



Farming, Food and Health. First

Te Ahuwhenua, Te Kai me te Whati Ora: Tuatahi

Farmer feedback on 2008/09 Irish wasp mini-release scheme

Pip Gerard

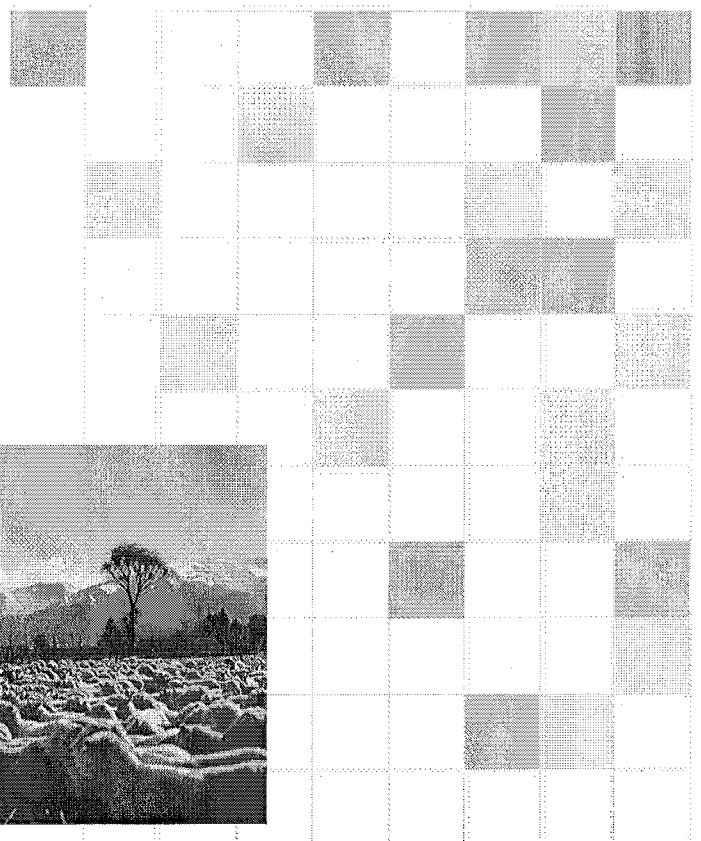
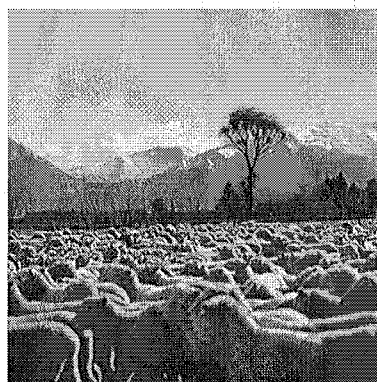
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1. EXECUTIVE SUMMARY

Clover root weevil (CRW) is a serious pest of white clover which has spread throughout the North Island and is currently spreading through the South Island. The Irish wasp *Microctonus aethioides* was released in 2006 as a biocontrol agent for the weevil and has established rapidly at multiple North and South Island release sites. Four strategies have been implemented to accelerate the widespread establishment of the Irish wasp throughout all regions where weevil infestations are causing problems. These are:

- medium-sized releases (up to 2500 parasitised weevil adults) at selected North Island sites which can act as point sources for natural and assisted dispersal.
- mini-releases of 10 parasitised weevils distributed directly to farmers through industry networks.
- medium-sized releases targeted at South Island infestations. The wasp will spread with CRW, slowing weevil dispersal and preventing the boom populations observed in the North Island.
- experimental releases at new localised South Island infestations using experimental emergence devices that release wasps only. This reduces the risk of also releasing non-parasitised CRW thereby avoiding contributing to CRW spread.

A postal survey was undertaken in spring 2009 to find out what dairy farmers thought about the mini-release approach, their awareness of the programme, and to provide an indication of how successful the approach was for getting the Irish wasp released.

Fifty-five of the 100 questionnaires posted were returned. Feedback indicated that the mini-releases were well received, most going to farmers that had had previously experienced losses due to CRW. The mini-releases were very effective in terms of getting the biocontrol to farms with 92% of insects arriving in good condition and 96% being released on the same day. The farmers appeared receptive of the information provided with the samples, indicating the project was successful in terms of tech transfer. There was good recognition of DairyNZ with 79% showing awareness of the organisation's involvement in biocontrol research.

