Short communication
Case studies on Nurseries Raising of Turmeric var 'Lakadong' in Jaintia Hills Meghalaya India

ABSTRACT

Meghalaya is home to a variety of spices of which turmeric (*Curcuma Longa* L.) is one of the prominent of the others. The Janita hills districts of Meghalaya are a native to one of the finest varieties of turmeric in the world namely 'Lakadong' and it is considered to be one of the world's best varieties of turmeric, with a curcumin content of around 6.8 to 7.5 per cent. Following single bud rhizome plugtray method developed by Tamil Nadu Agricultural University Coimbatore for rapid multiplication of seeds, Lakadong rhizome were raised in two types of Agro-shade net nurseries in Kyrwen Village, where model 1 is a poly-cum-shade net house covered with translucent 200µ UVS plastic on top and sides are covered with 50% green shade net and Model 2 is completely covered with 50% shade net. Studies indicate that while poly-cum-shade net achieved a higher sprouting rate for Lakadong rhizomes, it led to poor seedling development and lower survival rates when transplanted to the field, especially for seedlings grown in plugtrays. Conversely, transferring seedlings from poly-cum-shade net to shade net for a week significantly improved their field performance. Sade net nursery demonstrated better and healthier seedling development, with higher survival rates when transplanted. Additionally, Lakadong seedlings grown near the 50% shade net wall in poly-cum-shade net showed similar positive outcomes as those in shade net nurseries.

Keywords: Agro-shadenet, Cucurmin, Kyrwen, Lakadong, Nurseries, Turmeric

1. INTRODUCTION

The state of Meghalaya in the North-Eastern part of India is home to a variety of spices of which turmeric (Curcuma Longa L.) is one of the prominent of the others. The Janita hills districts of Meghalaya are native to one of the finest varieties of turmeric in the world namely 'Lakadong' and it is considered to be one of the world's best varieties of turmeric, with a curcumin content of around 6.8 to 7.5 percent[1;2]compared to regular turmeric 2-4 percent[3]. The rhizome of turmeric contains significant amounts of phenolic compounds; among them, the most important one is curcuminoids, which give the yellow color to the turmeric rhizome[4].Lakadong turmeric inherits its name from the small village Lakadong in the state of Meghalaya, Northeastern part of India. The area under turmeric in Meghalaya is 2577 ha with a total production of 16324 tonnes{Government of Meghalaya, Department of Agriculture "Lakadong mission" (2018-2023)} and Lakadong is the main variety with more than 50% area under this variety. It is cultivated in humid and warm climates, with very high rainfall of about 4000- 10000 mm. The Jaintia hill district of Meghalaya which comprises of East and West Janita hills is very congenial for production of good quality Lakadong turmeric. The practice of planting crops inside Agro-shade net nurseriesprotects the crop from adverse climatic conditions like high light intensity and temperature[5]. These shade net house require comparatively less land area for agricultural production system resulting in increased land productivity

and facilitate year-round production of crops[6]. Agriculture shade nets can regulate the temperature and humidity in greenhouses and nurseries, promote better plant growth and development, and extend the growing season. Planting media such as cocopeat and enhance sprouting and germination efficiency as cocopeat is considered as a good growth media component, with acceptable pH, electrical conductivity and other chemical attributes[7].

2. METHODOLOGY

Studies is carried out in Kyrwen Nurseries located in Laskein subdivision of West Jaintia Hills district in Meghalaya India and is situated 5km away from sub-district headquarter Laskein. Following the single bud rhizome plugtray method for rapid multiplication of turmeric seeds developed by Tamil Nadu Agricultual University Coimbatore, Lakadong rhizomes is cut into small piece weighing 5-7g each and treated with Trichoderma /pseudomonas fluorescens to avoid infection. Rhizome were then sown in a cocopeat medium treated with 10ml of humic acid, 15g of Citrus (multi-micronutrient fertilizer), and 10g of VAM (Pseudomonas), all mixed in 30 litres of water followed by regular watering to maintain moisture.Media combination of cocopeathave significantly influence the sprouting percentage and growth parameters of the turmeric transplants in plugtrays[8].After sprouting some rhizomes were transplanted into plugtrays filled with the same medium for further development into seedlings, while remaining were left in medium itself for further developed into seedlings.

This method was adoptedin two types of Agro-shade net nurseries (Fig 1), both using a green net with a 50% shade factor. The first type (Model 1) is a poly-cum-shade net house covered with translucent 200µ UVS plastic on top and sides are covered with 50% green shade net. The second type (Model 2) is completely covered with 50% shade net.

Fig 1: (A) Model 1 and (B) Model 2. Kyrwen Nurseries, Meghalaya India.

