepared by ICAR.
- Prescribed Nursery management practices and adoption of the Model layout plan.

Assessment Criteria: A system of Graded Certification

- It is essentially different from licensing of horticulture nurseries under the provision of some act or administrative orders. It is based on continuous evaluation of the source of parent material propagation in disease-free conditions by the adoption of technically prescribed method, adoption of good nursery management practices, reliable record-keeping, and training of staff. Each parameter will be critically examined by the assessment team as per the laid down criteria.

Score	Stars	Recommendations
Up to 40	No star	Not eligible for accreditation
41 to 60	*	Good
61 to 80	**	Very Good
81 and above	***	Excellent

Processing fee

- Processing fee of Rs 5000/- (non-refundable) shall be submitted in the form of a demand draft payable at NHB Gurgaon along with the application for recognition
- In case of renewal of recognition processing fee of Rs 3000/- (Non-refundable) shall be submitted in the form of a demand draft payable at NHB Gurgaon along with the application for renewal.
- Government/ SAUs/ICAR nurseries are exempted from the processing fee

Assessment

- The members of the assessment committee shall be nominated by NHB in consultation with the agencies concerned. Assessment will be conducted as pre-assessment, final assessment, and periodic / surveillance of nurseries. The committee will submit a report on their recommendations to the agency designated by NHB for this purpose.

Validity period of recognition

- After approval initially, the recognition shall be granted for a period of two years
- The effective fate of recognition shall be considered from the date of issuance of the certificate.

New entries at ICAR-DCR

Varieties	Suitable area	Characteristic features
Nethra Jumbo-1 (H 126) Release year: 2021	Cashew growing districts of West coast region of Karnataka and Kerala	Jumbo weight (12 g) Cluster bearing, Uniform nut size, kernels grade with W-130, And 50 % reduction in manpower for harvest, Easy peeling of testa is the striking feature.
Nethra Vaaman Release year: 2020	Dakshina Kannada, Udupi, and Uttara Kannada districts in the Coastal Zone of Karnataka and Kerala and semi malnad areas where similar soil and environmental conditions exist.	The variety is having the criteria of slow growth, precocious bearing, small size nuts, and attractive small size cashew apples with less fiber content and crispy nature. The growth rate is even less than 2m in height and less than 6m spread in 10 years and moderate pruning is required for its maintenance if it is very close to planting. Hence, this can be recommended for ultra-density planting. Prolonged bearing (4-5 months) is observed in this variety. It is also amenable for homestead gardens, terrace gardens, and for making Bonsai.
Nethra Ganga (H-130) Release year: 2018	Dakshina Kannada and Udupi Districts	The hybrid H-130 is a bold nut variety having a nut weight of 10-13 g, with a premier grade kernel (W110 -W150). It is a cluster bearing type having high precocity with 6-8 nuts per panicle. The variety has high shelling percentage (29.5%). it is highly responsive to pruning. Hybrid H-130 is a high yielder than earlier released varieties Bhaskara and NRCC Sel. 2.



Nethra Jumbo-1 (H 126)

