NURSERY TECHNIQUE

NURSERY TECHNIQUE *of* COMMON FOREST PLANT SPECIES

Trinath Pattnaik

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SHRI BIJAYSHREE ROUTRAY
MINISTER
Forest & Environment, Odisha

MESSAGE

It is heartening to note that "Nursery technique of Common Forest Species", an informative book has been written by Sri Trinath Pattnaik.

Scientific forest management depends a lot on afforestation. In a State like Odisha, where forest cover has become more than the National average, afforestation and plantation have to be target- oriented. Therefore, common as well as local forest species and planting material need to be available in plenty. "Nursery technique of Common Forest Species" will provide much needed insight into propagation technique of common forest tree and plant species.

I am sure, academicians, researchers, non-government organizations, forest officers and the general public will find this book quite helpful.

I extend my hearty greetings and congratulations to Sri Trinath Pattnaik for his laudable effort.

(Bijayshree Routray)

Shri Suresh Chandra Mahapatra, IAS
Principal Secretary to Government

MESSAGE

As large scale forest plantation is undertaken in the state under different schemes every year; there has been a demand for production of quality planting material of many indigenous species. There was a need for a reference book on nursery technique of important forest plant species. It will cater to the needs of Forest field functionaries as a field guide in raising saplings of important forest plant species. Sri Pattnaik's compilation will definitely fulfill the objective of developing a good nursery of forest species.

(Suresh Chandra Mahapatra)

S.S. Srivastava, IFS
PCCF, Odisha

MESSAGE

With great pleasure and curiosity I have gone through the information prepared on nursery for raising some common important and mostly indigenous forest plant species by Sri Trinath Pattnaik, Assistant Conservator of Forests. The book provides such information on 58 forest plant species with photographic presentation. This will help the field staff of Forest Department in raising quality planting material. It will also go a long way in increasing the biodiversity of forests and advancing the cause of conservation of forest resource in the state.

(S.S. Srivastava)

Sri Shashi Paul, IFS
RCCF, Berhampur Circle

MESSAGE

National Forest Policy of 1988 has set a goal of achieving one third of the total land area of the country under forest or tree cover. To bridge the gap between targeted and existing green cover, lot of emphasis is being placed on plantation activities. Not only Forest Department, but many other government agencies, civil society groups and individuals are associated with enhancing the green cover of our country. There are many species which are important and indigenous and are choice of people for plantation purpose. However, information on their nursery techniques is not easily available. Therefore, many such species get excluded from the plantation activities.

The present book by Sri T. Pattnaik "Nursery Technique of Common Forest Plant Species" is a welcome step in this direction as it covers nursery technique of 58 no of important forest species which will help field forest staff as well as other agencies raising plantation of their choice. This effort of Sri T. Pattnaik is praiseworthy and will go a long way in achieving the goal set by our National Forest Policy.

(Shashi Paul)

Ashish Kumar Behera, OFS
Divisional Forest Officer

MESSAGE

This book will help a lot to the field level Forest Department staff towards planning a good nursery as it gives valuable technical information like time of seed collection, number of seeds per kg, germination percentage, seed treatment method, germination period, preparation of mother bed and raising of seedlings, etc. The book contains such information on 58 forest plant species with photographic presentation which will help the field staff of the department, VSS members and others in raising quality planting material.

(Ashish Kumar Behera)

Author's Note

There has been a constant effort to gear up plantation activity in order to meet primary objectives like increasing tree cover, restore healthy environment and meet the demand for forest produces. There is a lot of scope to do Afforstration in areas outside forest like road side avenue, along railway line, canal bank, embankment of water bodies, river bank, coastal sand, institutions and industrial area, etc. Similarly reforestation in forest land including degraded forests and barren hills is also to be taken in an accelerated manner to restore forest ecosystem.

For both Afforstration and reforestation drive, raising of quality planting material in large numbers every year is a primary job of all forest officers and other people who are involved in plantation activity. This involves procurement and collection of good quality seed, appropriate method of seed treatment, adopting suitable technique of seed sowing / dibbling, raising of poly pot seedlings, rhizomes and stumps depending upon silvicultural characteristics of different plant species.

Though raising of forest nursery has been followed since long but adopting suitable nursery technique by the front line staff is very important to raise quality planting material. Keeping this necessity in mind for quite sometime and being inspired by Sri Shashi Paul, IFS, the Regional Chief Conservator of Forests, Berhampur Circle as well as Shri Ashish Kumar Behera, OFS, the Divisional Forest Officer, Berhampur Division I have taken this endeavor to prepare a publication on nursery technique of important forest species with special emphasis upon the local and indigenous plant species, which would help as a guidance to the forest filed functionaries for raising good nursery. Valuable inputs from Dr. Pratap Panda, Scientist, RPRC, Odisha & Dr. Prasad Dash, Botanist, Bio-Diversity Board, Odisha relating to taxonomy are acknowledged with thanks.

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INTRODUCTION

In forestry one of the important approaches of development is raising plantation of forest species under afforestation as well as reforestation programmes which would lead to increasing forest cover. For this the initial ground work is development of quality planting material in the nursery where all aspects of plant husbandry are taken into account. With this background an endeavor is made to prepare an informative source for the field staff, involved in plantation, relating to the technical knowledge on nursery raising of some common important forest species with special emphasis upon the local and indigenous plant species.

This information basically covers the following aspects of nursery technique along with the salient features of each component.

- **Distribution**- Includes the common areas including site conditions where the plant species grows.
- **Phenology**- Includes a general idea regarding flowering, fruiting and seed collection time of each such plant species.
- **Seed collection time and technique**- Appropriate time and method of seed collection.
- **Seed weight, Germination percentage and plant percent**- Information on the per kg seed number, its germination percentage and plant percent helps quantity of seed to be collected depending on the physical target of the nursery or plantation.
- **Germination period**- Depending upon the particular plant species the knowledge on germination period helps in preparing time schedule of the nursery i.e time of seed sowing and making ready of poly pots, shade, etc.
- **Pre treatment of seed**- This information helps the particular method of pre treatment required for the plant species to facilitate germination process.
- **Preparation of nursery beds**-
  - **Size of Nursery bed**- 12 m length, 1.2 m width and approximately 20 cm to 25 cm height with inters pace of 50cm to 60 cm
  - **Soil mixture**- Generally prepared by mixing fertile and porous soil, sand and FYM in the ratio of 1:1:1. The upper layer of soil mixture to a depth of at least 10 cm the soil, sand & FYM proportion shall be 1:2:1 to facilitate germination. Vermi compost is a suitable substitute to FYM.
  - **Treatment with fungicide and insecticide**- Treatment of soil mixture with insecticide like chloropyrophos is used to reduce chances of attack due to insect sps and use

of neem oil cake as a manure will also play role of bio pesticide. Further, the seeds need to be treated with fungicide (Bavistin or Blitox) will prevent the seedlings from fungal disease attack like Damping Off. Organic pesticide is more desirable.

- **Mulching**- Mulching by using straw is to be provided to facilitate germination

- **Seed sowing**- Depending upon the nature of plants species appropriate method of seed sowing like line sowing / broadcast sowing / direct dibbling in poly pots is adopted. In this regard it is to be kept in mind that for species with minute seeds broadcast sowing is advisable, species with bigger size seeds which can endure transplanting line sowing can be followed and in other cases where the seeds are big in size and the species do not respond to transplanting then direct dibbling in poly pots is followed. Seed sowing in mother beds should be light to reduce competition among the germinated plants for light, water and nutrient.

- **Filling of Poly pots**

  - **Soil mixture**- Generally prepared by mixing fertile and porous soil, sand and FYM in the ratio of 1:1:1. For preparation of soil mixture sieving of soil and sand are done using 2x2 mm mesh sieve which are generally used for sieving the sand for building construction. Substituting FYM by vermi compost reduces possibility of weed growth & white ant attack. In this regard, the upper layer of soil mixture to a depth of at least 5 cm having soil, sand & Vermin compost in a ratio of 1:2:1 in poly pots will become an ideal medium for germination of seeds. Further, the seeds need to be treated with fungicide (Bavistin or Blitox) to prevent soil borne diseases like Damping Off. Similarly, insecticide like chloropyrophos is used to reduce chances of attack due to insect sps and use of neem oil cake as a manure will also play role of bio pesticide

  - **Size of Poly pots**- Polythene bags of size 9"x5" are used for raising seedlings of 6 to 8 months and 10"x6" are used for raising seedlings of 12 months to 18 months.

- **Transplanting**- It is always advisable to do transplanting when the seedlings are in four leaf stage /approximate height of the seedlings should be around 5 to 6 cm for better survivality. Transplanted seedlings should be put at the centre of each poly pot with root portion inside and shoot portion out side the soil mixture. Seedlings of many species are sensitive to root damage and to take precaution use of a spatula to lift the seedlings with the surrounding soil is desirable. Another very important aspect is the process of planting the seedling and consolidating the soil around it. Precaution must be taken to see that the tap root remains straight when it is planted.

- **Provision of Shade in the nursery**- In hot climate or having high intensity of sun light, particularly, light overhead shade is to be provided in nursery beds for one week or more for their establishment for which agro shade net of required % of shade are to be used and the beds are to be aligned along east west.

- **Watering**- As a thumb rule watering is to be done in a regulated manner in poly pot beds and mother beds in such a way that the water is just sufficient to drench the soil.
- **Weeding of poly pots & mother beds**- Weeding is to be followed at regular interval depending upon extent of weed growth and before weeding proper watering will help removal weeds along with its root system & further weed growth will be reduced.
- **Root cutting, grading & resetting of seedlings**- At regular interval, depending upon relative extent of root and shoot growth; root cutting, grading & resetting of ply pot seedlings are to be followed. The process of grading & resetting should start as soon as the seedlings reach a height of 15 cm. During resetting seedlings of equal height can be set in each bed instead of seedlings of different height in a descending order to prevent shoot competition. To prevent possibility of root penetration into soil and subsequent damage to the seedlings it is essential to use poly sheet in such poly pot beds over which seedlings can be kept.
- **Plantable Seedling**- The nursery seedlings must be hardened before planting by regulated watering. Initially the watering is done once every day. Later on it may be reduced to 5 days in a week & further reduced to 4, 3, 2 or even once in a week gradually during which the root system develops very well, the seedlings become more branchy and base of the stem becomes more strong. Usually, the seedlings for planting should have a standard height of 45 cm to 60 cm and in case of avenue or row plantation seedlings with more than 60 cm height, preferably one year or more old, can be planted to exceed the height growth of 2 meter by the end of 1st year operation which will reduce chances of damage due to cattle and help establishment of the plants soon.

