

Reference 13 The seedling nursery

Summary

A good seedling nursery produces vigorous seedlings. This reference describes how to install and manage a nursery, from the soaking of the seed to the removing of the seedlings ready for transplanting.

In inland-valley lowlands, water control is usually poor. This is the main reason why rice is mostly transplanted in inland-valley lowlands. Particular care should be given to the installation and management of the seedling nursery. Good management will ensure that seedlings are vigorous, which is essential for their ability to face flooding, insect attacks, weed competition, etc. The different steps for obtaining a good nursery are presented below.

Seed pre-germination

Pre-germination involves two distinct steps, i.e. soaking and incubation. Soaking means that seeds are soaked in a loosely closed cloth or jute bag for 24 hours. Soaking allows the grain to absorb the quantity of water that is necessary to trigger germination. Incubation means that the seeds are withdrawn from the water and kept in a ventilated place, at a temperature close to 30°C, until they germinate, usually after 24 to 36 hours.

Preparation of the nursery

The nursery is prepared like the rice field itself, but with some extra care. Avoid clayey soil to facilitate the removal of seedlings, but the nursery should not be too sandy either, to prevent seedlings from drying out too easily. If clayey soils are used, it is advisable to spread a thin layer of sand (about 1 cm) on the sowing bed (at seedbed preparation) to facilitate the pulling of the seedlings that are ready to be transplanted.

After puddling and leveling the area that will be used for the nursery, 1 m × 10 m seedling beds (about 5 to 10 cm high) are constructed, separated by irrigation canals. Canals surrounding the nursery beds (30–40 cm wide) serve as pathways for transplanters to pull the seedlings, and as a barrier against insect pests.

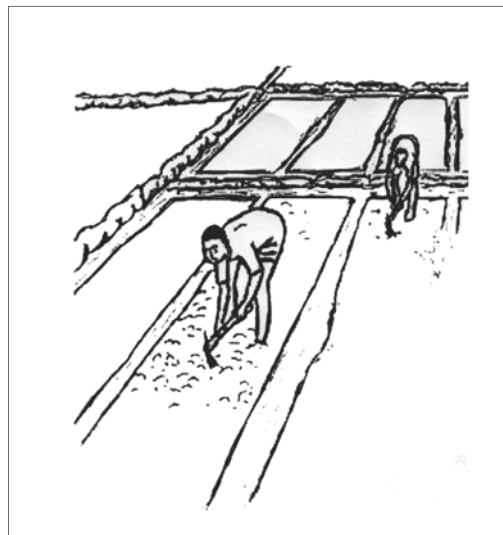


Figure 13.1. Preparation of the nursery's sowing beds

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Nursery site

The nursery must be installed in an accessible and sunny place, close to the rice fields and the water source, and sheltered from animals, including birds. Avoid installing nurseries in the shade of trees, as this will weaken the seedlings.

Sowing density

In order to obtain vigorous seedlings for transplanting, it is recommended to sow approximately 0.2 kg of seeds per m² to reach the appropriate seedling density. A 2500-m² field can be transplanted with the seedlings from a 50-m² nursery, which is five 10-m² beds, which will require 10 kg of seeds.

To obtain a good density at emergence, the following measures are recommended:

- Make sure that good-quality seeds are used (germination test, *see* Reference 9).
- Install the nursery on appropriate soil, well plowed and well leveled.
- When sowing, it is important to throw the grains with force onto the sowing bed to fix them in the mud, thus preventing them from being carried away by the irrigation water.
- Make sure that irrigation is well managed and protect the beds from birds, other animals and other pests.

Seedling age

Seedling age at transplanting depends on the season and on the characteristics of the plot. It is usually recommended that transplanting be done when seedlings are two to three weeks old during the rainy season, because the climate conditions will allow them to develop fast. However, during the dry season, three- to five-week old seedlings are recommended for transplanting, because plant growth will be reduced by cold temperatures. When water control and leveling are relatively poor, which is often the case in undeveloped inland valleys, it is advisable to transplant four- to five-week old seedlings in order to avoid damage by flooding.

Nursery water management

It is essential that the nursery never dries out; however, excess water will lead to weak seedlings that are too tall. Prolonged flooding may cause seedling death. The canals surrounding the sowing beds allow draining of the nursery while maintaining moisture levels. With good water control, the following recommendations may be followed for irrigating a nursery:

- Sow on drained soil. (Bring water back only two or three days later, to give the roots enough time to fix in the soil.)
- Maintain water level at 2 to 3 cm for 10 days.
- Drain the plot for 24 to 48 hours.
- Progressively raise the water level until seedlings are pulled for transplanting (5 cm).

During the dry season, it is advisable to drain the plot in the evening to avoid exposing the young seedlings to low water temperatures during the night. Irrigation is resumed rather late the next morning to let seedlings benefit from the sun. (This is particularly pertinent where night temperatures are low, e.g. in the north of West Africa, especially in the Sahel.)

When the nursery is installed in a place where it is not possible to irrigate, watering-cans can be used. The soil must be kept moist until emergence (i.e. for 3–4 days) and then progressively increase the number of waterings. In general, in such cases, hand-weeding becomes necessary and this should be done approximately 10 days after sowing.

