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Methods for Seed Germination and Seedling Establishment of Yam. *Dioscorea rotundata* Poir

by

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IITA Technical Report No. 1 *Single copies free to yam and other root and tuber crop researchers in developing countries. Price $0.50 (U.S.) from Communications and Information Office, IITA, PMB 5320, Ibadan, Nigeria.*

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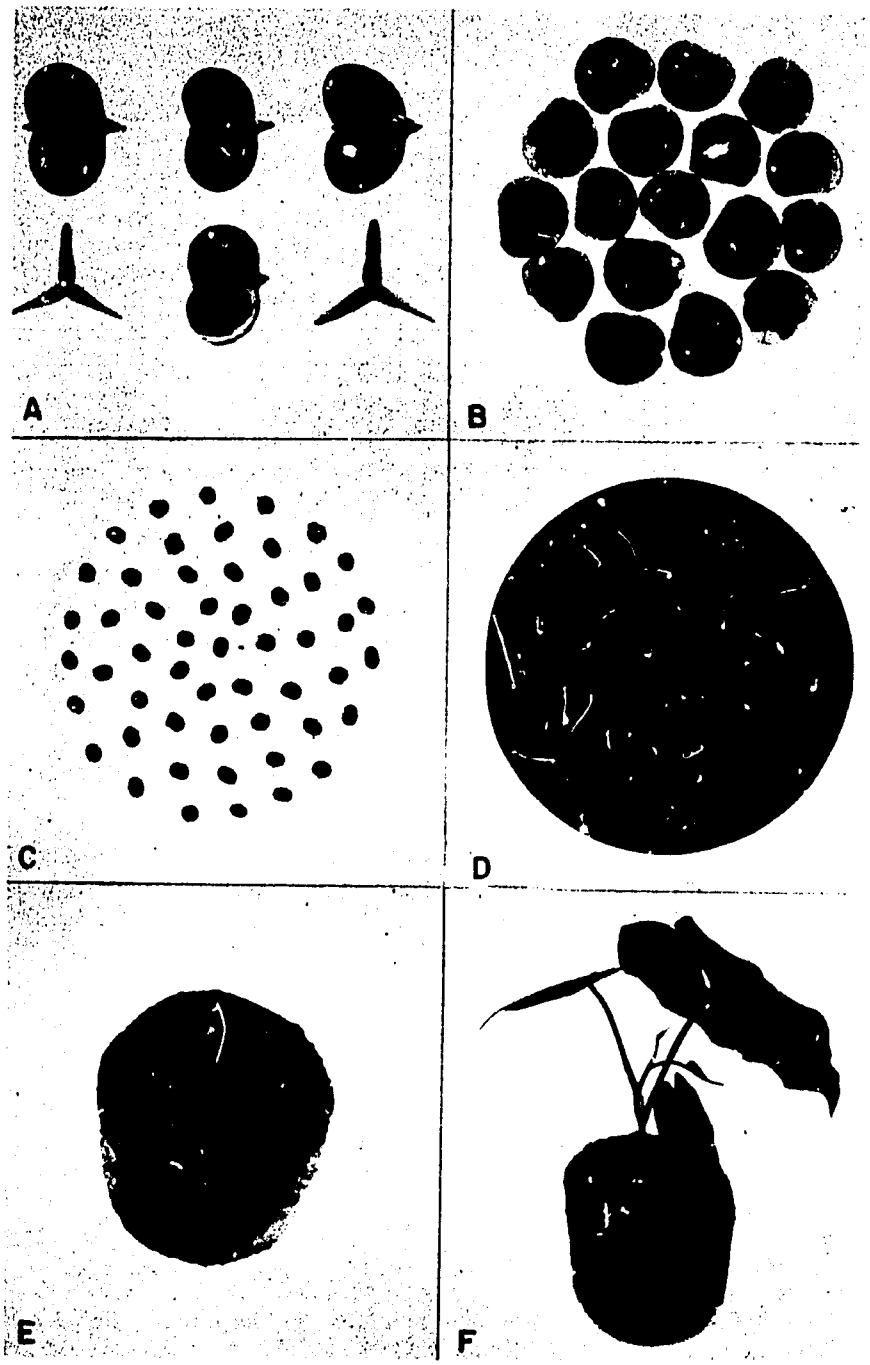
INTRODUCTION

Progress in improving the yield and quality of white yam, *Dioscorea rotundata*, has been slow because of the inavailability of sufficient genetical diversity for selection. This was mainly due to continuous vegetative propagation of the crop which retains intact the basic genetic complement of the parent plant. Vegetative propagation of cultivated yams was necessarily adopted because of the low degree of flowering and fruit set, and the inability to germinate seeds.