Ambada *(Spondias pinnata)*

English Name : Wild Mango Family : Anacardiaceae

Branch with fruits

Seeds from Ripen Fruits

Distribution : It is only found in some moist forest areas of Khurda Divn, Baripada Divn, etc.

Flowering : August-September

Fruit ripening : December to February

Seed Collection & storage : Ripen fruits are collected from the floor of the ground under the tree during February

Seed weight : 200 to 250 per kg

Germination % : 40 to 50

Plant percent : 40

Germination period : 15 to 25 days

Pretreatment of seed : Pre soaking in cold water for 12 hours

Seed dibbling : Fresh seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are planted during July attaining a height of around 45 cm.

Amla *(Phyllanthus emblica)*

English Name : Amla Family : Euphorbiaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is a common species of dry deciduous forest. It is light a demander and sensitive to drought.

Flowering : Yellow flowers in dense panicles develop during March to May

Fruit ripening : October to February

Seed Collection & storage : Ripen fruits are globose, yellow when ripe with 3 to 4 compressed oblong seeds. Ripe fruits are collected during January-February and seeds are obtained after de pulping. Seeds retained viability up to 1 year .

Seed weight : 8000 to 9000 per Kg.

Germination % : 40 to 50

Plant percent : 60

No of Seedlings per Kg of seed : About 5000

Germination period : 25 to 30 days

Pretreatment of seed : 24 hours pre soaking in warm water

Seed sowing : Seeds are sown during March in the raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate mulching with hay & over head shade are to be provided to facilitate germination. Regulated watering twice a day is to be followed.

Transplanting : Seedlings are transplanted when 2 to 4 cm in height to poly pots having soil mixture of soil, sand and FYM in a proportion of 1:1:1 & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Root cutting, grading, re setting of poly pot seedlings are done at a regular interval of about 45 days. The poly pots are kept on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings may be ready for planting during next July when the average ht will be about 45 cm.

Arjuna *(Terminalia arjuna)*

Common Name : Arjun Family : Combretaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is distributed in forests of almost all the districts of the state mainly on the banks of water courses. It grows well in fertile alluvial loam soil.

Flowering : Small whitish flowers in spikes appear in April to July.

Fruit ripening : Winged fruits ripen in February-May.

Seed Collection & storage : Ripen fruits are collected during March by lopping the branches or from the previously cleaned ground. The fruits are then dried in the sun for 2 to 3 days and stored in gunny bags. Viability remains up to one year.

Seed weight : 400 to 700 per kg

Germination % : 40 to 50

Plant percent : 40 (Around 200 seedlings from 1 kg of seed).

Germination period : 15 to 20 days

Pretreatment of seed : Pre soaking in warm water for 48 hours. The seeds are heaped and watered twice a day. When the seeds begin to sprout they are removed and sown / dibbled in poly pots.

Seed dibbling : Pre-treated seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Growth of the seedlings is slow in the nursery stage and therefore seedlings are planted during next year July attaining a height of about 60 cm. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Asana / Sahaja *(Terminalia alata)*

Common Name : Laure Family : Combretaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is most widely distributed in forests of almost all the districts with alluvial soil & clay soil but normally avoids sandy soil.

Flowering : Small whitish flowers in spikes appear during May-June.

Fruit ripening : Winged fruits ripen in February-March.

Seed Collection & storage : Ripen fruits are collected during March by lopping the branches when the tree is leafless. The fruits are then dried in the sun for 2 to 3 days and stored in gunny bags. Viability remains up to one year.

Seed weight : 400 to 500 per kg.

Germination % : 40 to 50

Plant percent : 40

Germination period : 15 to 20 days

Pretreatment of seed : Pre soaking in warm water for 48 hours. The seeds are heaped and daily & watered twice a day. When the seeds begin to sprout they are removed and sown / dibbled in poly pots.

Seed dibbling : Pre-treated seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Growth of the seedlings is slow in the nursery stage and therefore seedlings are planted during next year July attaining a height of about 60 cm. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Asoka *(Saraca asoca)*

English Name : Ashoka Family : Caesalpiniaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It doesn't occur wild in forest but is planted in the villages and other such areas.

Flowering : Red flowers appear in cluster during February-March.

Fruit ripening : April-May

Seed Collection & storage : Fruits are collected from the floor of the ground under the tree during May and dried for 1 to 2 days. Seeds retain viability for around two months.

Seed weight : 100 per kg

Germination % : 60 to 70

Plant percent : 60

Germination period : 25 to 30 days

Pretreatment of seed : Pre soaking in cold water for 12 hours

Seed dibbling : Fresh seeds are dibbled in polythene bags during May having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. To attain required height growth one year old seedlings are planted during next July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery

Transplanting : Seeds may also be sown during May in raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Mulching with hay & over head shade are to be provided to facilitate germination. Regular watering twice a day is to be followed. Seedlings can be transplanted from mother beds to Poly pot when 2 to 4 cm in height and maintained as stated above.

Plantable Seedling : One year old seedlings are planted during next year July attaining a height of around 60 cm.

Babool *(Acacia nilotica)*

Common Name : Babul Family : Mimosaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Normally found in cultivated fields; village waste lands and grows on alluvial soil and black cotton soil

Flowering : July & continues till August to September.

Fruit ripening : Pods ripen during December-January and seed fall during January.

Seed Collection & storage : Ripe pods are collected from the tree during May. Pods are dried in the sun to open and seeds are collected, dried and stored. Viability may retain up to one year.

Seed weight : 5,000 to 7,000 per kg

Germination % : 40 to 50

Plant percent : 30

Germination period : 10 to 30 days

Pretreatment of seed : Pre soaking in cold water for 12 hours.

Seed dibbling : Screened seeds after pretreatment are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling: Seedlings are planted during next July attaining a height of about 45 cm.

Bada chakunda (*Samanea saman*)

English Name : Rain Tree Family : Mimosaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is an exotic plant but planted commonly along avenues and also in pastures.

Flowering : Pinkish white flowers appear in May-June.

Fruit ripening : Fruit ripen in next year March-April.

Seed Collection & storage : Ripen pods are collected during March from the trees or from the ground., dried in sun for 2 to 3 days and beaten to harvest the seeds. Seed viability may remain up to 12 months.

Seed weight : 4000 to 5000

Germination % : 60

Plant percent : 50 to 60

Germination period : 30 to 40 days

Pretreatment of seed : Pre soaking in cold water for 12 to 24 hours.

Seed dibbling : Fresh seeds are dibbled in polythene bags during April having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Growth of seedlings in nursery stage is good and are planted during July. Polythene bags of size 10"X6" size are suitable as the growth of seedlings in the nursery is fast.

Plantable Seedling: Seedlings can be planted attaining a height of around 60 cm during July.

Bahada *(Terminalia bellirica)*

Common Name : Beleric myrobalan

Family : Combretaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is distributed in dry and deciduous forests of almost all the districts of the state. It grows well in fertile alluvial soil.

Flowering : Small greenish, white flowers in spikes appear in April to June.

Fruit ripening : Fruits ripen in November to February

Seed Collection & storage : Ripen fruits are collected during February by lopping the branches or from the previously cleaned ground. The fruits are then dried in the sun for 2 to 3 days and stored in gunny bags. Viability remains up to one year.

Seed weight : 100 to 120 per kg.

Germination % : 50 to 60

Plant percent : 50 (Around 50 seedlings from 1 kg of seed).

Germination period : 15 to 20 days

Pretreatment of seed : Pre soaking in warm water for 24 hours. The seeds are heaped and watered twice a day. When the seeds begin to sprout they are removed and sown / dibbled in poly pots.

Seed dibbling : Pre-treated seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plant able Seedling : Seedlings are planted during next July attaining a height of about 50 cm.

Bana bhalia *(Semecarpus anacardium)*

English Name : Marking Nut Family : Anacardiaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is commonly a tree of dry deciduous forests. It is a moderate shade bearer.

Flowering : Greenish yellow flowers appear during May-June.

Fruit ripening : December to March.

Seed Collection & storage : Fruits are collected from the floor of the ground under the tree during February-March. The seeds retain viability for a short period and should be sown immediately after collection.

Seed weight : 400 to 500 per kg

Germination % : 40 to 50

Plant percent : 50

Germination period : 25 to 35 days

Pretreatment of seed : Pre soaking in cold water for 48 hours

Seed dibbling : Fresh seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are planted during July attaining a height of around 45 cm.

Bandhan *(Ougeinia oojeinensis)*

English Name : Bandan Family : Fabaceae

Branch with ripe fruits

Seeds from Ripe Fruits

Distribution : Recommended for Plantation in land slips & river banks. It is a good coppicer & produces abundant root suckers.

Flowering : Pink flowers appear from February to May

Fruit ripening : May to June

Seed Collection & storage : Ripen fruits are collected during May to June and dried and fresh seeds should be utilized for nursery.

Seed weight : 25,000 to 30,000 per kg.

Germination percentage : 40 to 50

Plant percent : 5 to 15

Germination period : 10 to 20 days

Pretreatment of seed : 24 hours pre soaking in cold water

Seed dibbling : Seeds are dibbled in polythene bags during June having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. The growth of seedlings in the nursery is slow and are to be planted in next year July. Hence polythene bags of size 10"X6" size are suitable as the seedlings are kept for more than one year in the nursery.