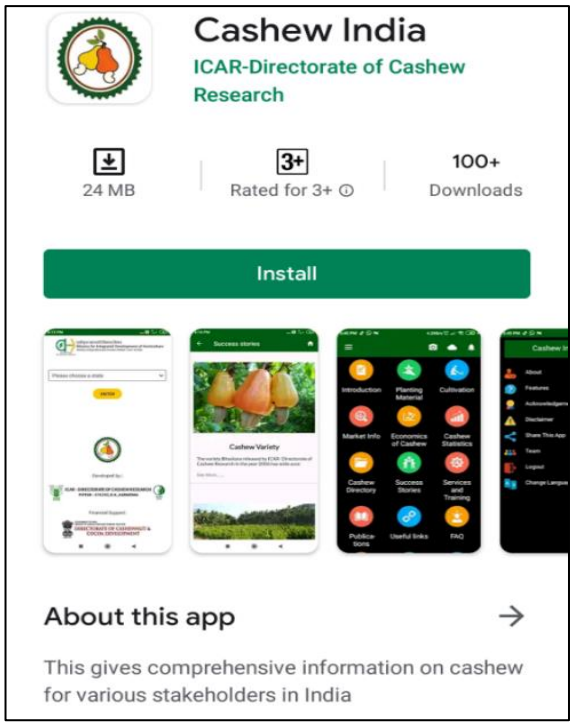


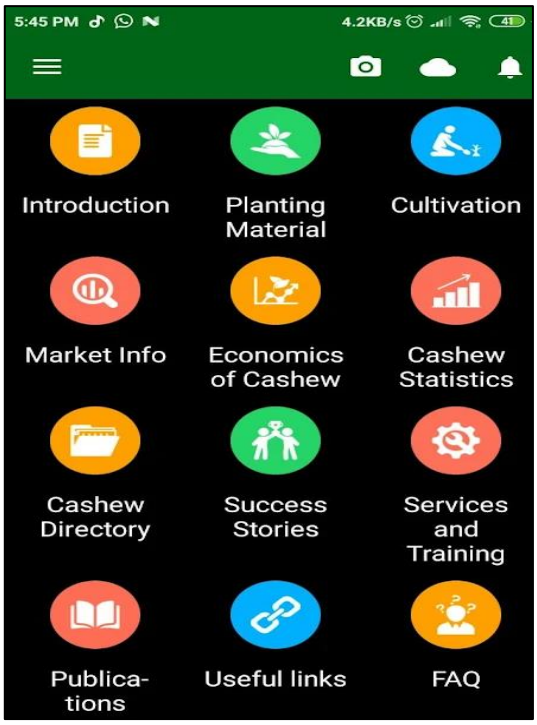
Nethra Ganga (H 130)


Nethra Vaaman

CASHEW GRAFT SALES

- Cashew grafts can be booked in advance from our Directorate either through e-mail or an android mobile application (Cashew India) developed from our Directorate available on the play store and website https://cashew.icar.gov.in/.





STATE-WISE LIST OF CASHEW NURSERIES

Sl. No.	State	Varieties
	Karnataka	
1.	Director, ICAR – Directorate of CashewResearch, DarbeP.O, Puttur, Karnataka – 574 202. Ph: 08251- 230902/231530/236490	**H-130** **Bhaskara Ullal - 1,3,4VRI-3** **V-4, V-7** **Dhana Priyanka** **Madakkathara**
2	Smt.Vanitha N.Y, Yashaswi Cashew Nursery, Near MahaVishu Murthy Temple,Ullal, Kuria – 574 210, Puttur, D.K., Karnataka. Mob:09449033758	**V-4** **Ullal-1 Bhaskara** **VRI -3** **Ullal-3**
3	Dr. C. Sunil, Farm Superintendent, Agriculture and Horticulture ResearchStation, Bhavikere, Tarikere Taluk, Chickmangalore Dist., Karnataka - 577144 Ph: 08261 – 255122	**V-4** **V-7** **Ullal-2**
4	Prof. & Head, Agriculture and Horticulture ResearchStation, Kapikad, Ullal, Dakshina Kannada, Mangalore -575020 Ph:0824-2466249	**Ullal-1 Ullal-2** **Ullal-3UN- 50**
5	Kerevase Nursery Karnataka Cashew DevelopmentCorporation Ltd., Abbakkanagar, 1st Main, Kottara,Mangalore-575 006. Ph: 0824-2457724/2457227 Fax: 0824-2457724	**Vengurla – 4**
6	Badal Nursery Karnataka Cashew DevelopmentCorporation Ltd., Abbakkanagar, 1st Main, Kottara,Mangalore-575 006. Ph: 0824-2457724/2457227 Fax: 0824-2457724	**Ullal-1** **Ullal-3** **Ullal-4** **Priyanka** **Selection-2** **Bhaskara** **Dhana**
7	Gujjady Nursery,Kundapur Karnataka Cashew DevelopmentCorporation Ltd., Abbakkanagar, 1st Main, Kottara,Mangalore-575 006. Ph: 0824-2457724/2457227	**VRI-3** **Vengurla-4** **Ullal-1** **Ullal-3**

