

**ONION (*Allium cepa* L.) SEED PRODUCTION UNDER CONTROLLED  
ENVIRONMENT AGRICULTURE AND VERTICAL  
HYDROPONICS SYSTEM**

**MARIECAR F. GUMAFELIX  
WENDY LEE O. BALA**

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## ABSTRACT

**GUMAFELIX, MARIECAR F., and BALA, WENDY LEE O.,** Department of Agricultural and Biosystems Engineering, College of Engineering, Science City of Muñoz, Nueva Ecija, Philippines, **JUNE 2023. ONION (*Allium cepa* L.) SEED PRODUCTION UNDER CONTROLLED ENVIRONMENT AGRICULTURE AND VERTICAL HYDROPONICS SYSTEM.**

Adviser: CAROLYN GRACE G. SOMERA, Ph.D.

Philippine agriculture has struggled to produce onion seeds for years. The Philippines is a major onion producer for domestic and foreign markets. However, domestic onion seed production has faced many challenges that have hindered its growth and self-sufficiency. Due to a lack of quality seeds, infrastructure, climatic factors, and import dependence, the onion seed industry has struggled to thrive. The study aims to produce an onion seed production under controlled environment agriculture and vertical hydroponics system. The effect of photoperiod in the production of onion seeds was determined in this study. The specific objectives were to establish a suitable environment for onion seed production, evaluate the effect of photoperiod in the growth and yield of onions, assess the water productivity of the system; and analyze the cost of production of onion seed under controlled environment.

The study examined 12 and 16 hours of photoperiod treatments for 22 weeks. The variety of onions used was Red Pinoy. The vertical setup for onion seed production measures 4.83 x 0.87 x 2.7 m (L x W x H) and consists of ten (10) towers made of 6-inch-diameter by 1.5-meter-long PVC pipes with 25-centimeter-apart holes. Five replications of two treatments, each with six samples, were performed. Based on the requirements of

onions from the bulb to the flowering stage, the temperature and relative humidity were also controlled throughout the study.

Results showed that bulb onions have no significant difference under different photoperiods in terms of plant height, number of leaves, number of stalks, bulb diameter, bulb neck diameter, and bulb weight. Also, in terms of water consumption, it was evident that irrigation every 16 hours have lower consumption. In terms of the total operating cost of the system, it was approximately Php 345,389.03.

Keywords: controlled environment; vertical hydroponics system; photoperiod; onion

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