

A LOW-COST READY-TO-INSTALL NET HOUSE FOR TIME-SPECIFIC PROTECTION FROM PESTS FOR TOMATO (*Solanum lycopersicum*) CULTIVATION

R.M.G.H. Rathnayake¹, P.D. Kahandage¹, W.C.P. Egodawatta², E.J. Kosgollegedara¹ and G.V.T.V. Weerasooriya¹

¹Department of Agricultural Engineering and Soil Science, Faculty of Agriculture, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka.

²Department of Plant Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka.

Tomato is a key vegetable crop yet highly vulnerable to various insect pests. While chemical pest control is commonly used, it poses significant environmental and health risks. Low tunnel net houses provide a valuable solution for pest management. However, continuous use is costly and can interfere with other management practices. This study introduces a ready-to-install net house structure designed for time-specific pest management allowing productivity and pest damage to be compared based on netting duration. The net house consists of a pre-stitched insect-proof net (40-mesh type) with a collapsible frame. To test time-specific management, netting times were varied across six plots each with 18 tomato plants. Six treatments were applied: no net coverage (T1), netting from 5:30 a.m. to 10:00 a.m. (T2), 10:00 a.m. to 2:30 p.m. (T3), 2:30 p.m. to 7:00 p.m. (T4), 7:00 p.m. to 5:30 a.m. (T5), and continuous coverage (T6), with eighteen replicates for each treatment. Growth rate, number of leaves and branches, fruit weight per plot, pest infestation severity, and yield over two weeks were measured. Data were analyzed using one-way ANOVA at $p \leq 0.05$. Results showed the highest plant growth in T6. The highest number of fruits was observed in T3, while T6 produced the heaviest fruit yield. Covering from 10:00 am to 2:30 p.m. (T3) resulted in higher yields and minimal damage while the fully covered plot (T6) reduced yield due to disrupted natural pollination, and the uncovered plot (T1) had lower yields due to greater pest damage. With an effective artificial pollination method in place, fully covering the crop could offer maximum benefits. The findings indicate that the most effective covering time for tomatoes is from 10:00 a.m. to 2:30 p.m.

Keywords: Low tunnel net house, Pest management, Ready-to-install, Time-specific management