8	Valalu Nursery,Kundapur Karnataka Cashew DevelopmentCorporation Ltd., Abbakkanagar, 1st Main, Kottara,Mangalore-575 006. Ph: 0824-2457724/2457227 Fax: 0824-2457724	**VRI-3** **Vengurla-4**
9	Shri.Chetan K,Proprietor, M/s Nethravathi Nursery Dasakodi, Balthila Post, Bentwal, D.K, Karnataka. Mob: 08105068165/09741130998	**Bhaskara** **Ullal- 1** **Vengurla- 4 & 7** **VRI- 3**
	Tamil Nadu	
10	Smt. S.Vijayalaksmi,Sri.Amman Nursery, Cuddalore Rd., V.Santhamangalam(P.O),VridhachalamTaluk, Cuddalore – 606 001, Tamilnadu. Mob: 09865245007/ 09715547407	**H-1 VRI-2VRI-3**
11	Shri.R.Ranganathan, Renganathan Cashew nursery,Pudukoorapettai, Vridhachalam, Cuddalore,Tamilnadu- 606001, Ph:09443577058	**VRI -3**
12	Shri. A. Danavel, Sri Murugan Nursery, Pudukooraipettai,Kuppanatham, Vridhachalam, Cuddalore, Tamilnadu-606 001 Mob: 9865197550	**VRI-3** **VRI(cw)H-1**
13	Shri. D.Xavier, M/s. Annai Velankanni Nursery,Pudukuraipettai Village, Vridhachalam, Cuddalore, Tamilnadu –606 001. Ph: 04143 – 239032/ 09894112554	**VRI-3** **VRI(cw)H-1**
14	Shri. Sadhasivan, M/s. Rasi Nursery and Landscaping, Pudukooraipettai,Kuppanatham, Vridhachalam, Cuddalore, Tamilnadu-606 001 Ph:09865050529	**VRI-3** **VRI(cw)H-1**
15	Shri. S. Selvakumar, M/s. Sri Lakshmi Nursery,Cuddalore Main Road, Pudukuraipettai Village, Vridhachalam, Cuddalore,Tamilnadu – 606 001. Ph:09788560821/08667229729	**VRI-3** **VRI(cw)H-1**