3. RESULTS AND DISCUSSION

3.1 Sprouting and Seedling Develeopment

Lakadong rhizome under Nursery model 1 showed higher sprouting rate but poor seedling development, particularly those transplanted into plugtrays, compared to the rhizomes left on the media (Fig 2 C). This finding is also report in papaya seed where germination percentage in poly-cum-shadenet house (93.9 %) was found significantly higher than black shadenet house (86.8%)[9;10].Higher temperature in poly cum shade net might be responsible for germination where most studies shows that low germination percentage was recorded in open field due to low temperature and cold wave at germination stage. Temperature recorded lower in black shadenet house than the open field even though germination percentage of papaya was at par with poly-cum-shadenet house that might be due to black shadenet structure reduce the effect of cold wave at germination stage[9].Seedlings from this model also exhibited a lower survival rate when transplanted directly to the field, However, when seedlings were transferred to Nursery Model 2 for one week, they performed best when subsequently transplanted to the field (Fig3). This suggests that light requirement in turmeric varies across the different growing stages and it requires lower light intensities in the initial phases of growth. Therefore, shade levels could be modified during the plant growth, starting with a higher shade level and then reducing it, aiming to maximize shoot growth and rhizome development of turmeric crops[11].

Under model 2, Lakadong rhizome shows comparatively less sprouting to model 1 but better and healthy seedling development in both the plugtrays and on the media(Fig 2 D). This may be the fact that, single shade net is allowing relatively more sunlightwhere wheat seedlings was found to grow more in number with relatively maximum growth rate in case of single shadenet as compared to double shadenet and polyhouse[12]. The partial shade of 50% also increased the

yield and it could be optimum for maximum photosynthesis and biomass accumulation of the turmeric crop[13;14]. This was also observed in the nursery model 1 where sprouting rhizome placed near the wall of the polyhouse closer to the 50% sheet net covered shows same results like nursery under model 2 (figure 2E).

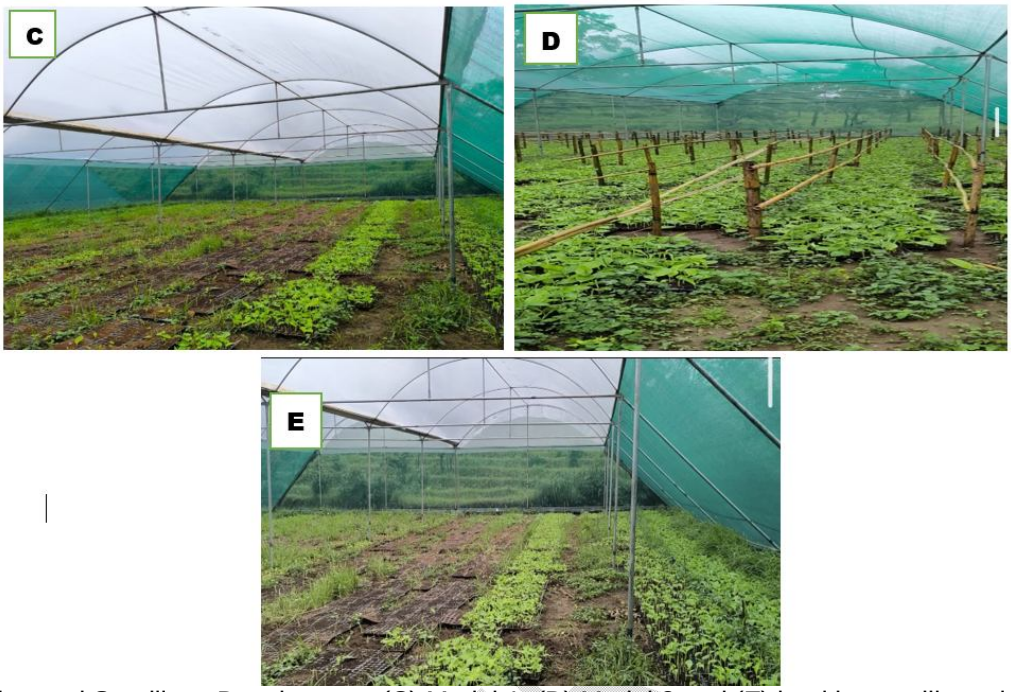

Figure 2: Sprouting and Seedlings Development (C) Model 1, (D) Model 2 and (E) healthy seedlings develop near the shade net

3.2Transplanting

Seedling of Lakadong from the ground shows very low live expectancy when transplanted to the field where as seedling from the plugtrays shows better performance (Fig 3). Research suggested that use of plug trays can reduce seedling mortality and can produce a greater number of viable seedlings in the field[15;16].Turmeric plant record highest plant height, number of leaves and number of tillers through single node rhizome raised in portray for one month and transplanted in the field compare to single node rhizome transplanted directly in the field[17].

Figure 3: (F) Transplanted seedlings directly from the media and (G) transplanted from the plugtray

4. CONCLUSION

Studies indicate that while Nursery Model 1 achieved a higher sprouting rate for Lakadong rhizomes, it led to poor seedling development and lower survival rates when transplanted to the field, especially for seedlings grown in plugtrays. Conversely, transferring seedlings from Model 1 to Model 2 for a week significantly improved their field performance.

Nursery Model 2 demonstrated better and healthier seedling development, both in plugtrays and on the ground, with higher survival rates when transplanted. Additionally, Lakadong seedlings grown near the 50% shade net wall in Model 1 showed similar positive outcomes as those in Model 2. Overall, seedlings grown in plugtrays under Nursery Model 2 conditions exhibited the best field performance.

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