



farmer-initiated technology transfer (FITT) programme

FITT Final Report (12FT05) (Updated grass grub advice and demonstrations)

Years of trial: July 2012 – June 2013
Group that proposed the trial: Clutha Ag. Development Board
Region: Southern South Island
Contact person(s): Denis Greer, Malcolm Deverson

(1) Introduction – background to the project

Damage from grass grub severely impedes farm productivity. The ability to grow quality grass/clover pastures is fundamental to the prosperity of individual farmers as well as maintaining New Zealand's export volumes. A moderate grass-grub infestation (300/m²) will cause a 20% production loss, while at higher levels pasture plants are destroyed, allowing inferior or non-palatable plants to invade, permanently reducing pasture production and quality. Remediation with organophosphate insecticides occurs after production losses are evident and too late to prevent permanent pasture degradation. In addition, the most effective chemicals, such as diazinon, may soon be de-registered because of concerns about safety. An alternative approach is to accept damage and renovate pastures more frequently, but this is expensive and energy demanding. There is a new approach available from recent research, and it requires a change of thinking and some practical demonstration to be successfully taken up by farmers.

(2) Key aims – what was the project trying to achieve?

(Note: FITT is co-funding this Sustainable Farming Fund project "Updated grass grub advice and demonstrations" SFF L12-133).

- * The overall objective was to practically demonstrate to farmers a comparison of management techniques for grass grub, incl. an innovative biological control technology.
- * A broader aim was to give farmers the knowledge and skills to predict grass grub damage potential and take the recommended action where necessary and where economically appropriate.
- * Also to encourage an awareness of grass grub losses, the grass grub cycle and appropriate farmer action times - widely promoted and distributed through a new AgResearch booklet, events and the media.

(3) Key findings & recommendations for farmers

In general we hope farmers have learnt that:

- Farmers have traditionally been reactive to grass grub damage. The project showed the value of a proactive approach in following a sequence of observations to manage the variable year-to-year grass grub issue. This begins with observations in August/ September of residual damage from the previous year; then observations of feeding flights in November; then digging in February for likely late autumn onwards damage.
- Pastures at risk can be predicted 2-3 years before damage occurs and the severity of potential damage can be predicted 2-4 months before it occurs

- The most effective management tool is still the diazinon chemical treatment according to our small demonstration trial, but farmers need to do the economics of spending this money on the basis of the predicted likely damage to their pastures.
- There is further explanation and advice in our new short bulletin "Best Practice for Managing Grass Grub" (Colin Ferguson, AgResearch) and farmers can obtain a copy from Beef + Lamb New Zealand, AgResearch or the Ag. Board.
- Farmers have also been advised during this project to subscribe to the pestweb alert arrangements from pestweb.co.nz and that this is a resource worthy of looking at.

(4) Methodology – what was done in the project?

Project farms were selected at Te Houka, Otekura, Hillend, West Otago, Clydevale, Hindon for a four stage process that neighbouring farmers were encouraged to imitate.

Stage one happened in September – farmers assessed their last season's damage on a 1-5 scale and considered in which paddocks the next serious issues may arise. This requires an understanding of the grass grub beetle's life cycle and how land cultivation and dry summers can effect grass grub numbers. Colin Ferguson, scientist at AgResearch supported farmers.

Stage two involved observations during the brief mating and then feeding flights of the grass grub beetles around mid November to early December (this varies district to district). Colin set out pheromone traps to attract the beetles and gauge numbers on each of the six farms. We then offered demonstration days on three of our farms, 22-23 November, and had good discussions with three small groups of largely local farmers. Likely grass grub numbers in the trialled paddocks were assessed.

We followed this work up in February 2013 with Stage three and a second series of neighbourhood farmer meetings at four of our farms. At each property we dug spade-width squares to a depth of approx 20cms to find and count the larvae and grown grubs of *Costelytra zealandica*. AgResearch advice is that at 8 larvae per spade square (200/sqm), there is very likely to be widespread damage and a considerable economic impact. Just 3 per spade square in new pasture will cause the same problems. There is good information at these two websites:

http://pestweb.co.nz/view_species.php?sp=Costelytra+zealandica&tab=1

<http://www.pggwrightsonseeds.com/uploads/Forage%20Focus%20No%2014%20Grass%20Grub.pdf>

As it so happened, there was little serious grass grub damage across the district this season. At only two of our farms did we find damage that indicated some mitigation strategies were necessary this particular year. Stage four involved our science advisor working with these two farmers to try two significant management techniques and then demonstrate the results to farmer meetings in late autumn.

At our West Otago site three strips in a significantly grass grub effected paddock of 2x20 metres were treated: as a control with no treatment, with urea (nitrogen) and with diazinon (applied with prills and followed by a good 25mm of rain as is ideal).

At our Hindon trial farm we selected a site that had a potential for moderate damage this autumn/ winter but serious damage in 2014. It was an opportunity to introduce *S. entomophila* (Bioshield) into the population to add to the effect of that natural pathogen's infection.

On 30 May 2013 at West Otago and on 11 June at Hindon we ran demonstration days to illustrate findings on these two properties and also give a focus to the current best practice process to cope with grass grubs. On the West Otago farm, numbers of grass grubs after approx. 10 weeks of treatment were 378/m² on the control strip, 316/ m² on the urea strip, and 22/m² on the strip treated with diazinon. The value proposition for using the chemical was discussed – the value of the pasture 'saved' had to be put against the cost of the chemical.

At Hindon it was found that after 8 weeks there was no change in the number of grass grubs present but this was not unexpected as the bacteria must move out of the prill they are applied in and be

ingested by feeding grass grubs. Even after infection the grubs may take several weeks to die and the process is moisture dependent also. We expect to follow up the plot after some more weeks and in 2014.

We ran two sessions of 11 then 24 farmers at West Otago and two sessions of 22 farmers then 11 at Hindon. The total of 68 far exceeded our expectations, especially for a year in which not so many farmers had large grass grub infestations.

A brochure "Best Practice for Managing Grass Grub" (Colin Ferguson, AgResearch) was also prepared for and distributed on these demonstration days. B+LNZ have also already made this available via their email communications and website. It will be incorporated into the AgResearch www.pestweb.co.nz website.

(5) Results

Results to date explained above through the process we have followed.

(6) Conclusions – what are the 'take home' messages?

The project team have been stressing the need to work on a staged process season to season to mitigate the worst damage of this pest which inevitably hits hard in some years.

Key messages are the recommendations as in question 3 above.

(7) How will the group apply the project results to their agri-businesses?

We expect the group and some of the field day participants to put this new knowledge into their practice in managing the grass grub issue. The Ag. Board will issue reminders at each of the significant stages in the next season as a reminder and as encouragement to make the gains that the project illustrated.

(8) Contact points for more information

More information can be obtained from:

Denis Greer, FITT project leader – denisandjanice@yrless.co.nz

Malcolm Deverson, Ag. Board, project manager – cadb@ihug.co.nz

Colin Ferguson, AgResearch, Invermay – colin.ferguson@agresearch.co.nz

Paul McCauley, Beef + Lamb New Zealand, Southern South Island Extension Manager, or your local area manager

To find out more about other FITT projects, freephone Beef + Lamb New Zealand on 0800 BEEFLAMB.

(9) Appendices – extra information

"Best Practice for Managing Grass Grub" (Colin Ferguson, AgResearch) Bulletin developed in this project.

"Sustainable Farming Fund Project L12-133: Updated grass grub advice and demonstrations" (CM Ferguson and SM Zydenbos) 30 June 2013. Science report on the project from AgResearch.

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