

RAGWORT BIOCONTROL AGENTS & SPRAYS

Is it possible to integrate the two?

To give ragwort biocontrol agents the best possible chance of working effectively you should avoid exposing them to herbicides and insecticides. However, there are some situations where this may not be practical:

- When the insects have only recently been released and are restricted in number or distribution;
- When conditions prevail that favour ragwort growth and/or do not favour the insects;
- When it is important to kill every plant – a result that is not usually achieved by biocontrol agents alone;
- When ragwort is growing among other weeds that need to be sprayed;
- When insect pests in pasture need to be controlled.

If you must spray always use the lowest rates and apply the smallest quantities of herbicide or insecticide possible. Avoid blanket spraying techniques and, wherever possible, spot-spray or wick-wipe plants. Also read below for particular instructions relating to each agent.

Ragwort flea beetle

The West Coast Ragwort Control Trust commissioned a study into the effects of two herbicides (Escort®, Tordon Gold®) and two insecticides (Dimilin® and Caterkill®) on the ragwort flea beetle (*Longitarsus jacobaeae*). Information on the use of herbicides is also available from a study funded by regional councils and from an Australian study.



Weed-wiping ragwort

When should I spray?

Do not spray when eggs and larvae are the predominant life stages (usually from autumn through to early spring) as they cannot survive if their host plant dies. It is safer to spray when pupae are the predominant life stage (from mid-spring to early summer) because the soil offers them some protection and they hatch into mobile adults that can seek out healthy plants. You can also minimise harm by spraying during mid- to late summer when adult beetles hide away and are less likely to come into contact with the spray. If possible, avoid spraying when adults are active (early summer and autumn to midwinter). Be aware that the beetle's life cycle may vary slightly throughout the country and from year to year, depending on climatic conditions. In warmer areas the beetles may complete two generations per year which will reduce safe spray times.

What herbicides are safe to use?

Data indicate that field rates of clopyralid (Versatill®), glyphosate (e.g. Roundup®), MCPA, MCPB, thifensulfuron methyl (Harmony®), metsulfuron methyl (Escort®), 2,4-D+picloram (Tordon 50-D®), or 2,4-D+dicamba (Banvine®) are not lethal to adult



beetles. However, these herbicides may cause sub-lethal effects and the last two may induce the beetles to waste their eggs by stimulating them to lay at a higher rate than usual on doomed plants. Sometimes exposure to herbicides may also cause beetles to lay fewer eggs overall. We recommend for:

- Spot spraying, use metsulfuron methyl (Escort®) because it does not appear to be toxic to the beetles and they are less likely to lay on sprayed plants. Tordon Gold® appears to be reasonably safe at lower rates (up to 10 ml/litre) but beetles may lay fewer eggs;
- Boundary spraying, use 2,4-D ester (e.g., Pasture-Kleen®) because although sprayed beetles may be killed, other beetles in the area will not be attracted to the sprayed plants and will not lay eggs on them;
- Cleaning up other pasture weeds, use MCPB (which doesn't kill ragwort beyond the seedling stage) as this may encourage the beetles to lay more eggs on ragwort plants in the short term. Spray in spring when few or no adult beetles are present.

What insecticides are safe to use?

Caterkil® (fenitrothian) is highly toxic to adult flea beetles and should not be used unless it can be applied at times when they are not likely to

come into contact with it (see below). Dimilin® (diflubenzuron) appears to be less toxic in the short-term but should likewise be avoided as it may have longer-term or sublethal effects.

Ragwort plume moth, ragwort crown-boring moth

No information is available on the impact of herbicides or insecticides on the plume moth (*Playptilia isodactyla*) or crown-boring moth (*Cochylis atricapitana*). The plume moth and crown-boring moth have multiple generations per year so there is no safe time to spray as there will always be some immobile life stages present that will be killed. It would be best to avoid spraying release sites and concentrate on areas where the moths are not yet present. The no-spray zone can be extended as the moths disperse away from the original release point.

Cinnabar moth

No information is available on the impact of herbicides or insecticides on the cinnabar moth (*Tyria jacobaeae*). It is likely to be safe to spray once caterpillars pupate in late summer until the moths emerge in the spring. The caterpillars hide away to pupate in sheltered crevices, which is likely to offer them some protection.

Safest times to apply herbicides and insecticides

Agent	Herbicides	Insecticides
Ragwort flea beetle	October–November and January–February	When adults are not around or active, usually January–February and June–November.
Ragwort plume moth	No safe time to spray	No safe time to spray
Ragwort crown-boring moth	No safe time to spray	No safe time to spray
Cinnabar moth	March–August	March–August

Note that these recommendations are derived from research on the effects of the most commonly used herbicides and pesticides and are not intended as an endorsement for any particular brand. The name or findings of Landcare Research or the West Coast Ragwort Control Trust may not be used for advertising or promotional purposes.

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