

PFR SPTS No. 16420

***Tamarixia triozae*; Sustainable Farming Fund No. 404861 Milestone 3**

Davidson M¹, Watkins L¹, Agnew N²,
Plant and Food Research, Lincoln¹, Hawke's Bay²,

June 2018

1 SUMMARY

This report provides a summary of work undertaken by The New Zealand Institute for Plant and Food Research Limited (PFR) for the Sustainable Farming Fund (SFF) Project No. 404861, Milestone 3, the first post-release survey for *Tamarixia triozae* for the SFF programme to determine whether the parasitoid can reproduce on tomato potato psyllid (TPP, *Bactericera cockerelli*) in the field.

The goal of the SFF is to establish self-sustaining populations of a parasitoid of TPP, *T. triozae*, in New Zealand. The task for Milestone 3 involved collecting TPP infested host plant material (Hawke's Bay and Canterbury) 1 month after the last *T. triozae* were released in the field, and monitoring it daily (Canterbury) or every 2–3 days (Hawke's Bay) for emerging adult parasitoids. The last releases for Milestone 2 Canterbury and Hawke's Bay sites were completed at the end of February 2018. Parasitoids were recovered from three of five release sites and were confirmed as *T. triozae* by Darren Ward (Landcare Research). This survey does not confirm the establishment of the parasitoid in New Zealand. Subsequent surveys over the next couple of years will determine whether *T. triozae* have successfully overwintered and established in the field.

Additional work included sending excess *T. triozae* adults from the colony at PFR Lincoln to Papakura, Auckland for release by a Clevedon grower. Since March 2018, 810 *T. triozae* adults have been sent for release at this site.

2 SFF MILESTONE 3. POST-RELEASE SURVEY

To determine whether *T. triozae* were able to reproduce on wild TPP during the summer season, TPP infested African boxthorn (*Lycium ferocissimum*) were collected at both the Hawke's Bay and Canterbury release sites at least 1 month after the last Milestone 2 release.

Four to six weeks after the last release of *T. triozae* adults at the Hawke's Bay and Canterbury sites, a post-release survey was undertaken on 26 and 27 March 2018. At each of the Canterbury release sites, three to four boxthorn branches were collected every 10 paces along the hedge. The Hawke's Bay sites were smaller therefore branches were randomly collected at these sites. Branches with TPP 4th and 5th instar nymphs were selected to ensure a reasonable chance of collecting parasitised nymphs if present. The cut end of branches were placed in oasis or pushed through plastic film covering 1.8 L plastic containers so the tip of the cut end was covered with water. All infested material was contained and transported back to the laboratory and placed in cages specifically allocated to the site in which they were collected (Figure 1). Cages were checked daily (Canterbury) or every 2–3 days (Hawke's Bay) for adult *T. triozae* and until no further adults were found (up to 14 days after collecting branches).



Figure 1. A mesh cage with tomato potato psyllid infested African boxthorn branches collected from one of the release sites in Canterbury.

TPP nymphs were easy to find at all sites during the post-release survey, except for Hawke's Bay site B where TPP were rare (Table 1). The number of branches collected at each release site depended on the length of the boxthorn hedge, therefore numbers differed for each site. The remains of TPP with exit holes, indicating nymphs had been parasitised, were observed in the field at Canterbury sites A and B (Figure 2a). At the Canterbury sites, two TPP nymphs, and Hawke's Bay site C, four TPP nymphs, were suspected of being parasitised (Figure 2b). These were collected into vials and maintained in the laboratory, where parasitism was confirmed following the emergence of adult parasitoids on both Canterbury TPP nymphs and two of the Hawke's Bay nymphs.

The post-release cages containing plant material from Hawke’s Bay site C, and Canterbury sites A and B in the laboratory produced 18, 185 and 334 live adult *T. triozae* parasitoids, respectively, during the monitoring period (Table 1). No parasitoids were found in cages containing plant material from Hawke’s Bay sites A and B. Six *T. triozae* were collected from each cage and preserved in 96% ethanol to confirm the identity of the parasitoids. All parasitoids collected thereafter were kept in a rearing cage containing a small amount of honey (supplementary food) and water before being re-released back at their original collection site.

Table 1. The numbers of *Tamarixia triozae* released, date of final release, and numbers of parasitoids recovered from tomato potato psyllid (TPP) nymphs on African boxthorn collected from the release sites in late March.