Plantable Seedling : Seedlings are ready for planting during July next year when attain height of 50 to 60 cm.

Bara *(Ficus benghalensis)*

English Name : Banyan Tree Family : Moraceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It an indigenous tree planted through out the state along road side, near temple & villages. This species is a light deminder and grows on a variety of soils.

Flowering : April to June

Fruit ripening : May-June

Seed Collection & storage : Sessile globous fruits become red when ripe containing minute seeds with low viability. Ripe fruits are collected during May - June, preferably through excreta of birds after being eaten, which are dried in the sun for 2 to 3 days. These dried fruits are mixed with cow dung and cakes are prepared which are again dried in the sun for 5 to 7 days as a method of pre treatment. The dried cakes are made into power and can be used for sowing.

Seed weight : Seeds are very minute and weigh about 10,00,000 per kg.

Germination % : 40 to 50 but survival rate becomes very low due to minute and delicate nature of seedlings.

Plant percent : 20 to 30

Germination period : 20 to 30 days

Pretreatment of seed : As described above.

Seed sowing : Cakes of ripen fruits with cow dung, prepared as per the above description are sown in mother bed with soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate Mulching with hay & over head shade are to be provided to facilitate germination. Regulated watering twice a day is to be followed. Since the seeds are very minute and delicate, watering is to be done carefully in a regulated manner to prevent washout & damping off.

Transplanting : Seedlings are transplanted when 2 to 4 cm in height to poly pots having soil mixture of soil, sand and FYM in a proportion of 1:1:1 & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Root cutting, grading, re setting of poly pot seedlings are done at a regular interval of about 45 days. The poly pots are kept on polythene sheet to prevent root penetration into soil. It is better to use polythene bags of size 10"x6" size as the seedlings are kept for more than one year in the nursery.

Plantable Seedling : Seedlings are fit for planting during the next year July when it reach at least 60 cm height.

Baula *(Mimusops elengi)*

English Name : Indian medlar (Bullet wood) Family : Sapotaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Usually it is not found in forest but grown in avenue plantation, near temple, in institutional campus because of its scented flowers and edible fruits.

Flowering : Flowers appear in February to April.

Fruit ripening : May to July

Seed Collection & storage : Ripen fruits (Drupes) are collected during May-June. Seeds loose viability early. Seeds are collected after removing the pulp and are washed and dried.

Seed weight : 1500 to 2,000 per kg.

Germination percentage : 30 to 40

Plant percent : 60

Germination period : 60 to 70 days

Pretreatment of seed : 4 hours pre soaking in warm water

Seed dibbling : Seeds are dibbled in polythene bags during June having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. The growth of seedlings in the nursery is slow and are to be planted in next year July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery.

Transplanting : Seeds can also be sown in raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soi during June. Mulching with hay & over head shade are to be provided to facilitate germination. Regular watering twice a day is to be followed. Seedlings can be transplanted from mother beds to Poly pot when 2 to 4 cm in height.

Plantable Seedling : Since growth of seedling is slow in the nursery. It is planted during next year July when its height will be at least 50 to 60 cm.

Bela (*Aegle marmelos*)

English Name : Stone Apple Family : Rutaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Throughout Odisha; found commonly in stiff, dry clayey and alluvial soils.

Flowering : March to May

Fruit ripening : During summer (April-May)

Seed Collection : The ripen fruits are collected and after continuous washing of the pulp, seeds are separated. The seeds are mixed with ash and dried. Viability is short & the seeds should be used soon after collection.

Seed weight : 5000 per Kg

Germination % : 55

Plant percent : 40

No of Seedlings per Kg of seed : 2000

Germination period: 10 to 25 days

Pretreatment of seed : Not required

Seed dibbling : Seeds are dibbled in polythene bag having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering, twice a day, is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, resetting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept in the beds on polythene sheet to prevent root penetration into soil. It is better to use polythene bags of size 10"x6" as it is kept for more than one year in the nursery.

Plant able seedling: Seedlings become suitable for planting during July next year since its growth is slow in the 1st year. Hence, Polythene bags of size 10"x6" are used.

Bheru (*Chloroxylon swietenia*)

English Name : Satin wood Family : Meliaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Distributed in dry deciduous forest of different districts of the state. Recommended for the plantation in poor soil with good drainage containing sand and gravel.

Flowering : March-April

Fruit ripening : May to August

Seed Collection & storage : Mature fruits (capsules), dark brown when ripe, are collected before dehiscing and are dried to get the seeds. Seeds loose viability quickly

Seed weight : 15000 to 20000 per Kg.

Germination % : 40 to50

Plant percent : 50 to 60

No of Seedlings per Kg of seed : Around 7000 to 8000

Germination period : 15 to 20 days

Pretreatment of seed : Not required

Seed sowing : Seeds are sown in May- June in the raised mother beds having soil mixture of soil sand and FYM (1:2:1). Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate Mulching with hay & over head shade are to be provided to facilitate germination. Regulated watering twice a day is to be followed.

Transplanting : Seedlings are transplanted when 2 to 4 cm in height to poly pots having soil mixture of soil, sand and FYM in a proportion of 1:1:1 & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Root cutting, grading, re setting of poly pot seedlings are done at a regular interval of about 45 days. The poly pots are kept on polythene sheet to prevent root penetration into soil. Preferably, The seedlings are kept for one year to attain height of at least 45 to 60 cm. It is better to use polythene bags of size 10"x6" size as the seedlings are kept for more than one year in the nursery .

Plantable Seedling : Seedlings growth is slow & fit for planting during next year July attaining height of 60 cm.

Chandan *(Santalum album)*

English Name : Chandan Family : Santalaceae

Branch with fruits

Seeds from Ripen Fruits

Distribution : It is found naturally only in a few forest areas of Koraput, Gajapati and Kandhamal districts. It grows in different kinds of soil including shallow rocky soil but cannot withstand water logging.

Flowering : May-June

Fruit ripening : December-January

Seed Collection & storage : Ripen fruits are collected during January, soaked in water and rubbed to remove the soft pulp. Then they are dried and used for raising nursery.

Seed weight : About 4000 to 5000 per kg.

Germination % : 20 to 30 (Seeds after being eaten by animals & birds come out through excreta germinate better)

Plant percent : 10 to 15

Germination period : 40 to 60 days

Pretreatment of seed : Due to hard seed coat seeds are treated with concentrated sulphuric acid for 30 minutes and then kept in jibberellic acid over night.

Seed dibbling : Fresh seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Growth of seedlings in nursery stage is slow and one year old seedlings are planted during next July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery.

Transplanting : Seeds may also be sown during April in raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Mulching with hay & over head shade are to be provided to facilitate germination. Regular watering twice a day is to be followed. Seedlings can be transplanted from mother beds to Poly pot when 2 to 4 cm in height and maintained as stated above.

Plantable Seedling : One year old seedlings are planted during next year July, attaining a height of around 60 cm.

Chara (*Buchnania lanzan*)

English Name : Chironji Tree Family : Anacardiaceae

Branch with fruits

Seeds (Magnified) from Ripe Fruits

Distribution : Through out Odisha; in dry deciduous forest. Recommend for plantation in sandy loam and alluvial soils.

Flowering : Twice a year. December-January and June-July.

Fruit ripening : January- February and July-August.

Seed Collection & storage : Dry ripple fruits are collected by betting the branches. Fruits are dried from which two winged seeds are collected. Seeds are minute and after drying should be shown immediately.

Seed weight : About 1,00,000 per Kg

Germination % : 0.05 to 4.5.

Seedling per one Kg of seed : 500 to 2,000

Germination period : 10 to 15 days

Pretreatment of seed : Presoaking for 48 Hours in Cold water.

Seed sowing : Seeds are broadcasted during March – April on a raised bed with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & manure in a proportion of 1:2:1 covered with mulching material of straw. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shading may be provided to mother beds in areas with hot climate.

Transplanting : One month old seedlings may be transplanted when they are about 2 cm in height to poly pots having soil mixture of soil, sand & FYM in a proportion of 1:1:1. The proportion may be modified depending upon nature of soil. & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept on polythene sheet in the nursery bed to prevent root penetration into soil. It is better to use polythene bags of size 10"x6" size as it may be kept for more than one year in the nursery.

Plantable Seedling : Seedlings of 45 to 60 cm height may be planted during July.

Chaatiana (*Alstonia scholaris*)

English Name : Devil's Tree Family : Apocynaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It can be planted on road side.
Flowering : Nov-Dec to March
Fruit ripening : During summer (May-August)
Seed collection & storage : Seed can be collected during first fortnight of May after lopping the branches and fruits (follicles) are dried in the sun to hasten opening.
Seed weight : About 3,00,000 per Kg.
Germination % : 50 to 60
Plant percent : 30
No of seedlings per Kg of seed : 90000
Germination period : 10 to 15 days
Pretreatment of seed : Not required
Seed sowing : Seeds are mixed with ash and broadcasted in beds during May. Raised beds are formed with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & FYM in a proportion of 1:2:1 covered with mulching material of straw. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade may be provided in areas with hot climate. Since the seedlings are very minute and delicate, watering is to be done carefully in a regulated manner to prevent wash out & damping off.

Transplanting : One month old seedlings may be transplanted to polythene bags having soil mixture of soil sand and FYM (1:1:1) & in each polythene bag the transplanted seedling is put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept in the nursery beds on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings of height above 45 cm are fit for planting during the month of July.

Dhaura (*Anogeissus latifolia*)

English Name : Axle wood Family : Combretaceae

Branch with fruits

Seeds (Magnified) from Ripe Fruits

Distribution : Through out Odisha; in dry deciduous forest. Recommend for plantation in sandy loam and alluvial soil.

Flowering : Twice a year. December-January and June-July.

Fruit ripening : January- February and July-August.

Seed collection & storage : Dry ripple fruits are collected by betting the branches. Fruits are dried from which two winged seeds are collected. Seeds are minute and after drying should be shown immediately.