2. BACKGROUND

Clover root weevil (CRW), a serious pest of white clover, was first detected in 1996 and has since spread throughout the North Island. It is currently spreading through the South Island. Larvae feed on the nodules, stolons and roots, while adults feed on clover foliage. Typical larval populations found in Waikato dairy pastures following the initial 1996-1997 wave of invasion have been shown to interfere with N fixation and reduce clover dry matter production by up to 33%. The Irish wasp was released in 2006 as a biocontrol agent. It is a natural enemy of CRW and works by injecting an egg into the adult weevil and sterilizing the females, thus they cease laying eggs. The weevils are killed later when the larvae emerge to pupate in soil litter, before emerging as new wasps ready to parasitise other CRW. The wasp goes through at least three generations from spring to autumn, and the fourth generation overwinters as diapausing first instar larvae inside autumn-emerged CRW.

Following successful establishment of the Irish wasp in 2006 at four initial experimental North Island release sites, four strategies have been implemented to accelerate the widespread establishment of the Irish wasp throughout all regions where weevil infestations are causing problems. These consisted of:

- medium-sized releases (up to 2500 parasitised weevil adults) at selected North Island sites which can act as point sources for natural and assisted dispersal.
- mini-releases of 10 parasitised weevils distributed directly to farmers through industry networks.
- targeted medium-sized releases at three infested sites in the South Island that will let the wasp spread with the weevil, hopefully slowing weevil dispersal and preventing the boom populations observed in the North Island.
- releases at a further two South Island infestations using experimental emergence devices that release wasps only. This reduces the risk of also releasing non-parasitised CRW thereby avoiding contributing to CRW spread.

The use of mini-releases is a novel approach in biocontrol as most classical biocontrol programme use mass releases at widely separated (>100 km) point sources. It was possible in this programme because the Irish wasp is asexual (females only) and even a single female can found a new population. In contrast, a sexual species may die out if too few are released: females may not find a mate and lay their eggs before death. While the risk of establishment failure for each individual mini-release is greater, they complement mass releases and provide additional benefits by:

1. improving speed of coverage
Multiple small releases throughout a region accelerates the spread of the biocontrol agent and therefore the benefits of biocontrol coming on-line.
2. improving business-science linkages
The mini-releases involved interaction between industry and researchers as the majority of the wasp giveaways went out via industry field officer networks
3. responding to farmer need
Many farmers were anxious to get the biocontrol..
4. providing a tech transfer conduit
Information pamphlets on grass/clover pasture management and biocontrol accompanied all samples
5. promoting benefits of levy-funded research to farmers
DairyNZ input was clearly branded.

A postal survey was carried out in spring 2009 to find out what farmers thought about this approach to providing a solution to an on-farm problem and obtain a measure of the

success of the Irish wasp delivery project in terms of getting the wasp release and recognition of DairyNZ input. This report outlines how this was undertaken and the responses received.

3. METHODS

In September 2009, 100 dairy farmers who had received mini-release samples were posted a questionnaire (Appendix 1) and a post-paid return envelope. Over 1000 dairy farmers received samples in 2008 and 2009 but insufficient details had been forwarded back through industry networks to do a truly random survey. Therefore the survey recipients were the first 100 farmers on the CRW mini-release database who had received samples through the DairyNZ consulting officers and for whom a full postal address had been recorded or could be readily obtained from the internet.

Input from Bruce Small, AgSystems AgResearch, and Alex Fear, DairyNZ, had been sought to ensure the survey questions were clear and appropriate.

4. RESULTS AND DISCUSSION

By 21 October 2009, a total of 55 responses and seven "return to sender" replies had been received. The majority of responses (44%) were from the Waikato. This was expected since few samples went to Waikato farmers in 2008 because of the severity of the drought, and therefore the focus of the mini-releases in 2009 was in this region where the drought had broken and clover had recovered allowing CRW numbers to build up.

Table 1: Region from where farmer survey responses were received

Region	Responses
Waikato	24
Taranaki	6
Northland	7
Southern Hawke's Bay	4
Bay of Plenty	4
South Auckland	2
Taupo	2
Not provided	6

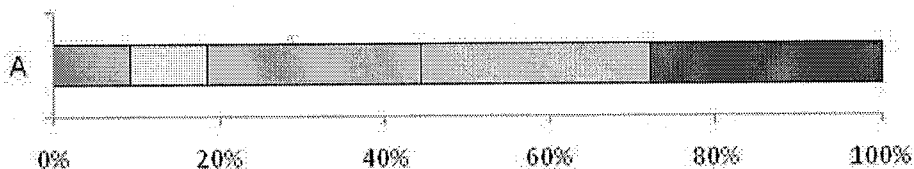
4.1 Responses to scaled questions

The responses to the questions posed are summarised below. All questions were asked on a 1-5 scale and the length of the colours in the following bar graphs denote what percentage of farmer responses were in each category.



