

## RAGWORT FLEA BEETLE — ASSESSMENT TECHNIQUE

*Longitarsus jacobaeae*

Here is an assessment technique you can use to measure how big an impact ragwort flea beetle is having on your ragwort. This technique involves removing ragwort flea beetles from small areas and demonstrating a subsequent resurgence in ragwort. People who intend to use this technique should attend a hands-on training session, or contact Landcare Research for further advice.

### What equipment will I need?

- Rectangular frame made of wire or wood, internal dimensions 1 m x 0.5 m
- 40 wooden pegs, 25 mm square x 300 mm long
- Mallet to hammer the pegs in
- Permanent marker pen
- Two identical knapsack or hand-held sprayers
- Halmark® insecticide
- Garden leaf-vacuum machine
- Data-recording equipment, e.g., pencils, paper, voice-activated recorder, data sheet

### How do I choose a suitable site?

Choose a site where ragwort flea beetle is well established – it is not necessary for the beetle to be noticeably reducing the density of ragwort plants at this site. Avoid areas that are infested with other ragwort biocontrol agents, or with a history of being mown. Make sure that the land



Plots are sprayed with Orthene® or water

manager does not plan to mow or spray herbicides or insecticides at the site (or close by) for the next 2 years, or the experiment will be ruined. Otherwise the site should be managed as normal, i.e., do not alter the grazing regime or fence off the plots.

### How do I set up the plots?

You need at least twenty 1 m x 0.5 m plots (the more the better). Ten will be control plots, and the remainder will be treated with insecticide. Mark out the plots anywhere ragwort might

grow. Avoid low-lying areas that may be flooded, or places where ragwort would not germinate or survive, e.g., long, dense grass. Try to scatter the plots randomly around the site. **Do not preferentially select places where ragwort is already growing** or you will not be able to show if the beetle is affecting the survival of small plants. It is acceptable to have some plots with no ragwort plants in them when you first begin. Space the plots as widely as you can. They must be at least 5 m apart and 10 m is better. There is no advantage to spacing them more widely.

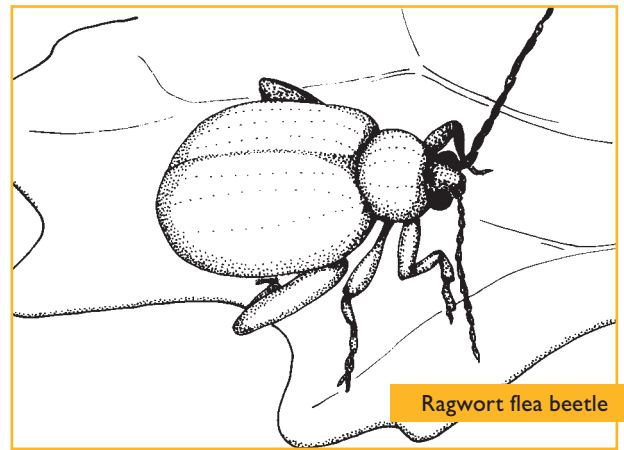
Place the frame on the ground and hammer a peg into the ground on the inside of one corner. Leave about 50 mm of the peg showing above the soil surface. Mark the peg with a permanent marker to show which way the frame should be positioned on subsequent visits. Now hammer in a second peg in the corner diagonally opposite and mark it too. The frame should fit snugly over the two pegs. Slip off the frame and mark out the other plots. Finally draw a sketch map or take some photos to help you to locate the plots in months to come.

#### How do I decide which plots to spray with insecticide?

Number the plots from 1 to 20 and write these numbers on both pegs. Toss a coin to decide the fate of each plot: heads = control, tails = insecticide. Repeat this until you have 10 plots of one type – the remainder will be the other type.