Seed weight : About 1,00,000 per Kg

Germination % : 0.05 to 4.5.

Seedling per one Kg of seed : 500 to 2,000

Germination period : 10 to 15 days

Pretreatment of seed : Presoaking for 48 Hours in Cold water.

Seed sowing : Seeds are broadcasted during March – April on a raised bed with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & manure in a proportion of 1:2:1 covered with mulching material of straw. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shading may be provided to mother beds in areas with hot climate.

Transplanting : One month old seedlings may be transplanted when they are about 2 cm in height to poly pots having soil mixture of soil, sand & FYM in a proportion of 1:1:1. The proportion may be modified depending upon nature of soil. & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept on polythene sheet in the nursery bed to prevent root penetration into soil. It is better to use polythene bags of size 10"x6" size as it may be kept for more than one year in the nursery.

Plantable Seedling : Seedlings of 45 to 60 cm height may be planted during July.

Gamhari *(Gmelina arborea)*

English Name : Gamhar Family : Verbenaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is an indigenous tree found through out the state mainly in deciduous forest. It grows well in fertile deep, well drained, sandy loam soils in moist valleys.

Flowering : Yellow tubular flowers in dense panicles develop during February to March when tree is leafless.

Fruit ripening : Fruits ripen from end of April to June.

Seed Collection & storage : Ripen fruits are collected during April -May. Fruits after being eaten by goats and come through excreta show profuse germination. Fruits can also be collected from the ground and heaped under a pit for 4 to 5 days and then washed to remove the pulp. Seeds can be stored for one year with slight decrease in viability.

Seed weight : Around 5000 per kg

Germination % : 70 to 80

Plant percent : 60 to 70

Germination period : 10 to 15 days

Pretreatment of seed : Presoaking in cold water for 12 hours may show better result.

Seed dibbling : Seeds are dibbled in polythene bags during April- May having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Seeds are also sown in mother beds and transplanted to poly pots and plantable seedlings are produce accordingly. Similarly, one year old stumps are also produced in the mother beds and pre-sprouted stumps are raised in poly pots for planting.

Plantable Seedling : Seedlings are fit for planting during July when they attain 45 cm height about 45 cm.

Genduli *(Sterculia urens)*

English Name : Kateera Gum Tree

Family : Sterculiaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is a drought resistant species found in rocky soil.

Flowering : Flowers in panicles appear in December to March.

Fruit ripening : April-May.

Seed Collection & storage : The ground under the tree is made clean before April. During April - May seeds are collected from the floor of the ground after the follicles burst.

Seed weight : 4000 to 4500 per kg

Germination % : 30 to 50

Plant percent : 20 to 40

Germination period : 15 to 20 days

Pretreatment of seed : Pre soaking in cold water for 12 hours

Seed dibbling : Fresh seeds are dibbled in polythene bags during May having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Growth of seedlings in nursery stage is slow and one year old seedlings are planted during next July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery

Plantable Seedling : Seedlings are planted during next year July attaining a height of around 60 cm. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Haldu (*Haldina cordifolia*) Syn. (*Adina cordifolia*)

English Name : Yellow Teak Family : Rubiaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Through out Odisha; common in deciduous forest; grows in sandy loam & clayey loam soil.

Flowering : Yellow pedanculate globose heads appear from June to August.

Fruit ripening : February to May when heads turn into yellowish black.

Seed Collection & storage : Seeds are extremely minute. The heads are plucked from February to March and dried in the sun to break and then immersed in water to separate the fertile seeds which settle down. These seeds are dried in sun and then cleaned by winnowing which can be stored in sealed tins up to the next season. Seeds germinate better after storage because they require after ripening.

Seed weight : 10,00,000 to 18,00,000

Germination % : 30 to 40

Plant percent : 30 to 40

Germination period : 10 to 15 days

Seed pretreatment : Not required

Seed sowing : Seeds are broadcasted during March – April on a raised bed with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & manure in a proportion of 1:2:1 covered with mulching material of straw. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shading may be provided to mother beds in areas with hot climate. Since the seedlings are very minute and delicate, watering is to be done carefully in a regulated manner to prevent wash out, damping off & insect attack.

Transplanting : Two month old seedlings are transplanted to polythene bags having soil mixture of soil sand and FYM (1:1:1) & in each polythene bag the transplanted seedling is put at the centre. The Proportion of soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Regular watering twice a day is to be followed. Shade, preferably with agro shade net may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept on polythene sheet, in the beds, to prevent root penetration into soil.

Plantable seedling : Seedlings are fit for planting during 2nd year July since its growth is slow in the 1st year. Hence, Polythene bags of size 10"x6" are used.

Harida *(Terminalia chebula)*

Common Name : Chebulic myrobalan

Family : Combretaceae

Branch with fruits

Seeds from Ripen Fruits

Distribution : It is commonly found in mixed, dry and deciduous forest. It grows well in loose, well drained and fertile soil such as sandy loam & clayey loam.

Flowering : Greenish white flowers in spikes appear in April to June.

Fruit ripening : Fruits ripen from January to March and fall after ripening.

Seed Collection & storage : Ripen fruits are collected from the previously cleaned ground. The fruits are then dried under shade for 2 to 3 days and stored in gunny bags. Viability remains up to one year. Fresh seeds germinate better.

Seed weight : 140 to 160 per kg.

Germination % : 40 to 50

Plant percent : 50 (Around 70 seedlings from 1 kg of seed).

Germination period : 20 to 30 days

Seed Pretreatment : Pre soaking in warm water for 24 hours. The seeds are mixed with cow dung, heaped and watered twice a day. When the seeds begin to sprout they are removed and sown / dibbled in poly pots.

Seed dibbling : Pre- treated seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are planted during next year July attaining a height of about 50 cm. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Hinjala *(Baringtonia acutangula)*

English Name : Hijal Family : Lecythidaceae

Branch with fruits

Seeds (magnified) from Ripe Fruits

Distribution : It is generally seen along the banks of streams and rivers.

Flowering : June-July. Colored flowers are seeing in slender, pendulous & racenes

Fruit ripening : December to January

Seed collection & storage : Fallen fruits are collected from the banks & the seeds are shown immediately in mother beds.

Seed weight : 1000 to 1200 per Kg

Germination percentage : 70 to 80

Seedling per one Kg of seed : 600 to 700

Germination period : 30 to 40 days

Pretreatment of seed : Presoaking for 12 Hours in Cold water.

Seed sowing : Seeds are sown in sunken beds at 7.5 cm x 7.5 cm apart to a depth of 0.5 cm vertically. Such sunken mother beds are prepared with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & FYM in a proportion of 1:2:1 covered with mulching material of straw. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate. Watering is to be done carefully in a regulated manner twice a day and the beds should remain wet throughout germination period.

Transplanting : Seedlings are transplanted 2 to 4 cm in height to poly pots having soil mixture of soil, sand and FYM in a proportion of 1:1:1 & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Root cutting, grading, re setting of poly pot seedlings are done at a regular interval of about 45 days. The poly pots are kept on polythene sheet to prevent root penetration into soil. Preferably, The seedlings are kept for one year to attain height of at least 45 to 60 cm. It is better to use polythene bags of size 10"x6" size as it may be kept for more than one year in the nursery.

Plantable Seedling : The seedlings are ready for planting during next year July.

Jamu/ Jamukoli *(Syzygium cumini)*

Common Name : Jamun Family : Myrtaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is a large semi evergreen tree found commonly along streams, damp & marshy localities. Recommended for plantation ion alluvial or clayey soil or loamy sand along nala bank, river bank or water logged areas .

Flowering : Dirty white fragrant flowers in trichotomous panicles appear in March-May.

Fruit ripening : Fruits (Drupes) ripen in June to August.

Seed Collection & storage : Fresh ripe fruits are collected from the ground under the mother tree during June-July. The fruits are then washed in water to clean the pulp to get the seeds. Then the seeds are dried in shade and used early within a month since viability is lost after that.

Seed weight : 1000 to 1100 per kg.

Germination % : 90

Plant percent : 50

Germination period : 15 to 20 days

Pretreatment of seed : Overnight pre soaking in warm for 12 hours

Seed dibbling : Fresh seeds are dibbled in polythene bags during June-July having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Transplanting : Seeds may also be sown during June-July in raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Mulching with hay & over head shade are to be provided to facilitate germination. Regular watering twice a day is to be followed. Seedlings can be transplanted from mother beds to Poly pot when 2 to 4 cm in height and maintained as stated above.

Plantable Seedling : Since seed sowing / dibbling is done during July, growth of the seedlings is small during 1st year in the nursery stage and therefore seedlings are planted during next year July attaining a height of around 60 cm. Hence It is better to use polythene bags of size 10"x6" size.

Jeutha *(Artocarpus lakoocha)*

English Name : Monkey fruit Family : Moraceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : A large semi evergreen tree with spreading crown found deep moist and well drained soil found planted in and near human habitations.

Flowering : January-February.

Fruit ripening : April-May.

Seed Collection & storage : Fruits are smooth yellow and irregularly lobed. There are 40 to 50 flat seeds in each fruit. Yellow fruits are collected by plucking them directly from the trees. Under ripe or over ripe fruits give poor result. Seed viability is very hardly for 4 to 5 days. Seeds are separated from the fleshy portions of the fruits, thoroughly washed and dried.

Seed weight : 2000 to 4000 per kg.

Germination % : 60 to 70

Plant percent : 50

Germination period : 8 to 20 days.

Seed Pretreatment : Not required.

Seed dibbling : Seeds are dibbled in polythene bags during April having soil mixture of soil sand and FYM. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are planted during next year July attaining a height of at least 50 to 60 cm. Hence polythene bags of size 10"x6" are desirable to be used as seedlings are kept in the nursery for more than one year.

Jhaun (*Casuarina equisetifolia*)

English Name : Casuarina Family : Casuarinaceae

Branch with fruits

Seeds (Magnified) from Ripe Fruits

Distribution : Most commonly planted in the coastal districts of the state in areas close to the sea on loose sand. It is a light demander and sensitive to water logging and fire.

