

Development of the Deleafing Machine for *Pachira Macrocarpa* Plants¹

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Abstract

Pachira Macrocarpa seedlings, one of important ornamental plants for exportation, earn a huge amount of foreign exchange income for Taiwan yearly. The commercial outgoing seedlings are prepared by pulling the plants from fields, removing the leaves by hands, and plaiting three or five stems in long pigtails separately. The manual operation is labor-intensive and time-consuming due to the lack of available handling machines. The objectives of this study were to 1) investigate characteristics and field conditions of *Pachira Macrocarpa* plants at the deleafing period and 2) develop a prototype deleafing machine for experimental purposes. By mounting spring rods on a rotating tube, the knock-type deleafing mechanism operated at a rotating speed of 250 rpm had both better deleafing effect and less damage than another two rotating speeds. However, the inevitable bud breaks and stem damage resulted from using this deleafing mechanism were undesirable drawbacks. Flat iron slabs with sharp breaches in a hook shape were also tested for cutting leaves. Nevertheless, the cut leaves and stalks would block up the breaches, thus deteriorating the deleafing effect for next batch operation. By referring to the function of a safe razor, stem-isolating bars of the cutter-type deleafing mechanism were used to protect the stems and buds from damage and only the leaves and stalks were cut. With the lowest damage percentage, the cutter-type deleafing mechanism was then chosen and installed in a prototype deleafing machine for field investigation. Results showed that the damage to the buds by using the deleafing machine was less than 8% with a deleafing percentage of only about 50% for one pass operation. Future work of this study should be addressed on further modification to improve the deleafing percentage and operating convenience of the prototype deleafing machine.

Key words: *Pachira Macrocarpa*, Deleafing machine.

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