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
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**Effect of Thermal Screens on the Microclimate and Overall Heat Loss  
Coefficient in Plastic Tunnel Greenhouses**

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**Abstract:** The objective of the present study was to evaluate the effects of thermal screens made of clear polyethylene (PE) and polyester material on the microclimate and overall heat loss coefficient in plastic tunnel greenhouses. The dimensions of the plastic tunnels were: width 6 m, length 20 m and height 3 m. Three different installations were used: (1) a single cover without a screen (as a control); (2) a single cover with a PE screen; and (3) a single cover with a polyester screen. The thermal screens made of PE with UV+IR additives and polyester materials were placed at a height of 2.5 m in the plastic tunnels, and supported with wires. Air temperature, relative humidity, wind speed, solar radiation and photosynthetically active radiation (PAR) were measured and recorded on a data-logger. In the plastic tunnels, the overall heat loss coefficient, heat input, the control factor for air-tightness, the rate of heat loss and the thermal screen effectiveness were calculated. The results showed that the polyester and PE screens were able to keep the air temperature inside the plastic tunnels 4.8 °C and 2.5 °C higher than that outside, respectively. Comparison of the calculated overall heat loss coefficients shows that the differences in the values between the plastic tunnels were large. The relationships between the overall heat loss coefficient and the wind speed, and the outside temperature were modeled, including the measured and calculated values. It was found that the thermal screen effectiveness was 16% and 19.8% for the PE and polyester screens, respectively.

**Key Words:** Plastic tunnel, Thermal screen, Overall heat loss coefficient

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