16	Smt. S.Sumathi, M/s. Rasi Nursery, Cuddalore Main Road, (North)Pudukuraipettai Village, Kuppanatham (P.O), Vridhachalam, Cuddalore, Tamilnadu – 606 001. Ph:09976986724/09942421717	**VRI-3** **VRI(cw)H-1**
17	Shri.R.Palani, M/s Prahadeeswaran cashew nursery, Chinnakandiyankuppam, T.Gopurapuram Post, Vriddhachalam Tk., Cuddalore Dt. Tamilnadu – 606 001Ph:09750023724	**VRI-3**
18	Shri. R.Venkatesan, M/s. Sri Dhanalakshmi nursery Cuddalore Main Rd., Pudukooraipettai,Tamilnadu – 606 001 Ph: 09626567148	**VRI-3** **VRI (cw) H-1**
19	Shri.G.Murugan, M/s. Karthika Nursery,Cuddalore Main Rd., Pudukooraipettai, Tamilnadu – 606 001 Ph: 09585093161	**VRI-3** **VRI (cw) H-1**
	Maharashtra	
20	Shri.YeshwantDhundirajSarvate,M/s. Rameshwar Nursery,A/P Kunde, Khandarawadi, Tal-Kudal, Sindhudurg Dist.,Maharashtra – 416520. Mob. 09422374401/09637083264	**Vengurla-4** **Vengurla-7**
21	Shri.PratapMahadevArolkar,M/s Arolkar Farm, At Post, Tendoli, Kudal Tal, Sindhudurg, Maharashtra-416520.Mob: 09422381430	**V-4** **V-7** **V-9**
22	Shri.Purnand Raghunath Naik,M/s Sudha Saurabh Nursery, At/Post Gulwan, Tal-Malwan, Sindhudurg-416 604. Ph: 02365 – 227733 Mob: 09422374134	**V-4** **V-7** **V-9**
23	M/s Manohar Nursery At/Post Nandgaon, Tal-Kanakvalli,Dist-Sindhudurg - 416 601, Maharashtra. Ph: 02367-248541/ 09422393618	**V-4** **V-7** **V-9**
24	Shri.SharadPanduragMorajkar,M/s Hirwai Nursery, At/Post Golwan, Tal-Malwan, Sindhudurg - 416 604. Ph: 02365 – 227718 Mob: 09421238499/ 9421190629	**V-4** **V-7** **V-9**
25	Shri.Mahadev Parshuram Hodawadekar M/s Hodawadekar Phalodyan, Nawarwadi, Vengurla, Dist-Sindhudurg - 416516,	**V-4** **V-7** **V-9**

	Ph: 02366 - 262578 Mob: 09423300975 / 09423881269	
26.	M/s. Rameshwar Nursery, A/P Kunde, Khandavawadi, Tal Kudal, DistSindhudurg, Maharashtra Mob: 9637083264 /9422374401	**V-4** **V-7**
27	Shri. NileshaBhagwanRawale,M/s. Nilesha Nursery, BhagawanRawale, At & Post, NerurJakat, Kudal – Taluk, Sindhudurg-416625Ph: 02362-222988	**V-4** **V-7**
	Odisha	
28	Shri. K. JaiSankar Naidu M/s. Laxmi Progeny Orchard, Vill-Fakira, Block- Kolnara, RayagadaDistrict, Odisha – 765001. Ph:09437818136	**Vengurla-4** **BBSR-1** **H1608**
29	Shri. Sanat Kumar Moharana,M/S. Shakti Nursery, At – Tangi, P.O. Kotasahi, Dist. Cuttack – 754 022, Odisha. Ph: 0671- 2873510 Mob: 09337258007	**V – 4 H-2/16** **H- 1680** **Balabadhra** **Jaganatha**
30	Odisha University of Agriculture Science & Technology, AICRPC,Cashew Research Station, Bhubaneswar – 751 003. Odisha. Ph: 0674 – 2397970/2397818/ 2397692 Fax: 0674- 2407780	**Jaganatha** **V-7 & V-4** **Balabhadra** **BPP-8** **VRI-3** **Bhaskara** **Dhana**
	Nurseries under Odisha State Cashew Development Corporation Ltd.,	
31	Solar Nursery, Odisha State Cashew DevelopmentCorporation Ltd., Jaipur, Odisha. Ph: 0674 – 555532/ 550855	**V-4**
32	Raijhar Nursery, Odisha State Cashew Development Corporation Ltd., Jajpur, Bandha Palli,Byree, Odisha. Ph: 0674 – 555532/ 550855	**V-4** **H-2/16**
33	Khatnahata Nursery, Odisha State Cashew DevelopmentCorporation Ltd., Khatanahata, Dhenkanal, Odisha. Ph: 0674 – 555532/550855	**V-4** **H 2/16** **VRI 3** **Ullal**
34	Bhangamal Nursery, Odisha State Cashew DevelopmentCorporation Ltd., Bhangamal, Dhenkanal, Odisha. Ph: 0674 – 555532/550855	**V-4** **Jagannath** **H-2/16**
35	Khunta- II Cashew Nursery, Odisha State Cashew DevelopmentCorporation Ltd.,	**H 2/16** **H- 1608**

