

Development of National Strategies to Manage Citrus Gall Wasp

– Current findings

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Introduction

Citrus gall wasp (CGW) is an emerging pest in the southern citrus regions. Heavily infested trees are littered with galls, resulting in yield loss and reduced fruit size (Figure 1).

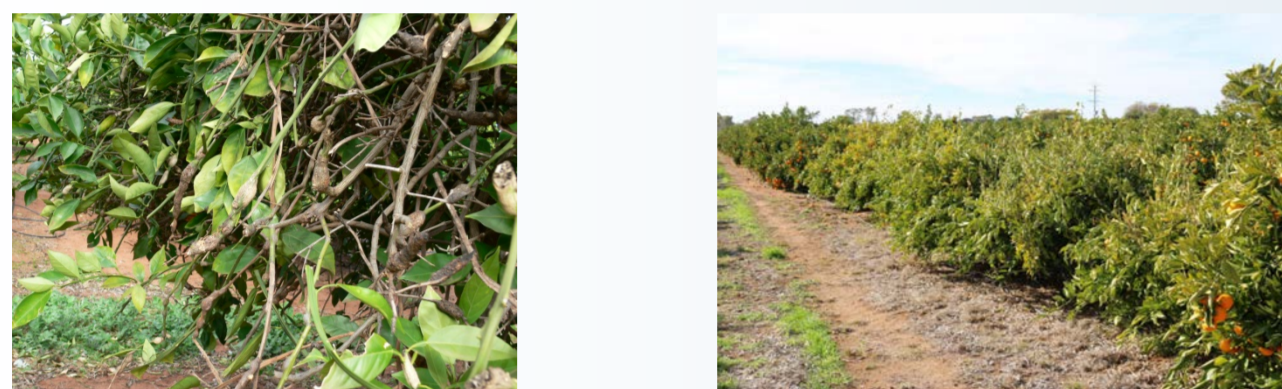


Figure 1. CGW galls in a heavily infested tree (left) and heavily infested trees in the middle of lightly infested trees. Notice the scarcity of fruit in the middle trees.

The wasps emerge in the spring to mate and lay eggs inside current-year spring shoots (Figure 2). After hatching, the larvae burrow into the soft bark tissue and feed there until pupation. As the season progresses, the area of the shoot where many CGW larvae are feeding and developing gradually swell to form the characteristic galls.

Females mate and lay eggs within the same day of emergence, with most eggs laid within the first 3 days of emergence. Each female can lay about 100 eggs

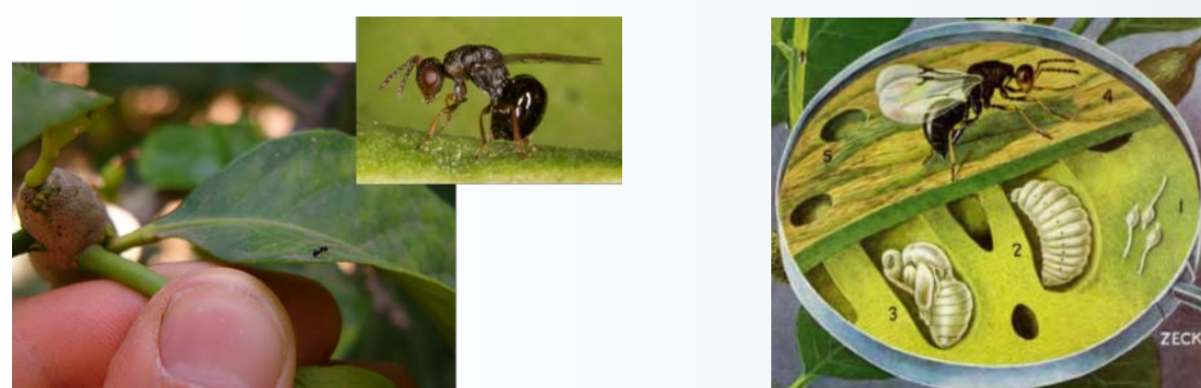


Figure 2. Citrus gall wasp adult female and lifecycle

Adult wasp emergence

In the southern citrus regions, adult wasps emerged from galls between late October and mid November. Most emergence (90%) occurred in a 2-3 week period (Table 1).

Table 1. CGW adult wasp emergence in the Riverina and Sunraysia.