Region	Site	Date of last release of <i>T. triozae</i> adults	Total no. <i>T. triozae</i> released	Date of post-release survey	Tomato potato psyllid status ¹	Total no. branches collected	Total no. <i>T. triozae</i> adults recovered from boxthorn
Hawke’s Bay	Site A	27/02/2018	181	27/03/2018	Easy to find	20	0
	Site B	27/02/2018	184	26/03/2018	Rare	17	0
	Site C	13/02/2018	216	26/03/2018	Easy to find	20	18
Canterbury	Site A	27/02/2018	595	27/03/2018	Easy to find	58	185
	Site B	12/02/2018	466	27/03/2018	Easy to find	97	334

¹TPP easy to find indicated relatively abundant populations, TPP rare indicates low populations.



Figure 2. Tomato potato psyllid (TPP) parasitised nymph with emergence hole on a boxthorn leaf found in the field at Canterbury site B (left) Photo courtesy of Robert Lamberts (The New Zealand Institute for Plant and Food Research Limited). Parasitised TPP nymph found on a collected boxthorn branch in the field at Canterbury site A (right).

2.1 Until end June 2018

Between March and May 2018, excess adults from the Lincoln *T. triozae* rearing colony were sent to a Clevedon grower for release in Papakura, Auckland. Since March 2018, 810 adults have been sent for release at this site. The Hawke’s Bay *T. triozae* colony was discontinued because it has been difficult to maintain and was surplus to requirements after the last of the releases in February 2018. Additional TPP and parasitoids were also supplied to Bioforce Limited to assist them in establishing a *T. triozae* colony.

2.2 Year 2 of SFF

Post-release surveys to determine if *T. triozae* can survive winter in New Zealand will be carried out in the summer of 2018–19; PFR plan to collect plant material from the PFR release sites in Canterbury and Hawke's Bay, and rear any collected TPP through to fate.

We will coordinate with the grower in Clevedon who released the parasitoid on his property to send us plant material with TPP so we could rear the TPP through to fate. Note, there is only a very limited amount of funding available for this activity so we could only afford to receive plant material once or twice from the sites.

Any further *T. triozae* releases in Years 2 and 3 will depend on the availability of the parasitoid. It may be possible for the PFR *T. triozae* laboratory colony to be maintained by a student until mid-August 2018. PFR will need to obtain funding from industry to maintain the colony at PFR after this time.

2.3 Additional in-kind activities

We have a student visiting us at PFR Lincoln for 6 months (March – September 2018). He was involved in the autumn post-release survey and is currently carrying out laboratory experiments to determine the survival and fecundity of *T. triozae* of TPP on African boxthorn, potato, tomato and capsicum plants.

Confidential report for:
Vegetables New Zealand
404861

DISCLAIMER

Unless agreed otherwise, The New Zealand Institute for Plant and Food Research Limited does not give any prediction, warranty or assurance in relation to the accuracy of or fitness for any particular use or application of, any information or scientific or other result contained in this report. Neither Plant and Food Research nor any of its employees shall be liable for any cost (including legal costs), claim, liability, loss, damage, injury or the like, which may be suffered or incurred as a direct or indirect result of the reliance by any person on any information contained in this report.

CONFIDENTIALITY

This report contains valuable information in relation to the Applied Entomology programme that is confidential to the business of Plant and Food Research and Vegetables New Zealand. This report is provided solely for the purpose of advising on the progress of the Applied Entomology programme, and the information it contains should be treated as "Confidential Information" in accordance with the Plant and Food Research Agreement with Vegetables New Zealand.

PUBLICATION DATA

Davidson M, Watkins L, Agnew N. June 2018. *Tamarixia triozae*; Sustainable Farming Fund No. 404861 Milestone 3. A Plant and Food Research report prepared for: Vegetables New Zealand. Milestone No. 70803. Contract No. 33968. Job code: P/336064/01. SPTS No. 16420.

Report approved by:

Melanie Davidson
Scientist, Applied Entomology
June 2018

Libby Burgess
Science Group Leader, Applied Entomology – Bioprotection
June 2018

For further information please contact:

Melanie Davidson
Plant and Food Research Lincoln
Private Bag 4704
Christchurch Mail Centre
Christchurch 8140
NEW ZEALAND
Tel: +64 3 977 7340
DDI: +64 3 325 9442
Fax: +64 3 325 2074
Email: Melanie.Davidson@plantandfood.co.nz

This report has been prepared by The New Zealand Institute for Plant and Food Research Limited (Plant and Food Research).
Head Office: 120 Mt Albert Road, Sandringham, Auckland 1025, New Zealand, Tel: +64 9 925 7000, Fax: +64 9 925 7001.
www.plantandfood.co.nz

