

**DESIGN, FABRICATION, AND PERFORMANCE EVALUATION OF  
AUTOMATED OVERHEAD BOOM IRRIGATION SYSTEM  
FOR NURSERY IN GREENHOUSE**

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An Undergraduate Thesis Submitted to the Faculty of the Department of Agricultural and  
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**BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS  
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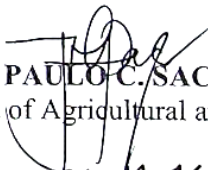
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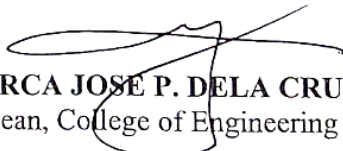
  
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## ABSTRACT

**TRINIDAD, EIRONNE G.**, Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija Philippines. **July 2024, DESIGN, FABRICATION, AND PERFORMANCE EVALUATION OF AUTOMATED OVERHEAD BOOM IRRIGATION SYSTEM FOR NURSERY IN GREENHOUSE**

Adviser: JONATHAN V. FABULA, Ph.D.

In crop production, the seedling stage is critical as its health status will manifest throughout a crop's growth and development. However, its yield and production remain downgraded by climatic factors, labor requirements, and poor irrigation methods, particularly in the seedling stage. Thus, this study aimed to improve nursery production by providing an automated irrigation system in a greenhouse with minimized labor, less water usage, and favorable irrigation uniformity for nursery production. Specifically, an automated traveling boom sprinkler irrigation in a greenhouse was designed and fabricated. The 3-m long boom sprinkler features two nozzles at both sides, with 20-in spacing, covering two sides of the irrigation area (8 x 1 m each). The system exhibited an average speed of 1.67 m/min, water consumed per cycle of 23 L, and a nozzle discharge of 11.83 ml/s. Upon varying the height of the boom sprinkler relative to the irrigation target (15, 20, and 25 in), the distribution uniformity (DU) was highest at 20-in height (76.04% DU), followed by 25-in (63.56%) and 15-in height (58.08%). The DU of the 20-in height is considered good for sprinklers. Adding nozzles to promote droplet overlap at the sides of the scope, where low distribution was observed, is recommended to further improve uniformity.

Keywords: boom sprinkler; cycle; distribution uniformity

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