PERFORMANCE EVALUATION OF DOUBLE-LAYERED GREENHOUSE WITH MIST COOLING SYSTEM

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ABSTRACT

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A greenhouse is a structure that allows farmers to produce and harvest food at any time of the year. It's used to protect crops from extreme cold or heat, as well as pests.

This study was conducted to determine the performance of double layered greenhouse with mist cooling system. Existing greenhouse was modified to add another layer to the structure. Shade cloth was used as material for saturation of water. Ten cross-sectional areas were designated for sensors. Environmental parameters like temperature inside and outside the greenhouse and relative humidity inside and outside the greenhouse were recorded. The water pressure, time of saturation, and water volume for shade cloth saturation were evaluated. Three treatments were used in the study: 0.5 m, 0.7 m, and 0.9 m spacing of the 1st layer to the 2nd layer of roof arch.

Based on the result of the study, the temperature inside the double-layered greenhouse with mist cooling system is significantly lower as compared to ambient temperature while the relative humidity level inside is significantly higher than the air moisture outside the structure. The difference between the temperature and relative humidity inside and outside structure rises as the roof arch difference increases. The relationship of the height to the temperature and relative humidity is directly proportional. Therefore, 0.9 m spacing is the recommended space for lower temperature

and high relative humidity. The integration of automated misting system is suggested for it help maintain a temperature of 25 °C to 30 °C and 60% to 80% relative humidity which is suitable for high land crops.

Keywords: double-layered greenhouse; misting cooling system; shade cloth; temperature; and relative humidity

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