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Factors influencing
selection of
settling sites within plants
and oviposition
by greenhouse whitefly
(Trialeurodes vaporariorum
Westwood)

A thesis presented in partial fulfilment of the
requirements for the degree of Doctor of Philosophy in
Plant Health at Massey University

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1991
Abstract
Orientation by adult greenhouse whitefly (*Trialeurodes vaporariorum* Westwood) to younger leaves is induced by negative geotaxis and positive phototaxis but there is a minor effect of features of the leaves. The selection of the lower leaf surface is predominantly the result of a preference for being upside-down (i.e. a response to gravity) but leaf characteristics also play a role. Negative phototaxis has a minor effect. Adult females lay more eggs on the younger leaves and on the lower leaf surface of some plant species but not others. Leaf hairiness and leaf angle are not significant factors in selection by adults of either 1) younger leaves or 2) the lower leaf surface nor are they significant factors in the number of eggs/female/day laid on either 1) leaves of different ages or 2) the lower or upper leaf surfaces.

Adult survival on sucrose sachets (aqueous sucrose solution sandwiched between two layers of Nescofilm) was optimum for 15–20% sucrose and eggs/female/day laid on the sucrose sachets was independent of sucrose concentration when it was between 10% and 30%. Eggs/female/day reached a maximum after 2–3 days and thereafter dropped sharply. The number of larvae that hatched was independent of sucrose concentration but higher concentrations appear to induce later hatch. Percent egg hatch varied from 40% to 77%. The number of eggs laid on 20% sucrose sachets in complete darkness was nearly twice that of any other light intensity. There was no graded relationship between light intensity and oviposition. More eggs were laid on 15% sucrose sachets in light/dark regimes of 8/16, 4/20 and 0/24 than of 12/12, 16/8 and 24/0 hours. No diurnal fluctuation in egg-laying occurred nor were more eggs laid in either light or dark periods. The sucrose sachet technique is a suitable tool for further studies on greenhouse whitefly behaviour.

The results provide further information for incorporation into integrated pest management research.
Acknowledgements

The final version of this thesis is at last final. The checking has been checked - again. The last mistake been found (or has it?). The protracted process of producing a properly presented thesis is finished. It but remains to acknowledge and thank those who made a contribution towards its completion.

First, I would like to thank my supervisors for their assistance: Dr Peter G. Fenemore for encouragement, returning work promptly and the many helpful comments, Professor Brian P. Springett for his insight and useful suggestions and Dr Hugo Varela-Alvarez for encouragement to keep going, patience in explaining the statistics and help in keeping the thesis in perspective with the rest of life.

The Department of Plant Health has been most generous in provision of facilities and time to work on my thesis. Mrs Lois J. Mather, Mrs Lorraine K. Davis, Mr Hugh Neilson (Department of Plant Health) and Mr David Sollitt (Department of Agronomy) provided valuable technical assistance. Dr Ian Gordon (Department of Agronomy) and Mr Greg Arnold (Department of Mathematics and Statistics) provided advice on statistics in the early stages of the experimentation. Central Photographic Unit took the photographs and provided facilities for mounting the prints. Dr Ian Warrington and Mrs Liz Halligan (Plant Physiology Division, Department of Scientific and Industrial Research) helped with the measurement of the light quality and intensity for the cool light source used in the experiments.

I would also like to acknowledge the encouragement of friends when I felt like giving up and the endurance of my husband Barrie who had to put up with the absence of his wife or her grumpiness when she was at home.

Thank you, all of you.

Greenhouse whiteflies may now rest in peace - on someone else's plants!
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