Attempts over the years to germinate yam seeds, and thereby increase the genetic diversity for plant improvement, were only partially successful and were later abandoned because of the common belief that yam seeds were not viable.

In 1973, however, two factors responsible for the low rate of seed germination were discovered. First, a large number of seeds lack well developed embryos; and second, seeds have a dormancy period of three to four months following harvest. Since these factors were identified, seeds have been germinated on a large-scale basis and more than 40,000 genotypes have been produced for selection and improvement.

The methods used for seed germination and seedling establishment are described below to help yam research workers increase the genetical diversity in yam through sexual propagation.


A
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METHODS

Seed Collection

1. Collect fruit *(Plate 1A)* after plants mature. It is common to find mature-green fruits on completely dry plants. Allow fruits to dry completely until brown by spreading them in a sunny and dry area. Fruits can be left to dry on parent plants, but there is danger of seed-loss due to shattering.

2. Split fruits to release seeds *(Plate 1B)*. Discard seeds that appear empty.

3. Remove the leathery wing surrounding the seed *(Plate 1C)* by rub bing against a coarse screen and blow away wings by winnowing. The seeds are light and can be blown away easily.

PLATE 1

Stages in yam seed collection, germination and seedling development prior to transplanting.

A. Dry fruits at the proper stage for seed collecting. Note opened fruit in center bottom row showing seeds in two locules.

B. Seed with wings.

C. Seeds after removal of wings.

D. Young seedlings in a petri dish.

E. Young seedling transplanted to a peat pot.

F. Well established seedling ready for transplanting to the field.

4. Store seeds in water-proof packets at temperatures not exceeding 25°C until the end of seed dormancy.

Seed Germination

1. Select filled and plump seeds.

2. Dust lightly and uniformly with a fungicide such as Arasan 75 (Thiram)* before sowing to reduce fungal growth.

3. Distribute seeds on water-soaked filter paper in petri dishes and germinate at temperatures between 25 and 30°C *(Plate 1D)*. Seeds showing micro-organism growth should be removed to avoid further contamination.

Seedling Establishment

1. Germination begins about three weeks after sowing and continues for several weeks. Transplant to peat pots after the first leaf has developed *(Plate 1E)*. Place pots in a greenhouse, preferably in a semi-shaded area, and keep pots well watered. "Jiffy-7"* pellets have given good results. These pellets should be soaked in water until fully expanded before seedlings are transplanted.

2. When seedlings have developed two to three leaves, they are ready for transplanting to the field *(Plate 1F)*.

3. To avoid restricting root growth, water pots thoroughly and peel off cloth from around the peat pot just before transplanting. Mulch ridges to protect seedlings from strong rains and to prevent soil erosion and crusting.

4. Plant seedlings at 25 cm spacing on ridges 1 m apart. This close spacing is adequate for screening during the first year.

5. Train seedlings on stakes.

**Mention of a trade name does not constitute an approval by IITA to the exclusion of other products that may also be suitable.*

Alternative Methods

In situations where laboratory and greenhouse facilities or peat pots are not available, the following alternative methods can be used:

1. *Wooden seed boxes:* Dust seeds with a fungicide such as Arasan 75 (Thiram)*. Germinate seeds directly in 10 cm deep wooden boxes filled with sterilized soil rich in organic matter. Place two seeds in each 1 cm deep hole, spaced at 5 cm intervals, and thin to one seedling after emergence. Transplant seedlings to the field at the two- to three-leaf stage. Minimize root damage by cutting through the soil around the seedling. Lift seedlings with as much soil as possible and transplant to the field.

2. *Nursery seedbeds:* Prepare seedbeds about 30 cm high to ensure good drainage. For handling convenience, beds should not be more than 1 m wide. Dust seeds with a combination of fungicide and insecticide such as Aldrex T*. Sow two to three seeds in 1 cm deep holes, 5 cm apart and in rows 10 cm apart. Mulch seedbeds lightly with finely-chopped straw. Construct over the seedbed a 1 m high wooden frame and cover with palm leaves or other suitable material to protect seeds and seedlings from heavy rains and to provide some shade. After seedlings emerge thin to one plant. Weed when necessary. Transplant to the field as in alternate method 1.