#### When/how do I spray the plots?

**You need to spray the plots at monthly intervals.** Because most ragwort plants are biennial, you will need to carry out this spray programme for 2 consecutive years. Take care to follow good spraying practice. Do not spray if rain is likely within 2–4 hours. If it rains lightly within 2 hours, or heavily within 4 hours of spraying, you will have to repeat the treatment. If the vegetation is wet, knock the water off the leaves by dragging a sack or a leafy branch over the area to be



sprayed. We do not know how wetting agents or other additives might affect the results, so do not use them.

Make sure that your sprayers are thoroughly clean as contamination may affect the results. Use one sprayer for the insecticide and the other for the water. Label each sprayer clearly so that you never put insecticide in your water sprayer.

Spray half the plots with clean water and then the remainder with Halmark® insecticide, using 4 ml per litre of water. Make sure that all the vegetation in each plot is thoroughly wet (the liquid should have begun to run off the leaves). Also spray a buffer zone of 1 m around the plots.

#### What measurements do I need to make?

The work programme is summarised as a calendar of events. Before you spray your plots, you must estimate the number of ragwort flea beetles present at the site and count the number of ragwort plants in your plots. You will need to repeat the plant measurements every 3 months including the months when you don't spray (e.g. February, May, August, November). Count the beetles three times between February and June, and then again once in November.

**Beetles:** Use a garden-leaf vacuum to collect ragwort flea beetles from 30 medium-sized rosettes outside the plots (see *Ragwort flea beetle*). This is to check that the beetles are actually present at the site and their level of abundance. If you can only find larger plants, then allow for



this by considering them to be the equivalent of two or more plants. Vacuum five plants then count and record the number of beetles you have collected (see *Guidelines for collecting, relocating & releasing insect biocontrol agents*). Release the beetles and repeat this six times until you've vacuumed all 30 plants (i.e., you will have six separate beetle counts). Make sure that you always make these measurements at the same time of the day, e.g., morning or afternoon. Avoid sampling early or late in the day.

**Plants:** Check each plot in its numerical sequence. Place the frame over the two pegs.



Use thin sticks or pieces of wire to divide the plot into smaller sections about 250 mm wide to make inspection easier. Carefully search through the vegetation in the plot, looking for any ragwort plants that have formed at least one proper leaf. Do not count the tiny seedlings that only have one or two cotyledons. Use a 5 mm wide pencil, or stick, to tease apart tangled grass. Score the plants you find into one of three categories:

- **small** plants = the diameter of the stem immediately below the lowest leaf (basal diameter) is less than 5 mm.
- **large** plants = the diameter of the basal stem is more than 5 mm.
- **multicrown** plants = the diameter of the basal stem is more than 5 mm and they have two or more shoots arising from the crown. Record the number of shoots arising from the crown, e.g., M5 = multicrown plant with five shoots.

Remember to record the **plot number** and **spray treatment**. A voice-activated tape recorder (dictaphone) is good if you are working on your own. Also, write down as much as you can about the site, e.g., the grazing regime, type of pasture, other weeds and insects present, when the beetles were released etc. Also record

#### Calendar of events

| Month     | Mark Out Plots | Count Beetles | Count Plants | Spray |
|-----------|----------------|---------------|--------------|-------|
| January   | ✓              |               |              | ✓     |
| February  |                | ✓             | ✓            | ✓     |
| March     |                | ✓             |              | ✓     |
| April     |                | ✓             |              | ✓     |
| May       |                |               | ✓            | ✓     |
| June      |                |               |              | ✓     |
| July      |                |               |              | ✓     |
| August    |                |               | ✓            | ✓     |
| September |                |               |              | ✓     |
| October   |                |               |              | ✓     |
| November  |                | ✓             | ✓            | ✓     |
| December  |                |               |              | ✓     |



# RAGWORT

anything unusual, e.g., large cowpat covering one third of a plot, extra dry conditions etc. If you find cinnabar moth in your plots, note this and contact Landcare Research for advice.

## What do I do with the data?

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Use the provided form to record your data. Contact Landcare Research if you need assistance to analyse your data.



Score the plants you find

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### For further information contact:

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