

被服環境が暑熱環境下植物工場内の 作業負担に及ぼす影響

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Effect of Clothing on Work Load in Large-Scale Greenhouse under Hot Environment

by

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ABSTRACT

We investigated the effect of clothing environment on workload for tomato cultivation work in a greenhouse. The WBGT (Wet bulb globe temperature), ECG (Electrocardiogram), tympanic temperature, subjective evaluation such as comfort, subjective work intensity and temperature and humidity in clothes were measured. The following six clothing conditions were used: shirt only, shirt only with mask, cooling vest over the shirt, cooling vest under the shirt, cloth with fans, and cooling vest under the cloth with fans. As a result, the followings were obtained. (1) The WBGT in a greenhouse was over 31 degrees even in the morning, and the risk of heat stroke was very high. (2) According to the %HRR (Percentage of Heart Rate Reserve) of ECG, wearing a mask tended to increase slightly the exercise intensity, and wearing a cooling vest or a cloth with fans tended to decrease the exercise intensity. (3) Subjective

work intensity was assessed to be higher in wearing a mask and lower in wearing a cooling vest. (4) The results of the measurement of temperature and humidity inside the clothes showed that the cloth with fans kept the humidity inside the clothes low. It was confirmed that the clothes with fans was effective in lowering the temperature and humidity inside the clothes.

要 旨

太陽光利用型植物工場でのトマト栽培作業を対象に、被服環境が作業負担に及ぼす影響を検討した。植物工場内のWBGT (Wet bulb globe temperature)、作業者の心電図、鼓膜温、快適感などの着心地に関する主観評価、運動強度の主観評価、衣服内温湿度を測定した。その結果、次のことが分かった。(1) 植物工場内のWBGTは、午前においても31度以上であり、熱中症のリスクが非常に高い。(2) 心電図の% HRR (Percentage of Heart Rate Reserve) から、マスクの着用により運動強度はわずかに上昇する傾向があり、冷却ベストの着用、ファン付き作業服の着用により運動強度は低下する傾向にあった。(3) 自覚的な作業強度は、マスク着用により高くなり、保冷剤を用いた着衣条件では主観的に作業負荷が小さいと評価された。(4) 衣服内温湿度の測定結果から、ファン付き作業服は衣服内温湿度を低く保つことが確認できた。