Flowering : Twice in a year i.e Feb to April & Sept. to Oct

Fruit ripening : Two corresponding fruiting periods are June & Dec.

Seed Collection & storage : Ripe fruits (globose) as woody cones containing minute seeds are plucked from the branches before the cones dehisce, dried in the sun & thrashed to separate the winged seeds. The dried seeds retain viability for about 18 months

Seed weight : 7.5 to 10.0 lakhs per Kg.

Germination % : 50 to 60

Plant percent : 60

No of Seedlings per Kg of seed : 2 to 3 lakhs

Germination period : 10 to 20 days

Pretreatment of seed : Not required

Seed sowing : Seeds are sown in January in the raised mother beds having soil mixture (15 cm thick) of sand and FYM (1:1). Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM . Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Application of *Azotobacter* bio-fertlizer helps in promotion of root nodule and growth of the plants. Shade is to be provided in areas with hot climate Mulching with hay & over head shade are to be provided to facilitate germination. Since the seeds are very minute and delicate, watering is to be done carefully in a regulated manner to prevent washout & damping off.

Transplanting : Seedlings are transplanted to polythene bags when they are about 3 to 4 cm in height. Poly pots are filled with soil mixture of soil, sand & FYM in a proportion of 1:2:1. Vermi compost / neem oil cake / *Azootobacter* can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. The poly pots are kept on polythene sheet to prevent root penetration into soil. Root cutting, grading, re setting of poly pot seedlings are done at a regular interval of about 45 days.

Plantable Seedling : Seedlings are fit for planting during July when they are about 45 cm to 60 cm in height.

Kadamba (*Anthocephalus kadamba*)

English Name : Kadamba Family : Rubiaceae

Branch with fruits

Seeds (Magnified) from Ripe Fruits

Distribution : It is commonly seen in swampy ground, along rivers and prefers a deep well drained alluvian soil.

Flowering : Flowers in globose heads appear from May to June

Fruit ripening : Fruit ripening from August to October. fruits are globose and contain large no of minute seeds.

Seed Collection & storage : Ripen fruits are collected from the ground during August –September and heaped under shade and allowed to rot for 3 to 4 days. The fleshy pulpy fruits are washed by hand in a bucket of water by which seeds sink to the bottom and are separated, dried and stored in dry container for 1 year.

Seed weight : 9,00,000 to 10,00,000 per kg.

Germination % : 50 – 60

Plant percent : 40 to 50

Germination period : 10 to 20 days

Pretreatment of seed : No specific treatment if required but the seeds, since very minute, are mixed with ash and then can be used for broad casting.

Seed sowing : Seeds mixed with ash are broadcasted in raised nursery beds during February to March. Raised mother beds are prepared with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & FYM in a proportion of 1:2:1 mixed with insecticide & covered with mulching material of straw. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate. Since the seedlings are very minute and delicate, watering is to be done carefully in a regulated manner to prevent washout, damping off & insect attack.

Transplanting : 2 months old seedlings are transplanted when 2 to 3 cm of height to poly pots having soil mixture of soil, sand and FYM in a proportion of 1:1:1. & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept on polythene sheet to prevent root penetration into soil. It is better to use polythene bags of size 10"x6" size as it may be kept for more than one year in the nursery. Watering is carefully done in a regulatory manner since the seedlings are very small & delicate.

Plantable Seedling : Seedlings of height above 60 cm are ready for planting during the month of July.

Kangada *(Xylia xylocarpa)*

Common Name : Indian Iron wood Family : Mimosaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It grows well in laterite soil.

Flowering : Pale yellow colored flowers in globose heads appear in March to April.

Fruit ripening : Pods ripen in February and seed fall from the dehiscent pods during March-April.

Seed Collection & storage : Ripe pods are collected from the tree as soon as they dehisce during March-April. Pods are dried in the sun to open and seeds are collected, dried and stored. Viability may retain up to one year.

Seed weight : 2000 to 2500 per kg.

Germination % : 70 to 80

Plant percent : 70 (Around 1500 seedlings from 1 kg of seed).

Germination period : 10 to 20 days

Seed Pretreatment : Pre soaking in cold water for 12 hours.

Seed dibbling : Pre-treated seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are planted during next July attaining a height of about 45 cm.

Kasi (*Bridelia retusa*)

English Name : Spinous Kino tree

Family : Euphorbiaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Found in the forest through out the state as a drought hardy species.

Flowering : May to July.

Fruit ripening : December to January.

Seed collection & storage : Globose ripen fruits (Drupes), purple black in color, are collected and then washed to remove the pulp. The seeds collected are dried and used soon as the viability is short.

Seed weight : 15000 per Kg.

Germination percentage : 60 to 70.

Plant percent : 50 to 60.

No of seedlings per Kg of seed : 7000 to 8000.

Germination period : 15 days.

Pretreatment of seed : Pre soaking in cold water for 24 hours.

Seed dibbling : Seeds are dibbled in polythene bags during Feb-March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at a regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Plantable Seedling : Seedlings are fit for planting during July when the height reaches about 60 cm.

Kataka *(Strychnos potatorum)*

English Name : Cleaning nut tree Family : Loganiaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is found in different forests as a shade bearer and drought resistant in nature.

Flowering : Small whitish fragrant flowers appear from February to May.

Fruit ripening : Globose fruits ripen from October to March.

Seed Collection & storage : Seeds are collected from February to March. Pulp of the fruit is washed and the seeds are dried in the sun. Seeds retain viability for about 1 year.

Seed weight : 800 to 1000 per kg.

Germination % : 10 to 15

Plant percent : 10

Germination period : 45 to 60

Pretreatment of seed : Pre soaking in warm water for 48 hours

Seed dibbling : Fresh seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Growth of seedlings in nursery stage is slow and one year old seedlings are planted during next July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery

Plantable Seedling : Since growth of the seedlings is very slow in the nursery stage, seedlings are planted during next year July attaining a height of around 50 cm. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Kendu *(Diospyros melanoxylon)*

English Name : Ebony Family : Ebenaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is found all over areas particularly in dry area both inside forest and open land.

Flowering : April to June

Fruit ripening : Next March-April

Seed Collection & storage : Ripen fruits are collected during April. After de-pulping the seeds are collected and then dried. Viability may continue up to one year.

Seed weight : Around 1000 per Kg.

Germination % : 40-50

Plant percent : 70-80

No of Seedlings per Kg of seed : 600 to 700

Germination period : 20 to 30 days

Pretreatment of seed : Presoaking in cold water for 24 hours

Seed dibbling : Seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at a regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. It is better to use polythene bags of size 10"x6" size as the seedlings are kept for more than one year in the nursery.

Plantable Seedling : Seedlings may be ready for planting during July of the next year as the growth is slow at nursery stage and does not reach plantable size in the first year.

Khaira *(Acacia catechu)*

Common Name : Khair Family : Mimosaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : A strong light demander & normally found in dry region; grows on a variety of soil & thrives best on porous alluvial well drained soil on riverain areas.

Flowering : June & continues till July or August.

Fruit ripening : Pods ripen during December-January and seed fall during January.

Seed Collection & storage : Ripe pods are collected from the tree during December-January when they are reddish black just before dehisce. Pods are dried in the sun to open and seeds are collected, dried and stored. Viability may retain up to six months.

Seed weight : 25,000 to 30000 per kg.

Germination % : 60 to 70

Plant percent : 30

Germination period : 15 to 25 days

Pretreatment of seed : Pre soaking in cold water for 12 hours.

Seed dibbling : Pre-treated seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are planted during next July attaining a height of about 45 cm.

Kochila *(Strychnos nux-vomica)*

English Name : Nux- vomica Family : Loganiaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is found in different forests having lateritic soil.

Flowering : Small greenish white flowers appear from March to May.

Fruit ripening : Globose fruits ripen during January to June.

Seed Collection & storage : Seeds are collected from January to March. Pulp of the fruit is washed and the seeds are dried in the sun. Seeds retain viability for about 1 year.

Seed weight : 500 to 600 per kg.

Germination % : 20 to 30

Plant percent : 25

Germination period : 60 to 70

Pretreatment of seed : Pre soaking in warm water for 48 hours

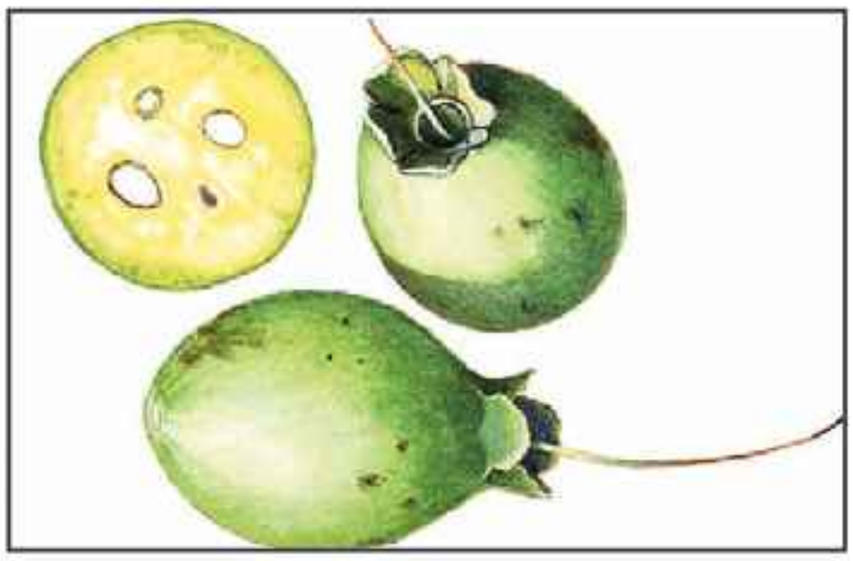
Seed dibbling : Fresh seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Growth of seedlings in nursery stage is slow and one year old seedlings are planted during next July.. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery

Plantable Seedling : Since growth of the seedlings is very slow in the nursery stage, seedlings are planted during next year July attaining a height of around 50 cm. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Kumbhi *(Careya arborea)*

Common Name : Wild Guava Family : Lecythidaceae

Branch with fruits



Seeds from Ripe Fruits

Distribution : Found through out the state in most part of the forest areas. It is a good coppicer.

