



PYRETHRUM PROPAGATION METHODS



NAVCDP

NATIONAL AGRICULTURAL VALUE CHAIN
DEVELOPMENT PROJECT

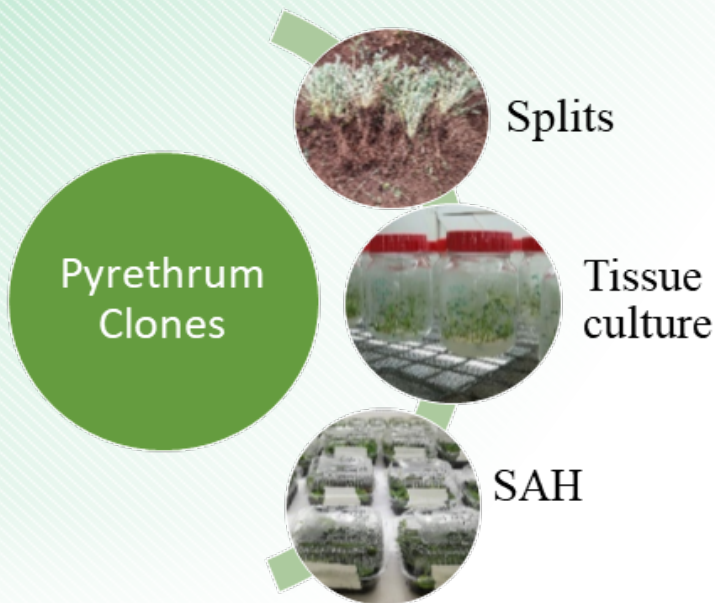
Introduction

Propagation is the process of creating new plants from existing ones sexually through seeds or asexually through vegetative methods such as splitting, tissue culture or semi-autotrophic hydroponics.

Pyrethrum propagation methods depend on the type of material whether, it is a clone or a variety.

A clone refers to a crop obtained by continuous vegetative propagation of single plant that is genetically identical to the original mother plant and is propagated asexually through splits, tissue culture and Semi-autotrophic hydroponics.

A plant variety is a heterogeneous plant population obtained through the hybridization of two or more clones through breeding. Varieties are propagated solely sexually through seeds.





Propagation of pyrethrum varieties

Varieties are propagated by use of seeds sown in nursery beds to produce seedlings. Seeds may be obtained from KALRO Molo, Pyrethrum Processing Company of Kenya or any certified seed merchants. This ensures that the seed is of high quality, true-to-type and is free from any pest and diseases.

How to establish a seed nursery

The procedures for establishment and management of a seed nursery include:

- i. Select a level ground and

make 1m wide seedbed which is raised to 15cm. (80 m bed length will produce enough seedlings to plant 1 acre).

- ii. Make furrows 15 cm apart and 2.5 cm deep using a stick.
- iii. Place pyrethrum seeds in the furrow at a density of about 10 seeds/ square inch.
- iv. Do not cover the seeds with soil.
- v. Place dry seedless grass like the elephant grass on the seed bed to minimize evaporation.
- vi. Place a drip line on the nursery or use watering cans for even distribution of water.
- vii. Remove the grass from the seed bed after 20 days to



Pyrethrum variety seed

- viii. start hardening the seedlings
- viii. Make a grass shed to cover the seedlings while hardening.
- ix. Gradually remove the shade to help seedlings acclimatize to the environment.
- x. Observe all the routine agronomic practices such as weed control and scouting for pest and disease infestation.
- xi. Transplant the seedlings while they are 4-5 months old and about 20-25 cm of height.

Propagation of Pyrethrum Clones

Pyrethrum clones are propagated vegetatively.

I. Use of pyrethrum splits

This involves dividing a mature pyrethrum plant into smaller sections, each containing roots and shoots, to create new plants.





*Healthy pyrethrum variety seedlings ready for transplanting
(Source M.Thuo and C. Kimutai - Kentegra)*

The propagation of pyrethrum using splits entails several key steps:

- Select a healthy and mature parent plant.
- Carefully dig up the parent plant from the soil, taking care to preserve its root system.
- Trim the plant to remove any damaged or excess roots and foliage. 10 cm root length and 15 cm stem length.
- Divide the plant into smaller sections or splits, ensuring that each split has a portion of the root system and multiple shoots or stems.
- These splits are ready for

planting.

- Plant the splits in suitable locations with well-drained soils during the rainy season to support the establishment and growth.

NB. It is estimated that 4,000 mature plants are required to raise enough splits to plant an acre (22,000 plants for an acre) with 5-10 splits per plant.

2. Tissue Culture Propagation

Tissue-culture or micro-propagation is an alternative method of pyrethrum propagation. The process is fast, efficient and

produces disease-free plants that maintaining genetic uniformity. Rapid multiplication through in-

ii. Shoot multiplication

Elongated shoots are transferred into a shoot multiplication media



Rapid multiplication of pyrethrum using micro-propagation (tissue culture)

(Source: Lusike Wasilwa)

vitro propagation of pyrethrum consists of several stages.

i. Shoot initiation

Meristems are disinfected then introduced to a fortified media with the appropriate hormones. Inoculated materials are then transferred into a growth room under 3000 lux of light and 18°-22°C to enable the shoots to elongate.

with higher levels of cytokinin hormones. The shoots produce multiple secondary shoots and a single shoot can produce 150-200 secondary shoots. After 4 weeks the shoot cluster is removed from the culture jars and shoots separated under sterile conditions. Separated shoots can either be recycled to produce more secondary shoots or advanced to rooting stage.

iii. Rooting

Shoots are then inoculated into the basal media with auxins as rooting hormone. Shoots elongate to 8-10 cm and in addition to producing roots they also produce rooted secondary shoots. This stage lasts 4 weeks.

iv. Acclimatization

This is the final step before tissue cultured pyrethrum is taken into the fields. It entails potting the rooted miniature plants in potting containing sterile rooting media. Commonly used planting material include:

- Peat moss
- Coco peat
- Sterilized forest soil
- Perlite
- Pumice.

The pots are then covered with thin film of clear polythene to help minimize the desiccation of young clonal plants. The pots are transferred to a shade net where routine management practices are executed. The thin film of polythene paper is gradually removed to help harden the seedlings till the point of field establishment.

3. SemiAutotrophic Hydroponics(SAH)

The SAH technique is a technique carried out in a controlled environment like laboratory and screen houses and involves placing modified soil, plant roots and little water in trays; this allows moisture to be transported while keeping the top of soil relatively dry.

In SAH systems roots are encouraged to grow downwards, and the dry soil on top discourages damp-off and other diseases caused by excess moisture. The technology allows for the production of materials that are entirely free of pests and diseases. It is cost-effective and adaptable, particularly for dispersed farming communities. This technology not only expedites access to pyrethrum planting material but also enhances overall productivity and resilience in pyrethrum farming practices.

- At the start of the SAH process, tissue cultured (in vitro) plantlets are produced under semi-hydroponic and semi-controlled environmental conditions.



Semi Autotrophic Hydroponic propagation unit for propagation of clones.
(Source J. Ndungu)

- They are then cut into mother plants that are transferred into trays with growth media and placed in the growth chamber.
- After 2-3 weeks the mother plant are recut making two plantlets from one, which are then put back into the growth chamber for 6-8 weeks to develop rooted plants.
- Trays can be transported in perforated cardboard boxes for over 48 hours, after which these can directly be planted in open fields for production or in screen houses for breeding.



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