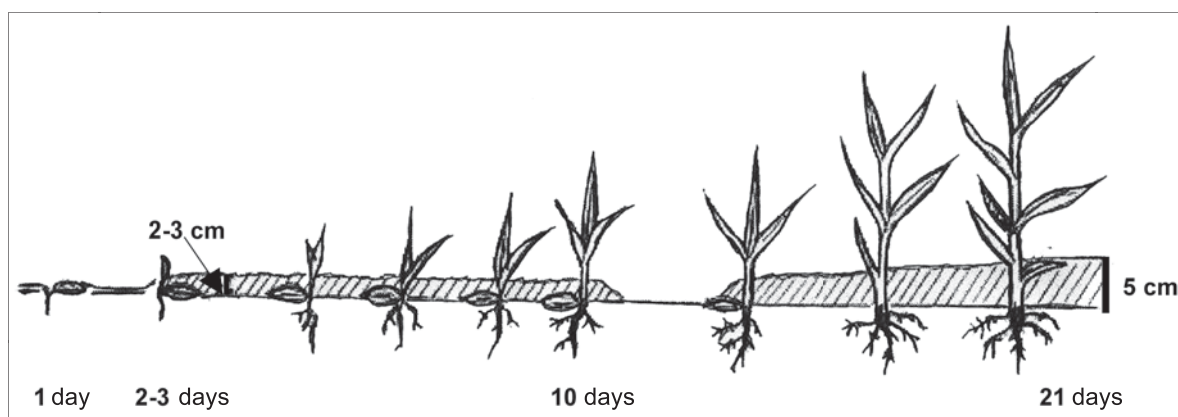


Figure 13.2. Water management in the nursery

Nursery fertilization

In case of poor soil fertility, or during the dry season, when growth is slower, it is recommended that nitrogen be applied—about 10 g of urea per m²—as top-dressing at about two weeks after sowing.

Pulling seedlings

Pulling rice seedlings is a delicate operation that is too critical to be left to children (which is often the case) or to paid outside labor (always wanting to finish the job quickly). If done without care, roots will be damaged, which may lead to substantial yield loss ('missing hills') or the need to re-transplant such missing hills.

Seedlings should be pulled under water and, to avoid damage, the following technique is recommended:

- Hold two or three rice seedlings between thumb and index finger, positioning the index finger almost perpendicular to, and the thumb parallel to the seedlings (Figure 13.3).
- Exert a little pressure downwards before slowly pulling the seedling toward oneself. Be careful to hold the seedlings close to the root.

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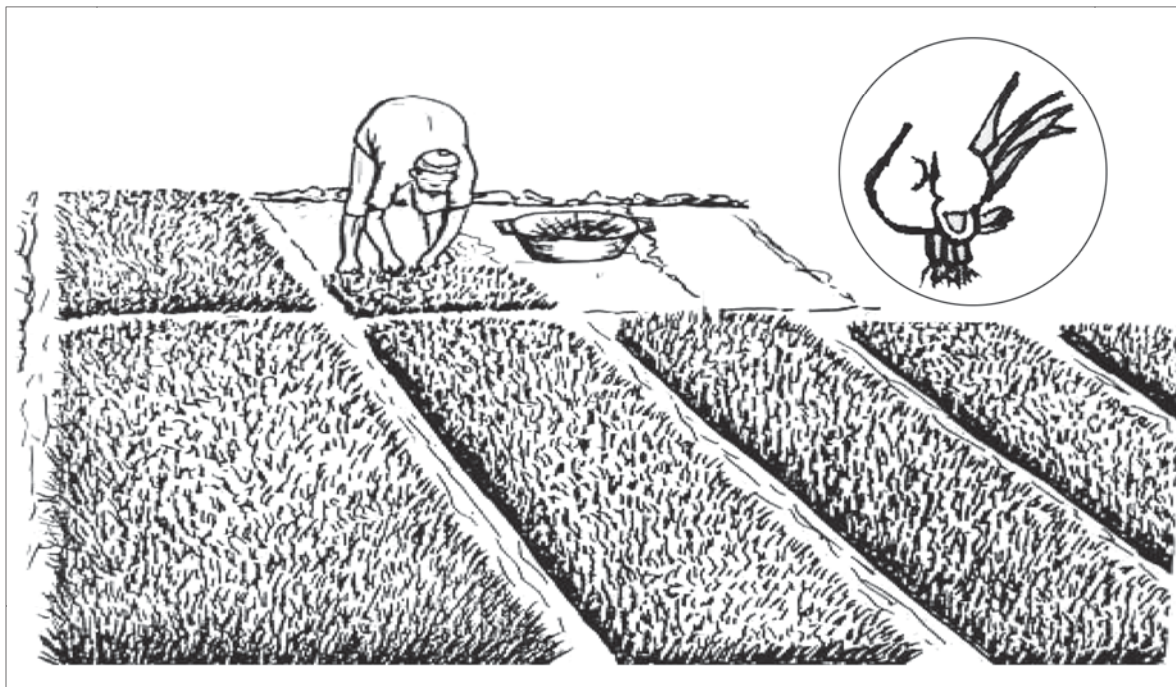


Figure 13.3. Pulling seedlings ready to be transplanted to the main field. (Inset shows how to hold the seedling between the thumb and the index finger)

Bibliography

Yoshida S., 1981. *Fundamentals of rice crop science*. International Rice Research Institute, Manila, Philippines, 269 pp.