Flowering : Yellowish or greenish white flowers with foetid smell appear in March & April when trees are with out leaves.

Fruit ripening : June-July.

Seed Collection & storage : Seeds more in number; are embedded in fleshy pulp.

Seed weight : 2500 to 2800 per kg.

Germination % : 25 to 30

Plant percent : 25

Germination period : 15 to 20 days

Seed Pretreatment : Not required.

Seed dibbling : Seeds are dibbled in polythene bags during June-July having soil mixture of soil, sand sand and FYM. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Seeds can also be sown in raised mother beds, by line sowing, during June July and transplanted into poly pots after 45 days when the seedlings are about 4 cm height having three to four leaves and maintained as above.

Plantable Seedling : Seedlings are planted during next year July attaining a height of at least 50 to 60 cm. Hence polythene bags of size 10"x6" are desirable to be used as seedlings are kept in the nursery for more than one year.

Kusuma *(Schleichera oleosa)*

English Name : Kusum / Lac tree

Family : Sapindaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is commonly found in different forest areas of the state preferably in sandy loam soil and is a shade bearer.

Flowering : Greenish yellow flowers appear during February-March.

Fruit ripening : June-July.

Seed Collection & storage : Fruits are collected from floor of the ground under the mother tree during June-July, dried and thrashed to separate the seeds retain viability for around 6 months.

Seed weight : 1000 to 1200 per kg.

Germination % : 50 to 60

Plant percent : 60

Germination period :15 to 45 days

Pretreatment of seed : Pre soaking in cold water for 12 hours

Seed dibbling : Fresh seeds are dibbled in polythene bags during June having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. To attain required height growth one year old seedlings are planted during next July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery.

Plantable Seedling: One year old seedlings are planted during next year July, attaining a height of around 60 cm.

Mahula (*Madhuca longifolia*)

English Name : Mahuwa Family : Sapotaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Distributed in moist & dry mixed deciduous forest. Recommended for Plantation in sandy soil but also grows in shallow & boulder soil.

Flowering : Green colored scented flowers appear in February to April.

Fruit ripening : June to July

Seed Collection & storage : Ripen fruits (Drupes) are collected by shaking the branches and the seeds are separated from the fruits by pressing and they are then dried. Seeds are being oily, loose viability early on storage.

Seed weight : 600 to 700 per kg.

Germination percentage : 20 to 50

Plant percent : 15 (100 seedlings per kg of seed)

Germination period : 10 to 20 days

Pretreatment of seed : Not required.

Seed dibbling : Seeds are dibbled in polythene bags during June- July having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. The growth of seedlings in the nursery is slow and are to be planted in next year July. Hence polythene bags of size 10"X6" size are suitable as the seedlings are kept for more than one year in the nursery.

Transplanting : Seeds can also be sown in raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Mulching with hay & over head shade is to be provided to facilitate germination. Regular watering twice a day is to be followed. Seedlings can be transplanted from mother beds to Poly pot when 2 to 4 cm in height.

Plantable Seedling : Growth of seedlings is slow at nursery stage for which seedlings are planted during next year July with a height of 50 to 60 cm.

Moi *(Lannea coromandelica)*

English Name : Wodier Family : Anacardiaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Distributed in moist & dry deciduous forest. It is a light demander, drought resistant and a good coppicer. Recommended for Plantation in deep alluvial soil.

Flowering : Flowers in spikes appear in February to April.

Fruit ripening : May to July

Seed Collection & storage : Ripen fruits (Drupes) are collected during May-June. Seeds loose viability early.

Seed weight : 5,000 to 6,000 per kg.

Germination % : 40 to 60

Plant percent : 15 (800 to 3000 seedlings per kg of seed)

Germination period : 15 to 20 days

Pretreatment of seed : 24 hours pre soaking in cold water

Seed sowing : Dried seeds are sown on a raised mother bed during June with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & FYM in a proportion of 1:2:1 covered with mulching material of straw. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate. Seeds are sown in lines 10 to 10 cm apart and 10 cm apart in the lines.

Transplanting : Seedlings of 2 to 3 cm height are transplanted to polythene bags having soil mixture of soil sand and FYM (1:1:1). & in each polythene bag the transplanted seedling are put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept, in the nursery beds, on polythene sheet to prevent root penetration into soil. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Plantable Seedling : One year old seedlings attaining at least 60 cm are planted during next year July.

Muchukunda (*Pterospermum acerifolium*)

English Name : Kanaka champa Family : Sterculiaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is a large evergreen tree found in the mixed semi evergreen, evergreen forests and also planted as an ornamental plant.

Flowering : March to July.

Fruit ripening : The capsules ripen in the following year during April to July.

Seed Collection & storage : Seeds are collected in April and remain viable for about one year.

Seed weight : About 4000 per kg.

Germination % : 60 to 70

Plant percent : 50 (Around 2000 seedlings from 1 kg of seed)

Germination period : 15 to 60 days

Seed Pretreatment : Not required.

Seed sowing : Seeds are sown in April in the raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate Mulching with hay & over head shade are to be provided to facilitate germination. Regulated watering twice a day is to be followed.

Transplanting : Seedlings are transplanted when 2 to 4 cm in height to poly pots having soil mixture of soil, sand and FYM in a proportion of 1:1:1 & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Root cutting, grading, re setting of poly pot seedlings are done at a regular interval of about 45 days. The poly pots are kept on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings of 45 to 60 cm height may be planted during July and for avenue plantation to prepare tall seedlings it can be used during next year July by using polythene bags of 10"x6" size.

Mundi (*Mitragyna parvifolia*)

English Name : Keli Kadam Family : Rubiaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is found growing in well drained forest land with deep soil. It is also recommended for plantation in black cotton soil & aullvial ground near rivers.

Flowering : Flowers are white or pale yellow & appear in June & July

Fruit ripening : November to January

Seed Collection & storage : Ripen fruits are collected during December to January and dried in the sun to break and then immersed in water to separate the fertile seeds which settled down. The fertile seeds are dried in the sun and then cleaned by winnowing. Seeds have got low viability and should be sown immediately.

Seed weight : Arround 1,00,000 per kg.

Germination % : About 50

Plant percent : 40 to 50

Germination period : 30 to 50 days

Pretreatment of seed : Not required

Seed sowing : Seeds are broadcasted during March – April on raised beds with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & manure in a proportion of 1:2:1 covered with mulching material of straw. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shading may be provided to mother beds in areas with hot climate. Since the seedlings are very minute and delicate, watering is to be done carefully in a regulated manner to prevent wash out, damping off & insect attack.

Transplanting : Two month old seedlings attaining height of 3 to 4 cm are transplanted to polythene bags having soil mixture of soil sand and FYM (1:1:1) & in each polythene bag the transplanted seedling is put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept on polythene sheet, in the nursery beds, to prevent root penetration into soil.

Planable Seedling : Seedlings are fit for planting during July next year since its growth is slow in the 1st year. Polythene bags of size 10"x6" are used as seedlings are kept for more than one year in the nursery.

Neem (*Azadirachta indica*)

English Name : Neem Family : Meliaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It grows on a variety of soils from sandy to clayey to black cotton soil. Commonly found in dry area with well drained soil. Grows well where drainage is good and sub soil water level is fairly high.

Flowering : March -April

Fruit ripening : June to August

Seed collection & storage : Ripen fruits are collected from the trees are swept from the floor under the trees. The pulp is washed up and seeds collected are dried in shade & used soon as it loose viability in 2 weeks.

Seed weight : 3000 to 4000 per kg

Seedlings per kg of seed : 1000 to 2000

Germination % : 70 to 90

Plant percent : 40 to 50

Germination period : 10 to 20 days

Seed pretreatment : Pre soaking in cold water for 24 hours

Seed sowing : Dried seeds are sown on a raised bed during June with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & FYM in a proportion of 1:2:1 covered with mulching material. Vermi compost / neem oil cake can be used as a substitute to FYM which can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate. Seeds are sown in lines 10 to 15 cm apart and 5 cm apart in the lines.

Transplanting : Seedlings of 2 to 3 cm height are ready for transplanting. Seedlings are transplanted to polythene bags having soil mixture of soil sand and FYM (1:1:1). & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept, in the nursery beds, on polythene sheet to prevent root penetration into soil. Polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Plantable Seedling : Poly pot seedlings of one year old are suitable for planting during next year July when the seedling height reaches at least 60 cm.

Oau (*Dillenia indica*)

English Name : Elephant apple Family : Dilleniaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is an evergreen tree which is usually found in human habitations rather than any forest area of the state and grows well in sandy loam soil.

Flowering : White flower appear from June to August and the petals fall quickly.

Fruit ripening : October and continue fall on the ground till March-April of the next year.

Seed Collection & storage : Seeds of reniform shape and sunk in a gelatinous pulp inside ripen fruits are collected from Dec. to Jan, thoroughly dried in the sun and the separated by winnowing. Viability of the seed is very low.

Seed weight : 30000 to 40000 per Kg.

Germination % : 20

Plant percent : 5

No of Seedlings per Kg of seed : 1500 - 1600

Germination period : 15 to 20days

Pretreatment of seed : Not required

Seed sowing : Seeds are sown in March in raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate Mulching with hay & over head shade are to be provided to facilitate germination. Regulated watering twice a day is to be followed.

Transplanting : Seedlings are transplanted when 2 to 4 cm in height to poly pots having soil mixture of soil, sand and FYM in a proportion of 1:1:1 & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Root cutting, grading, re setting of poly pot seedlings are done at a regular interval of about 45 days. The poly pots are kept on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are ready for plantation during July when the height is about 40 to 45 cm.

