Host range studies with the Lantana mealybug (*Phenacoccus parvus* Morrison)

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Summary

The host range of the lantana mealybug, *Phenacoccus parvus* Morrison (Pseudococcidae) among plants growing in close association with infested lantana, *Lantana camara* L. (Verbenaceae) in the field was observed, as was the acceptability to the insect of a range of economic plants in the glasshouse. Observations suggest that the insect has a very wide potential host range.

Introduction

The lantana mealybug, *Phenacoccus parvus* Morrison (Pseudococcidae) appeared in Queensland in 1988 and its subsequent apparent ability to provide some control of lantana *Lantana camara* L. has raised its status to that of a potential biocontrol agent for this serious weed. Its reported wide host range and collection from a number of economically useful plants (Williams and Watson 1988) suggests that it may also become a pest of crops.

Although originally described from the Galapagos Islands, *P. parvus* is now widespread in the neotropics and Pacific and has also been reported from West Africa (Williams and Watson 1988). These authors record it from New Caledonia, Vanuatu and Western Samoa and suggest that it may be a recent introduction to the South Pacific. The insect was noticed on lantana in the Brisbane region early in 1988 (B. Willson personal communication) and first collected from the same species at Gatton, 80 km west of Brisbane, in June 1988. By the end of 1988 it was widespread between Brisbane and Toowoomba and was being rapidly spread further north by graziers as a potential biocontrol agent for lantana.

Williams and Watson (1988) record the presence of *P. parvus* in the Pacific on *Solanum tuberosum* L. (potato), *Amaranthus* sp. (amaranth), *Cichorium* sp. (chicory), *Lantana camara, Lycopersicon esculentum* Miller (tomato), *Mikania scandens* Willd. (?= *M. micrantha* HBK.) (mile-a-minute weed), *Macroptilium atropupureum* (DC.) Urban (siratro), *Piper nigrum* L. (pepper), *Sida* spp. including *S. acuta* Burm.f. (spiny sida) and *Clerodendron philippinum* Schauer (Honolulu rose). They report that *P. parvus* is polyphagous, and may form heavy infestations in the absence of natural enemies.

The appearance and apparently rapid spread of the lantana mealybug throughout the Lockyer Valley and Brisbane areas and its continuing spread by graziers may be regarded as a mixed blessing. Whilst it appears to provide at least partial control of lantana especially in winter and spring, it does not seem to persist well through the summer in some areas and its known host range suggests that it may also become a pest of crops.

Observations were made by the first author of its presence on plants associated with infested lantana bushes in the field and a number of plants were deliberately infested in the greenhouse to test their acceptability as hosts to the lantana mealybug. The second author has also made observations in the field and is responsible for the verification of identifications.

Field studies

Native and exotic plants growing below, through and close to lantana infested with *P. parvus* were examined in the winter (June/July) of 1989 in the field at one site at Blenheim, two at Mt Whitestone and one at the University of Queensland, Gatton College, all close to Gatton in the Lockyer Valley of southeast Queensland.

The plants listed in Table 1 carried the

Table 1. Plants observed in the field to be susceptible to lantana mealybug

Species	Location on plant	Severity[a]
Asteraceae		
Conyza bonariensis Flaxleaf fleabane	Among rosette leaves	Light
Sonchus oleraceus Common sowthistle	Among leaves	Light
Tagetes minuta Stinking roger	Leaves	Light
Bignoniaceae		
Macfadyena unguis-cati Cats-claw creeper	Shoots	Light
Euphorbiaceae		
Mallotus claoxyloides	Midribs below leaves	Heavy
Fabaceae		
Macroptilium atropurpureum Siratro	Midribs below leaves	Light
Liliaceae		
Protoasparagus africanus Climbing asparagus	Cladodes	Light
Malvaceae		
Sida cordifolia Flannel weed	Leaves and stems	Heavy
Sida rhombifolia Common sida	Leaves and stems	Light
Sida subspicata Spiked sida	Upper leaves and inflorescences	Moderate
Poaceae		
Panicum maximum var. *trichoglume* Green panic	Midribs below leaves	Light
Rhamnaceae		
Alphitonia excelsa Red ash	Under leaves	Light
Solanaceae		
Lycium ferocissimum African boxthorn	Nodes on undersides of stems	Light
Solanum stelligerum var. *stelligerum* Devil's needles	Midribs below leaves	Heavy

[a] Severity was rated as light when only scattered individuals were present, moderate when scattered individuals merged into groups of low density, and heavy when dense groups of individuals were present.

