

GUIDE TO IMPROVED CITRUS PRODUCTION

INTRODUCTION: Citrus trees are widely cultivated in the country and rated to be among fruit trees which are of national importance. It also has wide acceptability. The fruits are major sources of vitamins necessary for the human body. Improved budded citrus seedling can be obtained through budding, because of advantages of budded trees over those raised directly from seeds. Such advantages include: early maturity, pests and disease resistance, reduced tree size, higher and regular fruiting pattern with good fruit quality.

CONDITIONS FOR SITES SELECTION (PRE-NURSERY/NURSERY)

- Site should be close to all season/permanent source of water
- Site should be relatively flat and accessible
- Soil should be free from hard pan rocks.
- Soil should be fertile and well drained.

PRE-NURSERY

i. Land Preparation

- Slash, stump, plough, harrow and planting bed using light equipment
- Make 1m wide planting bed of any convenient length

ii. Selection and Processing of Rootstock Seeds:

- Select Cleopatra mandarin and Rough lemon rootstocks for rain forest and savannah ecologies, respectively.
- Harvest ripe fruits from November-January
- Cut fruits (transversely) without cutting deep and twist to extract seeds
- Wash seeds with river sand and air dry under shade
- Air-dried seeds not sown should be treated immediately with Thiaabendazole (fungicide).

iii. Establishment and Management

- Air-dried seeds should be sown not later than one week after seed extracted and stored in baft bag to enhance good germination.

- Sow seeds across the bed in shallow furrows spaced 15cm apart.
- Mulch with dry grass
- Water twice a week
- Apply fertilizer (urea at 4 weeks interval)
- Spray Thiazobenzodazole + Cypermethrin mixture bi-weekly for pests and diseases control if infestation is observed.
- Hand hoe weeds at 4-6 weeks interval
- Transfer to the main nursery when the seedlings have attained 15-20cm height (4-6months).

Citrus pre-nursery bed

MAIN NURSERY

- Select a manageable plot size of 5m x 20m
- Punch holes with a punching rod.
- Select 4-6 month old, vigorous and healthy seedlings for transplanting
- Plant spacing at 30cm x 40cm (Cleopatra mandarin), 40cm x 40cm (Rough lemon)
- Carry out routine weeding and watering.
- Apply fertilizer 200 – 400kgN/ha at 4-6 weeks interval, 2-3 split doses
- Prune any lateral shoots from the rootstock seedling below 35cm to maintain a main stem.
- Spray with Thiazobenzodazole + Cypermethrin bi-weekly for pest and diseases control. If infestation is observed.
- Seedlings are ready for budding when the stem diameter size is 0.60-0.70cm

BUD-WOOD PREPARATION

- Collect bud-wood from an already fruiting of choice variety
- Prune leaves of the bud-wood leaving a small petiole to each bud.
- Bud-wood should be of same size with the rootstock.
- Store unused bud-wood in a cool place to preserve viability.

BUDDING MATERIALS

- Rootstock seedling adapted to the environment
- Bud-wood (scion) of the desired variety

- Secateurs for pruning
- Budding knife for budding
- Budding tape for tapping scion with the rootstock
- Budding stool for comfort of the budders when budding
- Rain-boots for budders safety on the farm
- Nylon spread to preserve budding materials from contamination.

BUDDING PROCESS AND CARE

- Bud under favourable environment condition (enough) moisture in the soil, cool weather conditions).
- Make an inverted “T” cut on the rootstock stem at 20-30cm above ground level
- Cut out a shield like bud of about 3cm long with a budding knife.
- Insert bud in the inverted ‘T’ cut
- Tie the bud firmly with budding tape.
- Greenness of bud eye two weeks after budding indicates success.
- Cut the rootstock 5-10cm above bud union to force the bud to ‘break/burst’.
- Regularly prune any offshoot from the rootstock every 3-4 weeks
- De-top the scion when it is 45cm long to promote the development of lateral branches (at 4-6months).
- Pot budded citrus using mixture of top soil and sawdust at ratio 2:1

ORCHARD ESTABLISHMENT AND MANAGEMENT SITE SELECTION AND PREPARATION.

- Citrus can be grown on a wide range of soil types, from the coast to the Northern part of Nigeria.
- Sandy loam soil is best for the cultivation of citrus
- Use soils that drain water freely.
- Saline soils or soil with underlying hardpan of about 1m to the surface soil should not be used.
- Clear site of all trees
- Remove stumps and plough before planting.

