



RESEARCH NOTE: NUMBER 47

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# Relative abundance of cicadas in ARGOS kiwifruit orchards: 2010 update

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## Background

Since 2005, ARGOS has measured the relative abundance of cicadas in 12 Green, 12 Green Organic and 12 Gold kiwifruit orchards. The orchards are arranged in 12 clusters with each cluster containing one of each of the three types of orchards. The orchards within each cluster are close together so that background variables like soil type and climate are similar. Each year (March), the number of shells on the trunks of vines has been counted in the centre rows of the same three blocks in each orchard. Each orchard was sampled just once each year with approximately 2000 vines sampled each year. This systematic and consistent sampling across years allows robust comparisons to be made.

## Results

### Trends (Figure 2)

The number of shells attached to the trunks of vines increased overall between 2005 and 2010. This was driven largely by increases in 2007 and 2008. The largest increase seems to have occurred in Green orchards.

Green orchards have consistently had the most number of shells per vine and Gold the least with Green Organic intermediate.

### Differences between production systems (Figure 3)

Overall, Green has had significantly more cicada shells than Green Organic orchards which have in turn have had significantly more shells than Gold orchards.

### Cluster comparisons (Figure 4)

When inspecting individual clusters, Green orchards had the highest relative abundance in 9 out of 10 clusters.

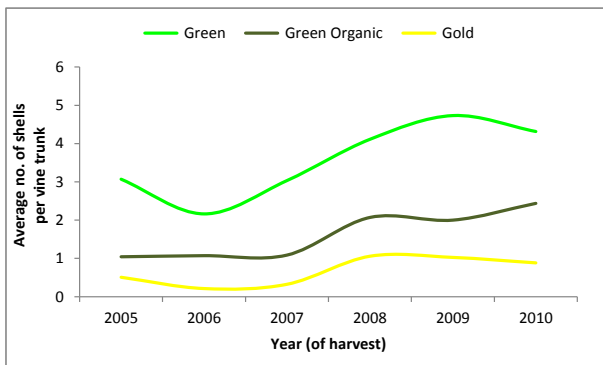
### Other factors (Figures 5 & 6)

There were no apparent associations between altitude or latitude and the relative abundance of cicadas in orchards.

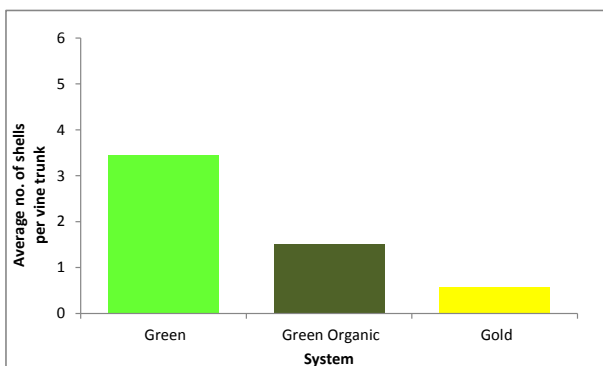


**Figure 1.** The two main Cicada species found on kiwifruit orchards, *Amphipsalta cingulata* (Clapping Cicada, Left) and *A. zelandica* (Chorus Cicada).

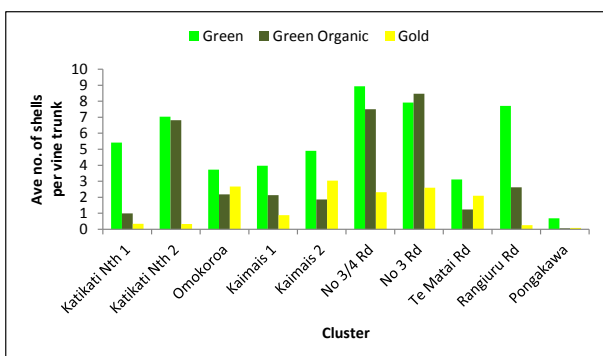
**Figure 2.** Relative abundance of cicada shells found in ARGOS kiwifruit orchards in the Bay of Plenty (10 orchards of each type sampled)<sup>1</sup>. Approx. 2,000 vines sampled each year.



**Figure 3.** Relative abundance (averaged for the 2005-10 period) found in ARGOS kiwifruit orchards in the Bay of Plenty (10 orchards of each type sampled). Values shown are significantly different from each other ( $P < 0.001$ )<sup>1</sup>. Approx. 2,000 vines sampled each year.

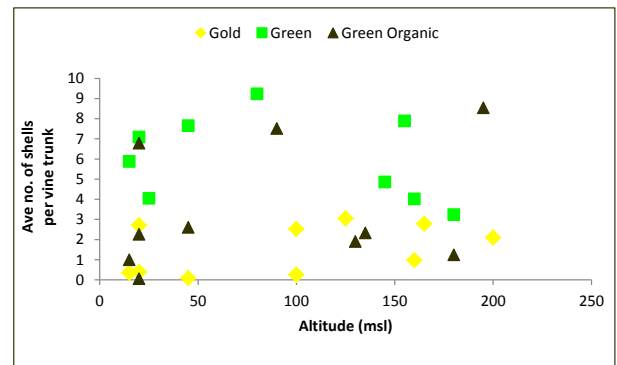


**Figure 4.** Relative abundance (averaged for the 2005-10 period) of cicada shells found in ARGOS kiwifruit orchards in the Bay of Plenty. A cluster is a group of three orchards (one of each type) close together. Reading from left to right, clusters generally run from North to South.

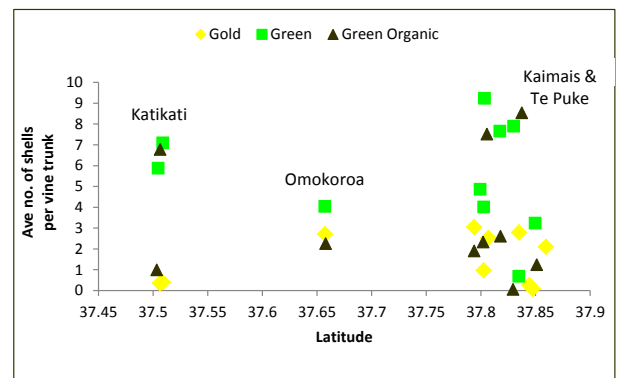


<sup>1</sup> Log back-transformed predicted means shown from repeated measures analysis.

**Figure 5.** Relationship between altitude and the relative abundance of cicada shells (averaged for the 2005-10 period) for ARGOS kiwifruit orchards in the Bay of Plenty.



**Figure 6.** Relationship between latitude and the relative abundance of cicada shells (averaged for the 2005-10 period) for ARGOS kiwifruit orchards in the Bay of Plenty.



**Previous related ARGOS research notes:**

- 3. [Cicadas in Kiwifruit Orchards](#) (2004)
- 22. [Annual monitoring of cicadas and spiders to indicate kiwifruit orchard health](#) (2006)
- 23. [Cicada Species in Kiwifruit Orchards](#) (2006)

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