Site	Region	Variety	Year	5%	50%	95%	5-95%
R1	Riverina	Salustiana	2015	24/10	31/10	10/11	17 d
R2	Riverina	Lemon	2015	25/10	31/10	10/11	16 d
R3	Riverina	Navel	2015	28/10	6/11	12/11	15 d
S1	Sunraysia	Valencia	2015	26/10	1/11	11/11	16 d
S2	Sunraysia	Grapefruit	2015	20/10	29/10	7/11	18 d
S3	Sunraysia	Navel	2015	26/10	31/10	9/11	14 d
S4	Sunraysia	Late lane	2010	8/11	20/11	26/11	18 d
S4	Sunraysia	Late lane	2011	20/10	1/11	9/11	20 d
S4	Sunraysia	Late lane	2012	18/10	30/10	6/11	19 d
S5	Sunraysia	Valencia	2012	29/10	5/11	17/11	19 d
S6	Sunraysia	Lemon	2012	20/10	27/10	1/11	12 d

Adult wasp repellent

Two large-plot field trials of Surround® (Kaolin) were conducted during 2015-2016 to evaluate its effect in repelling gall wasps from laying eggs in the shoots of treated trees. The results showed that two applications of Surround® in October reduced total gall weight by >50% (Figure 3).

Adult wasp control

Talstar, Actara, chlorpyrifos, Success Neo, and natural pyrethrum were applied on the body of wasps. All caused similar mortality of the test wasps.

Citrus leaves treated with Talstar, Success Neo and Actara showed longer residual activity than the other insecticides, remaining toxic to the adult wasps 14 days after the spray (Figure 4).

Larval control - Spring

Two field trials of systemic insecticides were conducted during 2015-2016. Three rates of Samurai® and one rate each of Confidor® Guard and Movento were tested.

Confidor® Guard applied at 9 ml/tree and Samurai® applied at 8-12 g/tree in late October reduced total gall weight by 50-65% compared to untreated trees (Figure 5). There were also less large galls.

Larval control - Autumn

In a separate trial, we tested the efficacy of the systemic insecticides for CGW control in Valencia trees in the Autumn. The results showed that Movento applied in April at 40 mL/100L + Hasten at 50ml/100L and Samurai® applied at 12 g/tree suppressed the emergence of CGW adult wasps by > 50% (Figure 6).

Parasitic wasps

The two main parasitic wasp species of CGW were both recovered in the southern regions (Figure 7), however, their numbers were too low (< 1%) to effectively control the gall wasp.

Of the two parasitic wasp species, *Megastigmus brevivalvus* is the most abundant. It emerges about 2 weeks after the CGW. It was able to tolerate 40°C heat stress for up to 5 hours without suffering high mortality if it had access to water.

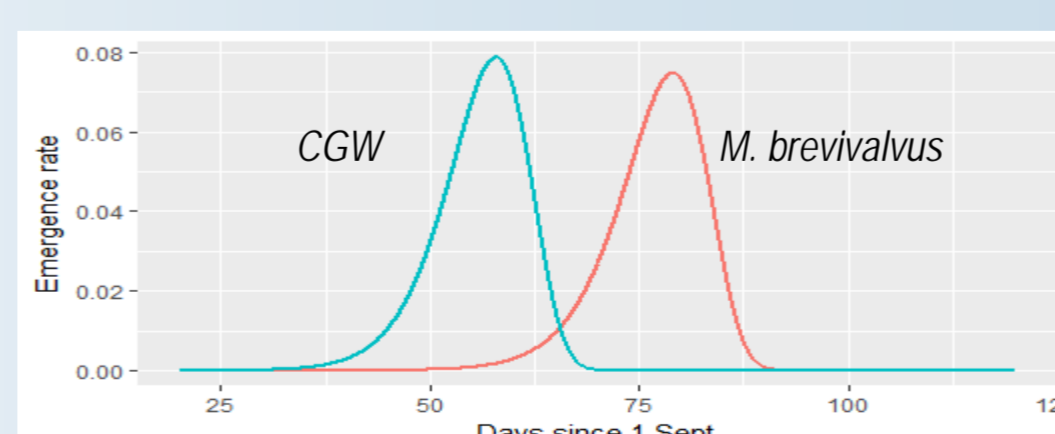


Figure 7. Two main parasitic wasp species recorded in the southern citrus regions (top) and emergence timing of the parasitic wasps relative to CGW (bottom).