Pahadi sissoo (*Dalbergia latifolia*)

English name : Indian Rose wood

Family : Fabaceae

Branch with fruits

Seeds from Ripen Fruits

Distribution : Distributed in moist deciduous forest of different districts of the state but now here abundant. It is a drought resistant and a good coppicer. Recommended for the plantation in good, deep loam or clayey soil containing lime.

Flowering : Panicles appear in June-July.

Fruit ripening : December to March.

Seed collection & & storage : Ripe dark brown fruits (pods) are collected from the trees by lopping the branches dried in the sun and broken before dehiscing and are dried to get the seeds. Seeds can be stored up to one year.

Seed weight : 20000 per Kg.

Germination % : 50 to 60

Plant percent : 40

No of Seedlings per Kg of seed : Around 10 000

Germination period : 10 to 20 days

Pretreatment of seed : Not required

Seed sowing : Seeds are sown in March in the raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate Mulching with hay & over head shade are to be provided to facilitate germination. Regulated watering twice a day is to be followed.

Transplanting : Seedlings are transplanted when 2 to 4 cm in height to poly pots having soil mixture of soil, sand and FYM in a proportion of 1:1:1 & in each polythene bag the transplanted seedling shall be put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Root cutting, grading, re setting of poly pot seedlings are done at a regular interval of about 45 days. The poly pots are kept on polythene sheet to prevent root penetration into soil. Since growth of seedlings in the nursery is fast, It is better to use polythene bags of size 10"x6" size.

Plantable Seedling : Seedlings are fit for planting during July of the same year during which it attains height of 45 cm to 60 cm.

Patuli/Padhel *(Stereospermum suaveolens)*

English Name : Family : Bignoniaeae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is found in different forest areas of the state having clayey soils.

Flowering : April to June

Fruit ripening : Capsules ripen during March to May

Seed Collection & storage : Fruits are plucked from the trees during March-April before dehiscence and dried in the sun on a cloth to separate the membranous seeds. Seeds retain viability for about one year.

Seed weight : 25000 to 27000 per kg.

Germination % : 40 to 50

Plant percent : 20 (5000 to 6000 seedlings per kg).

Germination period : 15 to 20 days

Pretreatment of seed : Not required.

Seed sowing : Dried seeds are sown on a raised bed during April with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & FYM in a proportion of 1:2:1 covered with mulching material of straw. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate. Seeds are sown in lines of 10 cm apart and within the line also 10 cm apart.

Transplanting : After about one month of seed sowing, seedlings of 2 to 3 cm height are ready for transplanting to polythene bags. Seedlings are transplanted to polythene bags having soil mixture of soil sand and FYM (1:1:1). & in each polythene bag the transplanted seedling are put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept, in the nursery beds, on polythene sheet to prevent root penetration into soil. It is better to use polythene bags of size 10"x6" size as it is kept for more than 8 to 9 months in the nursery.

Plantable Seedlings : Since growth of the seedlings is slow in the nursery stage, seedlings are planted during next year July attaining a height of at least 60 cm. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Pesta Badam *(Terminalia catappa)*

Common Name : Indian almond

Family : Combretaceae

Branch with fruits

Seeds from Ripen Fruits

Distribution : It grows well in loose, well drained and fertile soil such as sandy loam & clayey loam. It is commonly planted in avenue, institutions and parks.

Flowering : Greenish white flowers in spikes appear in April to June.

Fruit ripening : Fruits ripen from January to March and fall after ripening.

Seed Collection & storage : Ripen fruits are collected from the previously cleaned ground. The fruits are then dried under shade for 2 to 3 days and stored in gunny bags. Viability remains up to one year. Fresh seeds germinate better.

Seed weight : 140 to 160 per kg.

Germination % : 40 to 50

Plant percent : 50 (Around 70 seedlings from 1 kg of seed).

Germination period : 20 to 30 days

Pretreatment of seed : Pre soaking in warm water for 24 hours. The seeds are mixed with cow dung, heaped and watered twice a day. When the seeds begin to sprout they are removed and sown / dibbled in poly pots.

Seed dibbling : Pre- treated seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are planted during next year July attaining a height of about 45 cm. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

Piasal (*Pterocarpus marsupium*)

English Name : Bijasal Family : Fabaceae

Branch with fruits

Seeds from Ripen Fruits

Distribution : It is a common tree of moist & dry deciduous forests of the State. It grows better on well drained alluvial and a sandy loam soil.

Flowering : Golden yellow flowers in panicles appear from June to Oct.

Fruit ripening : December to March

Seed Collection & storage : Ripen pods are collected during March from the trees or from the ground.

Seed weight : Around 2000 per kg.

Germination % : 40 to 50

Plant percent : 20 to 30

Germination period :30 to 40 days

Pretreatment of seed : Pre soaking in cold water for 72 hours and in cow dung slurry for 48 hours.

Seed dibbling : Fresh seeds are dibbled in polythene bags during April having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Growth of seedlings in nursery stage is slow and one year old seedlings are planted during next July. Hence polythene bags of size 10"X6" size are suitable as the seedlings are kept for more than one year in the nursery.

Transplanting : Seeds can also be sown in raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil during April. Mulching with hay & over head shade are to be provided to facilitate germination. Regular watering twice a day is to be followed. Seedlings can be transplanted from mother beds to Poly pot when 2 to 4 cm in height and maintained as stated above.

Plantable Seedling : One year old seedlings attaining a height of at least 60 cm are planted during next July.

Prosopis *(Prosopis juliflora)*

English Name : Nesquite (Prosopis) Family : Mimosaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is a western Indian species & planted mainly for green fencing and also in dry localities. It doesn't tolerate water logged conditions.

Flowering : Yellow terminal panicles appear once in Sept-Oct & next in Feb-March

Fruit ripening : Pods ripen twice. Once in Nov-Dec & next in April-June.

Seed Collection & storage : Ripen pods are collected and soaked in water for 10 days, dried and separated into single segmented seeds which are used in the nursery.

Seed weight : 20,000 per kg.

Germination % : 70 to 80

Plant percent : 60

Germination period : 20 to 30 days

Pretreatment of seed : Pre soaking in cold water for 24 hours

Seed dibbling : Fresh seeds are dibbled in polythene bags during April having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings attaining height of 45 cm are planted during July.

Radhachuda *(Peltophorum pterocarpum)*

English Name : Yellow gold Family : Caesalpiniaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Recommended for plantation in avenue, institutions and parks

Flowering : Yellow color flowers in large panicles are seen commonly during January to March

Fruit ripening : During March-April

Seed Collection & storage : Ripen pods are plucked from the branches, lopped and dried in the sun for 10 to 15 days and then are used for raising nursery.

Seed weight : 10,000 to 15,000 per kg.

Germination % : 10 to 20

Plant percent : 5 to 10

Germination period : 10 to 20 days

Pretreatment of seed : 24 hours pre soaking in warm water

Seed dibbling : Seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. The growth of seedlings in the nursery is fast and are to be planted in next July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery.

Plantable Seedling : Seedlings are ready for planting during July when attain a height of 45 to 60 cm.

Rai (*Dillenia pentagyna*)

English Name : Karmal Family : Dilleniaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is a large deciduous tree which is usually found in mixed deciduous forest areas of different divisions of the state.

Flowering : February-March when trees are with out leaves.

Fruit ripening : June-July.

Seed Collection & storage : Seeds, more in number; are embedded in fleshy pulp.

Seed weight : 2500 to 2800 perkg.

Germination % : 25 to 30

Plant percent : 25

Germination period : 15 to 20 days

Seed Pretreatment : Not required.

Seed dibbling : Seeds are dibbled in polythene bags during June-July having soil mixture of soil, sand and FYM. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Seeds can also be sown in raised mother beds, by line sowing, during June July and transplanted into poly pots after 45 days when the seedlings are about 4 cm height having three to four leaves and the poly pots are then maintained as above.

Plantable Seedling : Seedlings are planted during next year July attaining a height of at least 50 to 60 cm. Hence polythene bags of size 10"x6" are desirable to be used as seedlings are kept in the nursery for more than one year.

Raktachandan *(Pterocarpus santalinus)*

English Name : Red Sander Family : Fabaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is endemic to south Andhra Pradesh but plantations of red sanders are found in a 3 to 4 places of Odisha. Recommended for plantation in lateritic loamy soil.

Flowering : Yellow flowers appear in April-May

Fruit ripening : Fruit ripen in next year Feb-March

Seed Collection & storage : Ripen pods are collected during March from the trees or from the ground. Dried in sun for 3 days.

Seed weight : 1000 to 1200 per kg.

Germination % : 40 to 50

Plant percent : 30 to 40

Germination period : 30 to 40 days

Pretreatment of seed : Presoaking in cold water for 72 hours and in cow dung slurry for 48 hours.

Seed dibbling : Fresh seeds are dibbled in polythene bags during April having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Growth of seedlings in nursery stage is slow and one year old seedlings are planted during next July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery.

Transplanting : Seeds may also be sown during April in raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Mulching with hay & over head shade are to be provided to facilitate germination. Regular watering twice a day is to be followed. Seedlings can be transplanted from mother beds to Poly pot when 2 to 4 cm in height and maintained as stated above One year old stumps can be prepared in the mother bed which can be used during next March for raising pre spouted poly pot seedlings.

Plantable Seedling : One year old seedlings can be planted attaining a height of at least 60 cm.

Rithaphala *(Sapindus emarginatus)*

English Name : Soap nut Family : Sapindaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It doesn't occur wild in forest but is planted in the villages and other such areas.

Flowering : White flowers appear in cluster during Oct to Dec

Fruit ripening : February to April

Seed Collection & storage : Fruits are collected from the floor of the ground under the tree during March and dried for 3 to 4 days. Single seeds are removed from the dried foods.

Seed weight : 1500 to 2000 per kg.

Germination % : 40 to 50

Plant percent : 50

Germination period :15 to 25 days

Pretreatment of seed : Pre soaking in cold water for 12 hours

Seed dibbling : Fresh seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Growth of seedlings in nursery stage is slow and one year old seedlings are planted during next July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery

Plantable Seedling: One year old seedlings are planted during next year July, attaining a height of around 60 cm.