A. Has clover root weevil been a problem on your property in the past?

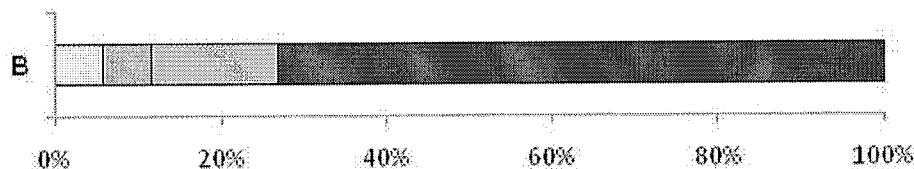
1 Not really 2 3 Sometimes 4 5 Yes, very much so



Over 80% of respondents had recognised that CRW had been a problem on their property at some time and 28% put it in the serious category.

B. Were the parasitised weevils alive when you received your sample vial?

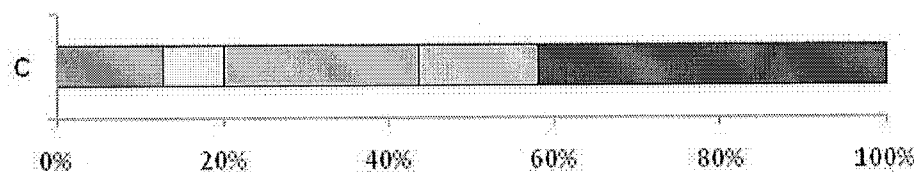
1 All dead 2 3 Half dead 4 5 All alive



Parasitized weevil survival from laboratory to farm was generally good with no deaths in 73% of the vials and only six farmers (8%) reported weevils not being in a good state (most noticeably eastern Bay of Plenty farmers).

C. Were you aware of the weevil biocontrol project before you got the Irish wasp sample?

1 Not really 2 3 Saw articles 4 5 Yes, very much so



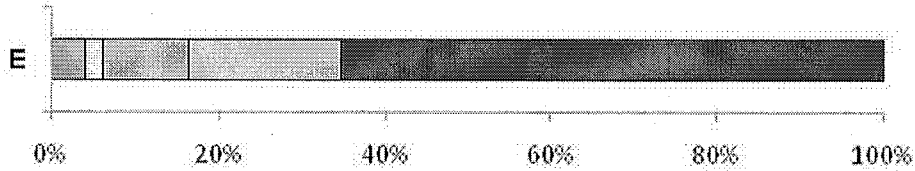
The extensive coverage of the CRW biocontrol programme in the media was evident in farmers' responses with 42% reporting they were very much aware of the project and a further 39% of farmers had seen articles and knew of it.

D. How soon did you release the sample?

Excellent release times were reported with 96% of samples being released on the day they arrived and the remainder the following day.

E. Were the instructions for release of the parasitised weevils clear?

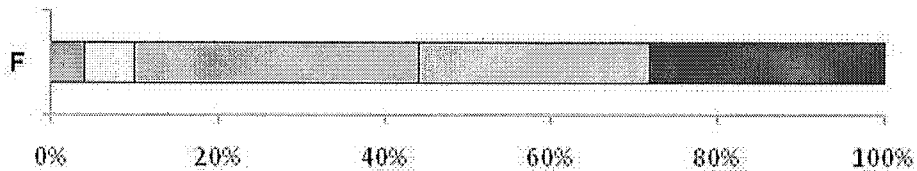
1 Not really 2 3 Just OK 4 5 Yes, very much so



Only three farmers felt release instructions were unclear with the majority finding no problems with the instructions.

F. Did the information pamphlets increase your knowledge of clover root weevil?

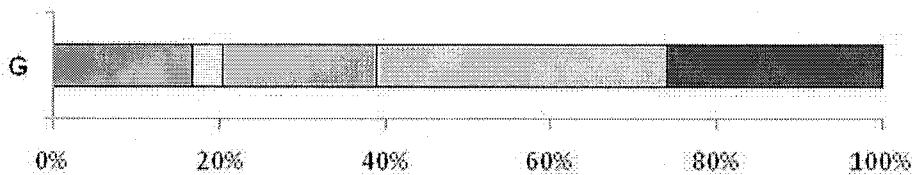
1 Not really 2 3 Learnt a bit 4 5 Yes, very much so



Most farmers (90%) reported some benefit from the accompanying information pamphlets. Five farmers did not receive the pamphlets as the consulting officer carried out the release.

G. Were you aware that DairyNZ funded the research for clover root weevil biocontrol

1 Not really 2 3 Assumed so 4 5 Yes, very much so



The majority of respondents (79%) were aware that DairyNZ funded the research or assumed so. A further 21% indicated they were unaware although two did write on their forms that they thought it was DairyInsight.