PROPAGATION

- Plant only budded seedlings in the orchards
- Unbudded seedlings take a long to fruit and may not be true-to-type
- Obtain budded seedlings from reputable sources like NIHORT, State Ministry of Agriculture and ADPs.

ORCAHRD ESTABLISHMENT

- Establish citrus orchards when rains are steady. (Southern Nigeria-May, Northern Nigeria-July/August)
- Dip planting holes in advance before purchasing budded seedlings
- Planting holes for sweet orange and medium canopy size tree should be 25cm x 25cm x 25cm in size.
- Set the seedlings in the holes which have been half-filled with rich topsoil.
- Shovel back the soil which was initially dug out
- Ram the soil firmly around the bussed seedlings
- Seedlings should not be planted deeper than they had grown in the survey.

ORCHARD MANAGEMENT

I. Weed Control

- Slash the orchard at least 3 times in a year for orchards that are more than 7 years.
- The last round of weed slashing should be at the onset of dry season
- Ring-weed individual trees constantly
- Herbicide such as Paraquant/Glyphosate can be used for weed control according to recommendation.

II. Insect/Pest Control

- Nursery pests are mostly leaf eating insects
- Control caterpillars with Cymbus, Ambush, or Sherps plus at the rate of 5ml/10l of water for 3-5trees, depending on level of infestation.
- Orchard pests are mostly scale insects, fruit flies, fruit piercing moths and bugs.

- Control the scale insect using Sherpa plus or ultracide mixed with any light oil (not petrol) apply at 5ml/10l.
- Early spraying (before ripening) with Malathin or dimethoate at two weeks interval minimizes attack. Alternatively and more environmental friendly is the use of traps baited with yeast solutions (obtained locally from brewery wastes) or Parapheromones for mass trapping. Baiting should be accompanied with cultural practices such as early harvest at 50% ripening and removal + deep burying of dropped fruits.
- Control of fruit fly, fruit piercing moth and bug using integrated approach is best under close supervision by experts.

III. **Fungal Disease Control:** Disease of citrus affects the leaves, stem, root and fruits on the field during storage. Some of the diseases include:

- Twig or branch dieback
- Fruit rot
- Brown rot gummosis
- Blast
- Control fruit anthracnose and phytophthora rot with Thiabendazole at 10ml/10L water.
- Seek advice of Crop Protection scientists for the control of gummosis, scab and root rot attack.

IV. **Viral Disease Control:** Viral diseases of citrus include scaly back, Exocortis, psorosis, citrus greening and tristaza diseases. They attack seedlings and mature Plants.

Control is by:

1. Sterilize budding tools
2. Use Disease-free budwood
3. Integrated approach under close supervision (i.e. integrated pest management)

V. **Nematode Disease Control:** Nematode diseases of citrus include citrus decline and /or die back disease. They attack nursery seedlings as well as establishment trees.

Control is by:

1. Raising seedling in sterile soil
2. Field sanitation
3. Use disease-free propagules
4. Integrated approach under close supervision.

VI. **Fertilizer application:** Fertilizer may not be necessary during the 1st year of planting in the orchard. Subsequent application of recommendation rates should be as follows:

- 2-4years of age: 500g of N.P.K. 15:15:15 PER TWICE IN THE YEAR.
- 5-10years of age: 2kg of N.P.K. 15:15:15 + 600g of K₂O per tree, twice in the year (i.e. June and Sept.)

VII. **Irrigation**

- Lack of adequate moisture depresses citrus yield
- Provide enough water for citrus trees during the long dry season of November – February.
- Apply 10litres of uncontaminated water to the base of each citrus tree twice in a week.

VIII. **Intercropping citrus with selected field crops**

- Utilize the alleys/inter row space between the citrus trees for additional income before the canopy closes.
- Grow compatible crops such as groundnut, maize, cowpea, soyabean, watermelon, egusi melon, okra, pepper and leafy vegetables (until the canopy closes).
- Do not intercrop cassava, plantain and pineapple with citrus.
- Leave a distance of about 1m between the citrus trees and the arable crops
- Adopt effective pest/disease management
- Apply 300-400kg/ha of NPK 15:15:15 as base application (i.e. Work the fertilizer into the soil before planting of intercrops.) Intercropping helps to maximize land utilization and control weeds.

Expected yield from the seventh year.

- 20-40t/ha depending on the variety/species.

NOTE: Feasibility report on Citrus production is available on request.

For further information, contact

Office of the Executive Director
National Horticultural Research Institute
PMB 5432, Jericho GRA
Idi-Ishin, Dugbe, Ibadan
info@nihort.gov.ng, nihortinfo@yahoo.com
www.nihort.gov.ng