Table 2. Plants observed in the greenhouse to be susceptible to lantana mealybug

Species	Location on plant	Severity[a]
Anacardiaceae		
Mangifera indica Mango	Growing points, young nodes	Heavy
Apiaceae		
Apium graveolens Celery	Bases of leaflets	Heavy
Daucus carota Carrot	Upperside of leaf midribs	Light
Asteraceae		
Chrysanthemum hybrid Chrysanthemum	Senescent stems and leaf axils	Moderate
Helianthus annuus Sunflower	Leaf axils, undersides of main leaf veins	Heavy
Chenopodiaceae		
Beta vulgaris var. *cicla* Silver beet	Undersides of leaves	Light
Cucurbitaceae		
Cucumis sativus Cucumber	Lower sides of stems, leaf axils, bases of leaf laminae and young fruits	Heavy
Fabaceae		
Glycine max Soybean	Leaf axils	Light
Liliaceae		
Allium sativum Garlic	Leaf sheaths and leaf bases	Light
Malvaceae		
Abelmoschus esculentus Okra	Leaf axils	Light
Gossypium sp. Cotton	Leaves and stems	Heavy
Polygonaceae		
Rheum rhababarum Rhubarb	Undersides of leaves	Slight
Solanaceae		
Capsicum annuum Capsicum	Nodes, internodes and leaves	Heavy
Lycopersicon esculentum Tomato	Stems, petioles and leaves	Heavy

[a] Severity was rated as light when only scattered individuals were present, moderate when scattered individuals merged into groups of low density, and heavy when dense groups of individuals were present.

indicated infestations of lantana mealybug.

Glasshouse studies

One to four plants of a range of economic plants were grown from seed, roots or transplants in 20 cm pots in standard potting mix on glasshouse benches in winter and spring (June to September 1989). When sufficiently large, each plant was infested with lantana mealybugs at all stages of development by placing a heavily infested lantana node or shoot tip among its foliage. The plants were kept watered and observed for eight to fifteen weeks. Plants which failed to develop lantana mealybug infestations after the initial treatment were reinfested after four to six weeks.

Lantana mealybugs and crawlers spread from the points of infestation over and between adjacent plants. Mealybugs often clustered at nodes or along the lower sides of horizontal stems and appeared to reproduce freely in that crawlers were constantly present around groups of larger insects. Plants which developed lantana mealybug infestations under glasshouse conditions are listed in Table 2 and those that were apparently resistant to the insect in Table 3.

In a separate observation a potted cotton plant growing in a glasshouse at Indooroopilly was found to be heavily infested on the leaves and stems and was believed to have been naturally infested from lantana plants growing nearby.

Table 3. Plants observed in the greenhouse to be apparently resistant to lantana mealybug

Apiaceae	
Pastinaca sativa	Parsnip
Petroselinum crispum	Parsley
Brassicaceae	
Brassica oleracea var. *botrytis*	Cauliflower
Raphanus sativum	Radish
Bromeliaceae	
Ananas comosus	Pineapple
Fabaceae	
Cicer arietinum	Chickpea
Medicago sativa	Lucerne
Pisum sativum	Pea
Liliaceae	
Allium cepa	Onion
Poaceae	
Avena sativa	Oats
Hordeum distichon	Two-row barley
Sorghum bicolor	Sorghum
Triticum aestivum	Wheat
Zea mays	Sweet corn

Discussion

The polyphagous habit of *Phenacoccus parvus* suggested by Williams and Watson (1988) is amply supported by this work. The results suggest that the insect is unlikely to attack cereals and probably other grasses although they have been recorded in low densities on *Panicum maximum* in the field.

Despite its wide host range among cultivated plants, lantana mealybug is thought to be unlikely to become a serious problem in annual cropping because of its apparently low mobility. The relatively large monocultures of most annual crops, the frequent use of insecticides, and the removal of crop and weed residues soon after harvest followed by a plant-free fallow should be enough to prevent the lantana mealybug becoming a serious pest of annual field crops.

Lantana mealybug has greater potential to become a problem in perennial crops including orchards, in which situations its slow spread is less of a limitation to it and its numbers can build up over longer periods.

The ability of a least some broadleaved weeds to host the lantana mealybug suggests that field hygiene may be important where this insect is present among susceptible perennial crops.

Reference

Williams, D J and Watson, G W (1988). 'The Scale Insects of the Tropical South Pacific Region. Part 2. The Mealybugs (Pseudococcidae)' p.159. (Commonwealth Agricultural Bureau, Farnham Royal, England).