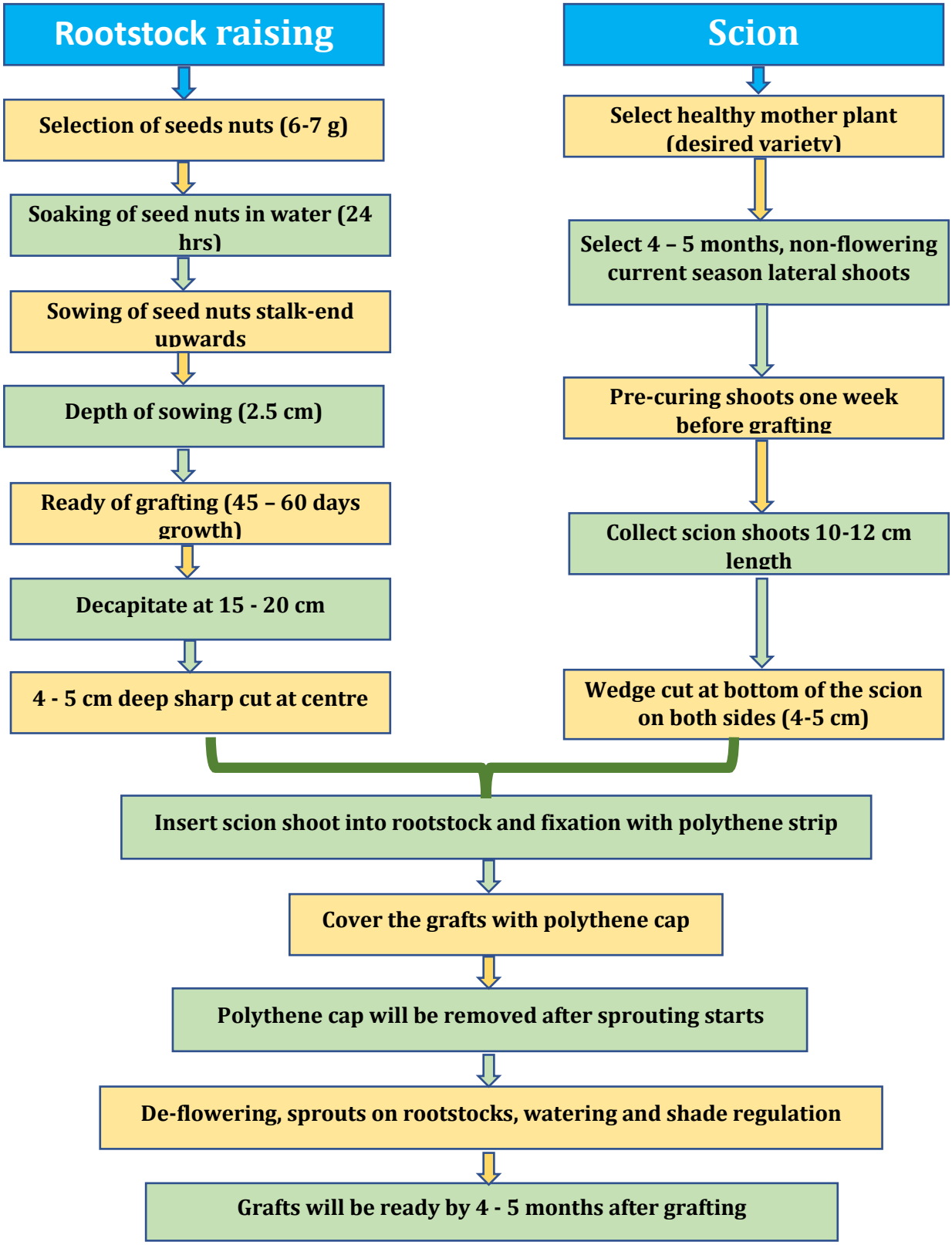
	Khunta, Mayurbhami Ph: 0674 – 555532/550855	**V- 4**
36	Khumta -I Cashew Nursery, Odisha State Cashew Development Corporation Ltd., Mayurbani, Odisha Ph: 0674 – 555532/550855	**H 2/16** **V-4** **H 1608**
37	Sanapalla Nursery, Odisha State Cashew DevelopmentCorporation Ltd., Khordha, Odisha. Ph: 0674 – 555532/ 550855	**V-4** **H-1608**
38	Lahanga Nursery, Odisha State Cashew DevelopmentCorporation Ltd., Khurdha, Jatni, Odisha. Ph: 0674 – 555532/ 550855	**V-4**
39	Bhuinpur Nursery, Odisha State Cashew DevelopmentCorporation Ltd., Khurdha, Khurdha Rd., Jatni, Odisha.Ph: 0674 – 555532/ 550855	**V-4 VRI-3**
40	Niamuhan Nursery, Odisha State Cashew DevelopmentCorporation Ltd., Niamuhan, Khurdha, Odisha. Ph: 0674 – 555532/ 550855	**V-4** **VRI-3**
41	Barunia Nursery, Odisha State Cashew DevelopmentCorporation Ltd., Niamuhan, Khurdha, Odisha. Ph: 0674 – 555532/ 550855	**V-4**
42	Sizua Nursery, Odisha State Cashew DevelopmentCorporation Ltd., Niamuhan, Khurdha, Odisha. Ph: 0674 – 555532/ 550855	**H-1608**
43	Pitapalli Nursery, Odisha State Cashew Development Corporation Ltd., Khurdha, Odisha. Ph: 0674 – 555532/ 550855	**V-4** **H-1608** **H-2/16**
44	Ghatika Nursery, Odisha State Cashew Development Corporation Ltd., Khurda , Odisha. Ph: 0674 – 555532/550855	**V-4,** **H- 1608,** **Ullal,** **Balabhadra,** **VRI-3,** **Jagannath**
45	Jayantagiri Nursery, Odisha State Cashew Development Corporation Ltd., Koraput, Jayantagiri,Odisha. Ph: 0674 – 555532/550855	**V-4** **VRI-3**

