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The lifecycle and epidemiology of the Tomato/Potato Psyllid (*Bactericera cockerelli*) on three traditional Māori food sources

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Abstract

The tomato/potato psyllid (*Bactericera cockerelli* (Sulc), TPP) is a species of Psylloidea first detected in New Zealand in 2006. Since its incursion the TPP has proved to be a major insect pest of solanaceous crops, particularly potatoes (*Solanum tuberosum*), tomatoes (*Lycopersicon esculentum)* and capsicums (*Capsicum* L.). The TPP is a vector of Zebra Chip Disease or liberibacter (*Candidatus* Liberibacter solanacearum syn. psyllaurous), a lethal plant disease related to Citrus greening disease (*Candidatus* Liberibacter asiaticus). Successive annual population outbreaks coupled with widespread liberibacter infection continues to challenge New Zealand's horticulture sector.

Three traditional Māori food sources, namely taewa (Solanaceae, *Solanum tuberosum* L. ssp. *andigena* and ssp. *tuberosum*), kūmara (Convolvulaceae, *Ipomoea batatas* (l.) Lam.) and poroporo (Solanaceae, *Solanum aviculare* G. Forst syn. *S. Laciniatum* (LINN.), are known to be susceptible to TPP infestation. Kūmara and taewa are annual summer plants present during the peak TPP development and population growth period. Poroporo flowers and fruits year-round and is therefore theoretically susceptible to infestation throughout the year and may serve as a potential overwintering host and food source for TPP.

Poroporo was assessed as an overwintering host of the TPP and the lifecycle progression of TPP was also compared on the three host plant species; taewa, kūmara and poroporo. The role of these three host plants in the annual lifecycle of this insect pest in the New Zealand environment.

The results showed that poroporo was not an important overwintering host of the TPP in the Manawatu/Rangitikei region; rather it can be viewed as an alternative or refuge host in the absence of the primary solanaceous host species and other volunteer weed host plants. The results indicated that taewa is a more suitable host of the TPP than poroporo and kūmara. In the same vein, poroporo is clearly more suitable as a host than kūmara. The relationship seen in this study in terms of host suitability can be pictorially represented as; Taewa> Poroporo> Kūmara

This study showed that all three host species are capable of supporting TPP and therefore each of the host species should be managed with a view to minimise the impact of TPP across seasons.

Acknowledgements

This thesis was undertaken in an attempt to amalgamate my undergraduate study in plant protection and my postgraduate study based on Māori natural resource development. It seemed all too convenient that in my first year of postgraduate study the tomato/potato psyllid (*Bactericera cockerelli*) arrived in the Manawatu District and infested the Massey University taewa (Māori potatoes, *Solanum tuberosum* ssp. *andigena*) seed bank managed by Dr Nick Roskruge. Fate some would say, and therein lies the conception of my thesis. The Tomato/Potato psyllid (TPP, *Bactericera cockerelli*) is an interesting insect, so small and some would think insignificant, it is hard to believe the impact this insect and Zebra Chip (*Candidatus* Liberibacter solanacearum syn. psyllaurous) disease has had on New Zealand horticulture.

I wish to first thank Dr Nick Roskruge, my supervisor and mentor, for without whom this thesis would not have been possible. Your knowledge, experience and endless patience have made this research possible. I am amazed by what you have accomplished and wish you well in your post-doctoral studies

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And to my ‘home’ of five years, Massey University Manawatu, my journey here has come to an end and I must move on. I would like to acknowledge the Institute of Natural Resources for their friendship and camaraderie.

God Bless.

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