4.2 Responses to open questions

Around half of the respondents took the time to write comments. They are grouped below in common themes

Farmers are looking for follow-up information

- More publicity, articles etc., follow up assessment of establishment
- More publicity/trial results
- Feedback on how the Irish wasp has attacked the CRWs ie the outcome
- We need to know how to check for wasps and when to see if they are working

Farmers were concerned how the drought/lack of clover will affect establishment.

- Timing was not good as we were in drought conditions at the time of release. Hot conditions and very little clover
- We are hoping the wasps have survived the "big dry of 2008".
- Time of season wasp released - starting to go into dry season so not so much clover around
- Very good approach. Don't know if it has worked as we now have no clover

Farmers wanted more releases

- More pots for more farmers besides discussion groups
- We would be prepared to release more. We need to have a blanketing effect on neighbouring farms.
- More vials for everyone. CRW does not seem to be a problem at the moment

Observations on clover and CRW

- Looking forward to seeing a positive effect on clover
- Plenty of clover in the past year. There is no sign of CRW
- No evidence of improvement in control at this stage
- Very little evidence of CRW at present (spring 09)
- Such a small number of weevil are hard to monitor
- Still have root weevil signs

Positive feedback

- This was a good and worthwhile project but like a lot of pest problems we only think about them when it is a big problem
- Very happy to be included in the release
- Thanks for the weevils. We hope they do their job
- You guys have done a good job. Now just solve this pasture pulling problem
- Excellent project
- Was impressed we had the opportunity to augment release
- The Irish wasp is a great pin-up boy for sustainable dairying - congratulations

5. CONCLUSIONS

The mini-release project appears highly successful with our sample of dairy farmers. The feedback from dairy farmers indicated the mini-releases were well received, most going to farmers that had had CRW problems in the past. The mini-releases were very effective in terms of getting the biocontrol to farms with 92% arriving in a good state and being released on the same day. The farmers appeared receptive of the information provided with the samples, indicating the project was successful in terms of tech transfer. There was good recognition of DairyNZ with 79% showing awareness of its involvement in biocontrol programme.

6. RECOMMENDATIONS

The following recommendations arise from this project:

1. Check Irish wasp establishment in North Island districts where there was poor clover recovery from the 2008 drought
2. Discuss with DairyNZ desired strategy to release wasp where coverage is absent (Milestone 3). This may be using either a medium or mini-release strategy sourcing parasitised weevils from known high parasitism sites.
3. Ensure project progress is reported in a farmer-friendly manner through the media and other extension opportunities.
4. Ensure the contributions of DairyNZ are highlighted in any future publicity highlighting ongoing results arising from the work described in this report.

7. ACKNOWLEDGEMENTS

The author thanks all the DairyNZ field officers who took part in the mini-release scheme. She also thanks Tina Eden and Gabriela Burch who co-ordinated the packaging and distribution of samples, Derrick Wilson for the farmer addresses and the Waikato B. Sci Tech. summer students for assisting in the mass rearing of the Irish wasp. The CRW biocontrol program has had long term support from DairyNZ, Meat & Wool NZ, and FRST. In 2008/09 the mini-release project was supported by an AGMARDT Innovation Grant.

8. APPENDIX

Irish wasp delivery: Farmer evaluation and feedback

In early 2008 or 2009 you received a vial of weevils that had been parasitised by the Irish wasp. This wasp attacks the clover root weevil and by distributing this biocontrol agent directly to farmers selected by DairyNZ consultants, we hope that it will lead to rapid control of the pest throughout all dairy farming regions in the North Island. We would like to know what you think about this approach to providing a solution to an on-farm problem. We welcome your feedback as this will help us to get science out and working for you on the farm.

Please circle the number that best represents your opinion

A. Has clover root weevil been a problem on your property in the past?

1 Not really 2 3 Sometimes 4 5 Yes, very much so

B. Were the parasitised weevils alive when you received your sample vial?

1 All dead 2 3 Half dead 4 5 All alive

C. Were you aware of the weevil biocontrol project before you got the Irish wasp sample?

1 Not really 2 3 Saw articles 4 5 Yes, very much so

D. How soon did you release the sample?

Day 1 Day 2 Day 3 Day 4 or later 5 Never

E. Were the instructions for release of the parasitised weevils clear?

1 Not really 2 3 Just OK 4 5 Yes, very much so

F. Did the information pamphlets increase your knowledge of clover root weevil?

1 Not really 2 3 Learnt a bit 4 5 Yes, very much so

G. Were you aware that DairyNZ funded the research for clover root weevil biocontrol

1 Not really 2 3 Assumed so 4 5 Yes, very much so

H. What could have been done better?

I. Any other comments?

Name (Optional)
Address (Optional)

Region/district



A clover root weevil adult being stalked by an Irish wasp

This survey is being undertaken by Dr Pip Gerard and her biocontrol team at AgResearch