46	Koraput Nursery, Odisha State Cashew Development Corporation Ltd., Koraput, Odisha.Ph: 0674 – 555532/550855	**V-4**
47	**M/s. Agneepur nursery,** **Odisha State Cashew DevelopmentCorporation** **Nawaranpur Agneepur, Odisha** **Ph: 0674 – 555532/550855**	**V4**

REFERENCE:

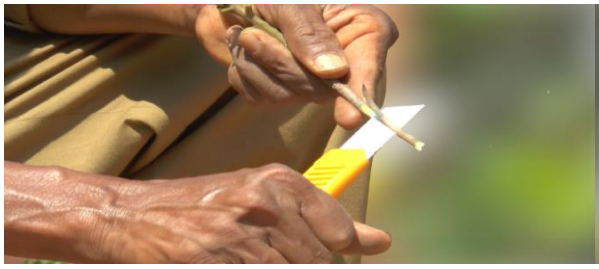
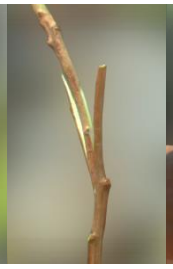
1) https://cashew.icar.gov.in/
2) https://www.dccd.gov.in/
3) National Horticulture board; Guidelinesfruitplantnurseries.pdf www.nhb.gov.in
4) Nayak, M.G. 2010. Softwood grating and nursery management in Cashew. ICAR-Directorate of Cashew Research.

Flow chart of Softwood grafting technique





Preparation of rootstock for grafting


Preparation of scion stick and joining rootstock


Capping/covering of graft union


Successful grafts

हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

Agrisearch with a human touch