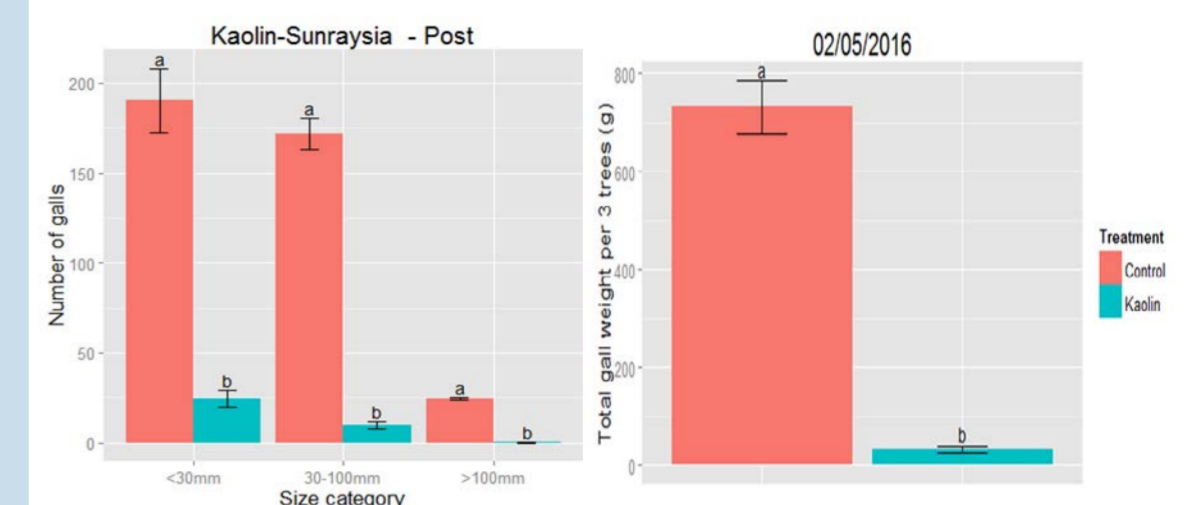


Figure 3. 2015-16 Surround trial in the Sunraysia. Top row of bags are from un-treated trees and bottom row from treated trees.

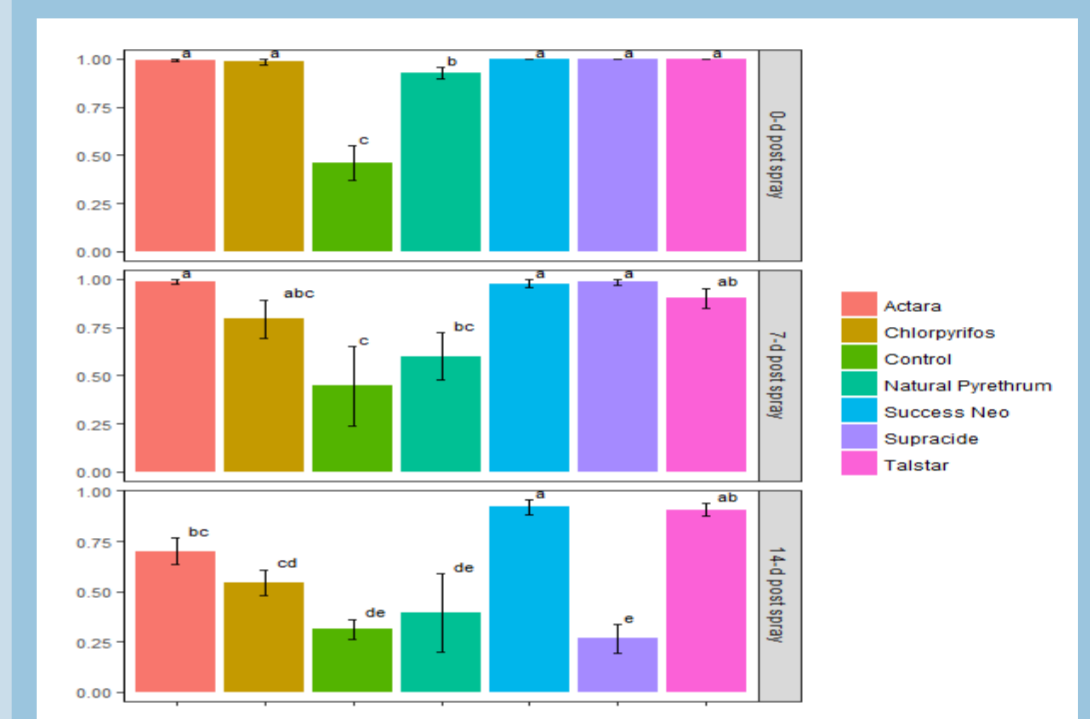


Figure 4. Residual activity of selected insecticides at 0, 7, and 14-days after spray.

