



Preparation of Modified Mat Nurseries (MMN) for Improved Rice Seedling Production

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Editor: The System of Rice Intensification (SRI), an unconventional approach to rice production that has spread throughout many parts of the world since the late 1990s, is comprised of a set of flexible management practices. CEDAC, based in Cambodia, summarizes these as follows:

- *Shallow (1-2 cm) transplanting of strong, young seedlings that are uprooted and quickly moved from moist but well-drained seedbeds.*
- *Transplanting of 1-2 seedlings per hill at wider-than-usual spacings, between 25 x 25 cm (9.84 x 9.84 in.) and 50 x 50 cm (19.66 x 19.66 in.), ideally in a square pattern or in straight rows to facilitate weeding.*
- *Alternate flooding and drying of the field during the period of vegetative growth.*
- *Early and frequent mechanized weeding to control weeds and to aerate the soil.*
- *Adding nutrients to the soil, preferably in organic form.*



Figure 1: Confined roots within mat

Producing healthy young seedlings and transplanting them in a quick and efficient manner is an SRI priority. For the production of seedlings that are generally transplanted between 8-15 days, various nursery approaches have been developed and promoted throughout Asia including:

- **Plastic Bubble Trays** – *Rice seedlings are grown in plastic seedling flats somewhat similar to those used to produce vegetable transplants. Young seedlings with small, intact root balls are easily lifted individually from the trays.*
- **Dapog (Mat) Nursery** – *Seedling beds approximately 1 m (3.28 ft.) wide and 10-20 m long are laid out with a layer of plastic sheets or banana leaves spread over the marked off area. The walls of the bed are formed out of bamboo splits or banana sheaths (IRRI). A 2-3 cm (0.79-1.18 in.) thick seedbed can be established using soil and organic matter at a 1:1 ratio. Plastic sheets or banana leaves lying underneath prevent rice seedling roots from running too deep into the soil prior to transplanting (SSIA). Seedlings that are 8-15 days old are ready to be planted out. Small seedlings are gently lifted from the plastic sheet or banana leaves, mud is carefully washed away from the roots, and seedlings are carried to the field on a tray for transplanting.*

During the ECHO Northeast India meeting in October 2010, Dr. D.P. Patel, a scientist with the Indian Centre for Agricultural Research (ICAR) Research Complex for the NEH Region, offered a presentation on SRI and Integrated Crop Management (ICM) that included a portion related to the Modified Mat Nursery (MMN). Similar to the Dapog rice seedling production approach,

MMN offers various benefits over conventional nurseries for the production of healthy and strong young rice seedlings for SRI and similar modified rice production systems.

The following text and photos are adapted from the ICAR extension publication “SRI and ICM Rice Culture for Water Economy and Higher Productivity.”

Preparation of Modified Mat Nursery (MMN)

In MMN, seedlings are raised in a 4 cm (2.54 in.) layer of soil mix arranged on a firm surface. A



Figure 2: Wooden frame for MMN

100 m² (119.6 yd²) nursery and 5-6 kg (11-13.2 lb.) of good quality seeds are sufficient for producing enough rice seedlings to transplant one hectare of SRI or ICM paddy [Ed: *Integrated Crop Management (ICM) is a variation of SRI. Distinctive aspects of ICM include: 1) rice seedling transplant age of 18-20 days compared to 10-12 days for SRI; 2) seedling planting distance of 20 x 20 cm (7.87 x*

7.87in.) compared to 25 x 25cm (9.84 x 9.84 in.) or more for SRI; 3) 2 seedlings per hill compared to 1 seedling per hill for SRI; and 4) related to water management, providing intermittent irrigation compared to allowing only moist conditions for SRI.].

A wooden frame, 1.0 m wide and 4 cm high,(3.28 ft. wide and 2.54 in. high) and of a suitable length should be divided into equal segments of 0.5 m (1.6 ft.) each. ICAR suggests that local materials, such as bamboo, can be used to make the frame walls. Such a frame should be placed over a plastic sheet (or banana leaves) spread over an even, firm surface (Figure 2).

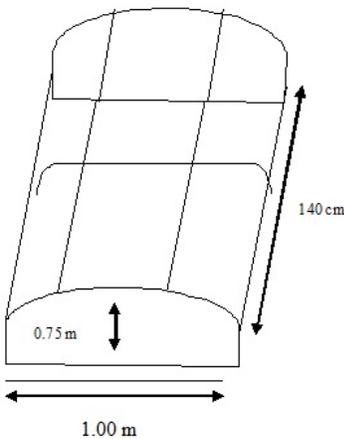


Figure 3: Plastic tunnel design for MMN

Each frame segment should be filled with soil mix almost to the top. The soil mixture, 4 m³ (5.23 cubic yd) for every 100 m² (119.6 yd²) of mat nursery, is prepared by mixing 75-80% soil, 15-20% well decomposed manure and 5% rice hull ash. Organic manures, such as farmyard manure, or even vermicompost, can be used. To complete this soil mixture, ICAR recommends adding 1.5 kg (3.3 lb.) of powdered diammonium phosphate or 2 kg (4.4 lb.) compound fertilizer (15-15-15) and mix well.

Pre-germinated seeds, sown uniformly over the bed surface at a rate of 50-75 gm/m², should be covered with more soil mix and firmed gently with the hand. Sprinkle the seedbed with water as needed, but protect the bed from heavy rains for the first five days.

Using a watering can, continue to keep the nursery bed moist by regular watering until seedlings are ready for transplanting in 15 days. In warm weather, the seedlings will reach 16-20 cm (6.3-7.87 in.) height with 3-4 leaves and no tillers in 15-16 days after seeding.

ICAR recommends that plastic tunnels be used in high rainfall areas such as northeast India, to avoid damage due to heavy rains. Materials required for making such plastic tunnels include bamboo lengths, low-density polyethylene plastic and 18 gauge wires (Figure 3).



Figure 4: Leveling and compacting the nursery beds



Figure 5: Covering the surface with banana leaves or polyethylene sheets



Figure 6: Preparing homogenous mixture of soil and organic manures



Figure 7: Applying a uniform 3-4 cm layer of soil mixture on banana leaves



Figure 8: Carefully broadcasting sprouted seeds at 50-75 gm/m²



Figure 9: Covering the sprouted seeds uniformly with soil mixture



Figure 10: Covering the bed with straw



Figure 11: Straw cover removed two days after seedlings germinate



Figure 12: Nursery at 12 days

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Figure 13: Scooping up small seedlings