

UNIVERSITI TEKNOLOGI MARA

**WEED CONTROL IN OIL PALM
NURSERY POLYBAG
USING RICE HUSK MAT**

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ABSTRACT

Weed management is an essential part of nursery maintenance for four- to twelve-month-old oil palm seedlings. Monthly basis hand weeding is performed in polybags to ensure the absence of weeds and the production of high-quality oil palm seedlings. This conventional method is effective, but it is time-consuming and labour-intensive, resulting in high maintenance expenditures. Rice husk is an agricultural by-product of the rice milling process. It has been demonstrated that rice husk suppresses weeds, but its potential for weed management in polybag nurseries remains unknown. Thus, the objectives of this study were to 1) determine the effective thickness of rice husk mulch mat for weed control; 2) examine the effects of watering amounts on the physical and degradable properties of a rice husk mulch mat; and 3) evaluate the effectiveness of rice husk mulch mat for weed control in oil palm seedlings. In the rain shelter experiment, increasing the thickness of the mat from 2 to 8 mm reduced weed seedling emergence, coverage, and biomass six weeks after treatment. The 8 mm thick mat was the best thickness, since it completely inhibited the germination of *Eleusine indica*, *Ageratum conyzoides*, and *Cyperus distans*. Under rain shelter condition, the 8 mm thick mat was then treated to varying watering quantities per polybag for four months. The mats' biomass, thickness and diameter decreased by 43, 27, and 12%, respectively, when the watering regime was increased from 0 to 16 mm. The findings were supported by scanning electron microscopy and Fourier transform infrared spectroscopy analyses, which revealed a high rate of degradation of both rice husk and polyvinyl alcohol in mats subjected to a 16 mm watering regime. In contrast, a 4 mm watering regime had less impact on the mats due to their better stress resistance and tensile strength. During a six-month evaluation in a field nursery, the 8 mm thick mulch mats still provided complete weed suppression despite their biomass, diameter, and thickness dropping by 17, 7, and 3%, respectively. In terms of plant height and girth collar of oil palm seedlings, the mat treatment was also superior to the conventional practice treatment. These results suggest that the rice husk mulch mat can reduce the frequency of hand weeding while enhancing the growth performance of oil palm seedlings in nursery polybags.

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CHAPTER 1

INTRODUCTION

1.1 Research Background

The development of superior oil palm planting material is entirely dependent on nursery management's attention to detail, which necessitates strict adherence to well-established standards and procedures. To maximize production, the grower must choose and sow just the finest seedlings in the field. At both the pre- and main-nursery stages, watering and weeding are essential nursery maintenance tasks.

Irrigation is an important part of oil palm nurseries that must be controlled properly. The most critical component in acquiring high-quality planting materials in the nursery is the availability of sufficient, high-quality water to maintain optimal growth of oil palm seedlings. Watering of the oil palm seedlings should be done twice a day for a total of 45 minutes using nursery irrigation system technology, such as an overhead sprinkler system or lay flat irrigation tubes, to deliver 8 mm of water per day (Tan, 2011; Nicole, 2008). In addition, weeds that compete for nutrients, moisture, and sunshine should be kept out of the polybags. Furthermore, weeds may harbour pests or serve as disease hosts. There is very little weeding needed during the pre-nursery stage, where oil palm seedlings (OPS) are kept for four months, but hand weeding inside the small polybag should be done monthly if appropriate.

Furthermore, manual weeding is necessary to eradicate weeds as they arise in order to preserve and keep our plant free of weeds and undesired plants. Weed management is also essential in nursery upkeep, both from an aesthetic and biological standpoint (Dilipkumar, 2020). Weeds will grow freely in the nursery and have a direct or indirect influence on the plant's quality, particularly in potted decorative plants. The use of repeated herbicide sprays for weed control will influence plant quality (Hatfield and Sauer, 2015). Weed control in nurseries and potted plants is sometimes difficult due to the intricacy of many species.

Meanwhile, herbicide application is not recommended at the nursery stages due to disruption of OPS growth because any errors could result in OPS harm. OPS are transplanted and held in big polybags for 8 months during the main nursery stage. Any weeds that emerge can be quickly and easily removed by hand (Tan, 2011). Weeds on