Rohini *(Soymida febrifuga)*

English Name : Indian Red Wood

Family : Meliaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is found in the dry deciduous forests. It is recommended for plantation on lime soil, black cotton soil & in dry areas having lateritic and kankar soil.

Flowering : Large panicles of small Greenish white flowers appear during May-June.

Fruit ripening : Capsules ripen in May-June.

Seed Collection & storage : Fruits are collected from the trees during February-March before they dehisce and dried in the sun to separate the seeds. Seeds loose viability quickly.

Seed weight : 8000 to 9000 per kg.

Germination % : 20 to 40

Plant percent : 25

Germination period : 15 to 20 days

Pretreatment of seed : Pre soaking in cold water for 24 hours.

Seed dibbling : Fresh seeds are dibbled in polythene bags during May having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. Growth of seedlings in nursery stage is slow and one year old seedlings are planted during next July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery.

Plantable Seedling : Since growth of the seedlings is very slow in the nursery stage, seedlings are planted during next year July attaining a height of around 60 cm.

Salia Bamboo (*Dendrocalamus strictus*)

English Name : Bamboo Family : Poaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : This is the most common bamboo occurring in deciduous forest of almost all the districts. It prefers well drained soil. Growth of the clumps depends upon soil fertility .

Flowering : Sporadic flowering is more common and gregarious flowering occurs once in twenty to thirty years.

Fruit ripening : March-April.

Seed Collection & storage : Fruits are collected by cleaning the ground and then lopping the panicles.

Seed weight : 20000 per Kg.

Germination % : 50 to 60

Plant percent : 40

No of Seedlings per Kg of seed : Around 10 000

Germination period : 10 to 20 days

Pretreatment of seed : Not required

Seed sowing : Seeds are sown in March in the raised mother beds having soil mixture of soil sand and FYM (1:2:1) preferably using sandy loam soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown in lines 6 cm x 6 cm so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate Mulching with hay & over head shade are to be provided to facilitate germination. Regulated watering twice a day is to be followed. Commonly, one year old rhizomes are prepared from the mother bed & put in poly pots in the month of March.

Transplanting : Rhizomes of 2 to 4 cm length ,prepared from the mother beds, and dressed are transplanted to poly pots filled with soil mixture of 1:1:1. & in each polythene bag the transplanted rhizome shall be put at the centre just flush to the soil level and covered with mulching. The Proportion of soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Root cutting, grading, re -setting of poly pot seedlings are done at a regular interval of about 45 days. The poly pots are kept on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are fit for planting during July attaining height of about 60 cm. It is better to use polythene bags of size 10"x6" size as the seedlings are prepared from the pre sprouted rhizomes.

Sidha (*Lagerstroemia parviflora*)

English Name : Benteak Family : Lythraceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Distributed in moist & dry deciduous forest. It is a light demander, drought resistant and a good coppicer. Recommended for Plantation in good, deep loam or clayey soil.

Flowering : White flowers in auxiliary & terminal panicles appear during April to June.

Fruit ripening : December to February

Seed Collection & storage : Ripen fruits (capsules) are collected during February before they open, dried in the sun and the seeds extracted by beating and then cleaned. Seed availability is very low.

Seed weight : 25,000 to 30,000 per kg.

Germination percentage : 2 (very low)

Plant percent : 2

Germination period : 15 to 20 days

Pretreatment of seed : 24 hours presoaking in cold water

Seed dibbling : Seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil. The growth of seedlings in the nursery is slow and are to be planted in next year July. Hence polythene bags of size 10"x6" size are suitable as the seedlings are kept for more than one year in the nursery.

Plantable Seedling : One year old seedlings attaining at least 60 cm are planted during next year July.

Sima Kayan *(Pithecellobium dulce)*

English Name : Manila tamarind Family : Mimosaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Commonly found in hot regions outside the forests.

Flowering : Globose flowers appear in January to March

Fruit ripening : March to May

Seed Collection & storage : Ripen pods are collected during April-May, dried in sun and thrashed to get the seeds. Fresh seeds are sown since viability is low

Seed weight : 5000 per kg.

Germination % : 60 to 70

Plant percent : 50 (2000 seedlings per kg)

Germination period : 10 to 15 days

Pretreatment of seed : Not required.

Seed dibbling : Seeds are dibbled in polythene bags during April having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are ready for planting during July when attain a height of about 45 cm.

Sunari (*Cassia fistula*)

English Name : Indian labarnum Family : Caesalpiniaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : Found in the forest through out the state more commonly in dry deciduous forest in eroded lands more commonly in clay soil. A good sps for afforestation in shallow laterite and stony soil. A good coppice.

Flowering : April-May

Fruit ripening : January to March

Seed collection & storage : Fruits (Ripe pods) are collected during April-May after getting separated from the pulp, washed with cold water and dried. Viability is for at least one year.

Seed weight : 6000 per Kg.

Germination % : 40

Plant percent : 30

No of Seedlings per Kg of seed : 2000

Germination period : 40 to 60 days

Pretreatment of seed : Pre soaking in hot water for 24 hours

Seed dibbling : Seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, resetting of poly pot seedlings are done at a regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are planted during next year July when they attain height of 50 cm. Hence, polythene bags of size 10"x6" size are used.

Swarna champa *(Michelia champaca)*

English Name : Champ Family : Magnoliaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is not commonly found in wild rather it is grown as an avenue / institutional / in temple /garden plant. It can preferably planted in loamy soil.

Flowering : Usually April to June & in certain conditions it may continue up to December.

Fruit ripening : August-September

Seed Collection & storage : Ripen fruits are collected during August-September, heaped in shade for 2-3 days till they open completely and then the seeds are removed manually. Seeds loose viability soon & hence to be used within 3 to 4 days.

Seed weight : About 1000 per Kg.

Germination % : 60 to 70

Plant percent : 40

No of Seedlings for Kg of seed : Around 1000

Germination period : 15 to 25 days

Pretreatment of seed : Not required

Seed sowing : Dried seeds are sown on a raised bed during September with a bottom layer (8 cm to 10 cm) of ash produced by burning brush wood covered with a fine layer (5 cm to 8 cm) of soil mixture of soil, sand & FYM in a proportion of 1:2:1 covered with mulching material of straw. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Neem cake can also be useful as an organic pesticide. Seeds may be treated with fungicide (Bavistin) and soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Seeds are normally sown so deep that the depth of the soil above it is not more than the minimum diameter of the seed. Shade is to be provided in areas with hot climate. Seeds are sown in lines 10 to 10 cm apart and 10 cm apart in the lines.

Transplanting : After about one month of seed sowing, seedlings of 2 to 3 cm height are ready for transplanting to polythene bags. Seedlings are transplanted to polythene bags having soil mixture of soil sand and FYM (1:1:1). & in each polythene bag the transplanted seedling are put at the centre. The Proportion in soil mixture may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done in the nursery at a regular interval of about 30 days. The poly pots are kept, in the nursery beds, on polythene sheet to prevent root penetration into soil. It is better to use polythene bags of size 10"x6" size as it is kept for more than 8 to 9 months in the nursery.

Plantable Seedling : Seedlings may be ready for planting during July next year when the height is about 60 cm.

Tentera *(Albizia odoratissima)*

English Name : Black siris, Ceylon rosewood Family : Mimosaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It grows in forest areas of different divisions on a variety of soil.

Flowering : Pale yellow to white colored flowers in globose heads appear from April to June.

Fruit ripening : January-February when seeds fall from the dehiscent pods.

Seed Collection & storag : Ripe pods are collected by lopping the braches as soon as they start dehisce eduring January-February. Pods are dried in the sun to open and seeds are collected, dried and stored. Viability may retain up to one year.

Seed weight : 12000 to14000 per kg.

Germination percentage : 40 to 50

Plant percent : 40

Germination period : 10 to 20 days

Pretreatment of seed : Pre soaking in cold water for 24 hours.

Seed dibbling : Pre-treated seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Seedlings are planted during next July attaining a height of about 45 cm.

Tentuli *(Tamarindus indica)*

Common Name : Tamarind Family : Caaesalpiniaceae

Branch with fruits

Seeds from Ripe Fruits

Distribution : It is commonly found near village out skirts / road side and open village community areas. Recommended for enrichment / NTFP plantation in dry deciduous forest.

Flowering : April to June

Fruit ripening : Fruits (pods) ripen in March.

Seed Collection & storage : Fresh ripe fruits are collected from the ground under the mother tree after beating the branches if necessary. The pods are then dried in the sun & shells are removed. Seeds are separated from the dry pulp. Then the seeds are dried in shade and used for raising the nursery. Viability of the seeds is retained up to one year.

Seed weight : 1400 to 2000 per kg.

Germination % : 60 to 70

Plant percent : 40

Germination period : 15 to 20 days

Pretreatment of seed : Overnight pre soaking in warm for 12 hours

Seed dibbling : Fresh seeds are dibbled in polythene bags during March having soil mixture of soil sand and FYM (1:1:1). The Proportion may be modified depending upon nature of soil. Vermi compost / neem oil cake can be used as manure to an available extent as a substitute to FYM. Soil mixture may be treated with insecticide like chloropyrophos to prevent white ant attack. Organic pesticide is more desirable. Mulching is to be provided to facilitate germination. Seeds are normally dibbled at the centre of poly pots so deep that the depth of the soil above it is not more than the diameter of the seed. Regular watering twice a day is to be followed. Shade may be provided depending upon intensity of sun light. Root cutting, grading, re setting of poly pot seedlings are done at regular interval of about 30 days. The poly pots are kept in the nursery bed on polythene sheet to prevent root penetration into soil.

Plantable Seedling : Growth of the seedlings is slow in the nursery stage and therefore one year old seedlings are planted during next year July attaining a height of about 50 cm. It is better to use polythene bags of size 10"x6" size as it is kept for more than one year in the nursery.

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