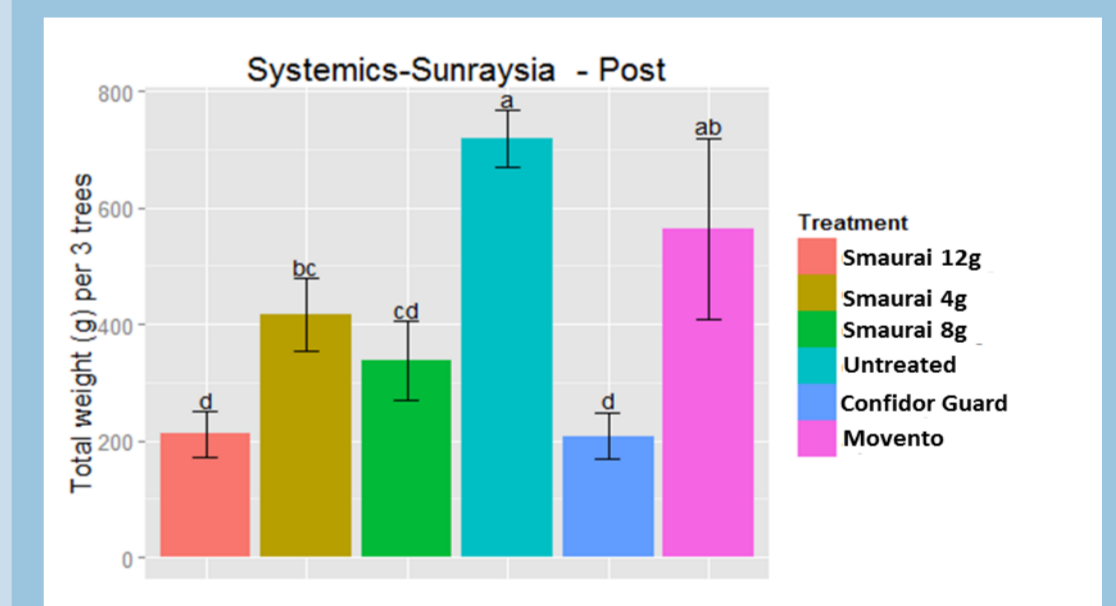


Figure 5. Total gall weight in the 2015-16 trial of systemic insecticides in the Sunraysia.

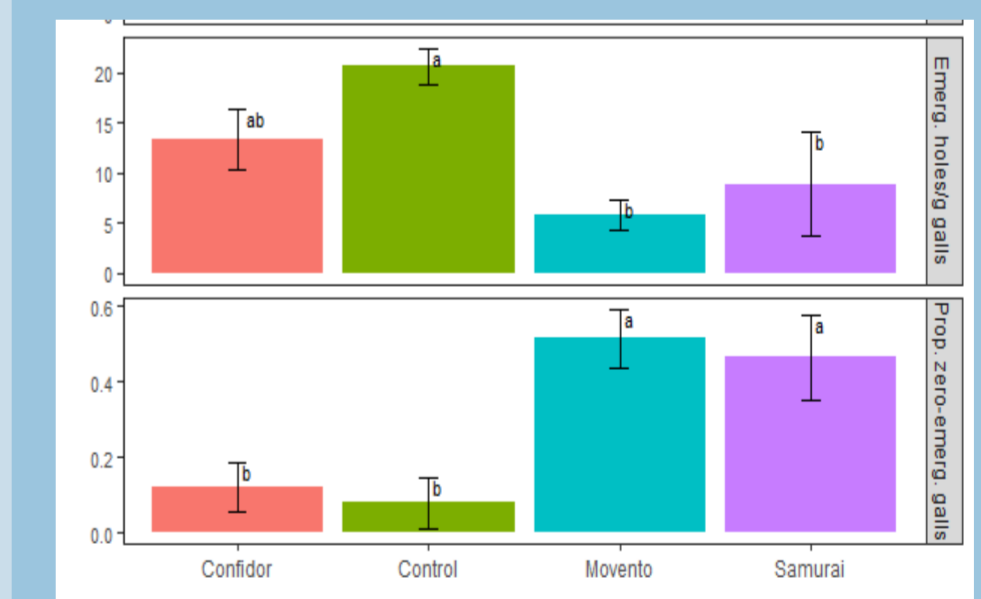


Figure 6. Suppression of CGW emergence in Valencia trees by systemic insecticides applied in Autumn.

Acknowledgements

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