# Farming Weeds and Biocontrol Insects

## Mass-production and Harvest of the Hound's-tongue Root Weevil, *Mogulones cruciger*

The European weevil, *Mogulones cruciger,* is showing excellent potential as a bio-control agent for the invasive rangeland weed, hound's-tongue. The larvae of this insect feed within hound's-tongue roots, thereby causing damage to plant growth and reproduction. Because the weevil is difficult to collect on mass from field sites, a project was initiated to develop a cost-effective method of mass-producing the weevil for field release. The project involved learning how to grow hound's-tongue as a crop, 'seeding' the weevil into the crop for multiple generations of propagation, and developing a method of weevil harvest. This fact sheet describes the insect part of this process.

### 'Seeding' the Weevil into the Crop

For a hound's-tongue crop seeded in the fall, time must be allowed for the plants to emerge and bulk up in the spring prior to releasing the weevils for propagation. Thus, release the weevils in late June or early July, when the plant roots have a ground-level diameter of at least ½ in. If using field-collected weevils for the initial seeding (see reverse for method of collection), it is recommended to collect in late April or early May, and refrigerate until release. The fridge must be at a temperature above freezing (i.e., about 4°C or 40°F), and ease the insects to that temperature by first placing them in a cooler with ice packs. Also collect twice what will be needed as there will be mortality. Hold the insects on hound's-tongue leaves in plastic tubs lined with dry paper towels and with tight-fitting lids (200-500 per small tub; ca. 12" x 10" x 6"). Give the weevils fresh leaves as needed; e.g., 1 to 2 times per week.

Alternatively, weevils may be field collected and immediately moved to a large, pre-existing infestation of hound's-tongue for propagation over a 2 yr period prior to harvest and further distribution.

When it is time to release the weevils into the hound's-tongue crop, let them warm to room temperature if stored in a fridge, transitioning them through a cooler again. Also let them acclimate to outdoor temperatures by sitting the box with weevils in the field, but in the shade, for about 30 min. Release the weevils in small groups of about 50 spaced equally throughout the crop. It does not take a large initial population of the weevil to get good rates of return in production; e.g., releasing 2000 weevils into a ¼ acre plot of hound's-tongue with about 10,000 healthy plants, may produce up to 22 times the initial number of weevils within 2 yrs.

J. Qureshi

### Harvesting and handling the weevils

***Collection of weevils:*** Harvest the weevils in early spring as soon as hound's-tongue plants begin growing (April-May depending on climatic zone), as this will be when adult weevils emerge to feed, mate, and lay eggs. Also harvest in the afternoon when the weevils are most active. The weevils drop from plants when disturbed, so we developed a non-traditional method for their harvest which makes use of a wet-dry shop vacuum powered with a portable generator. Gently move the vacuum nozzle immediately around and in among the young leaves of each trap plant. Being gentle will ensure that the plants live for repeated collections. Re-collect from the same plants within 2 to 3 days. The plants should be able to sustain up to 6 to 7 collections.

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Dirt and plant debris also will be sucked up with the weevils, so periodically empty all contents into large, light-coloured, sealed containers for holding (e.g., white plastic bags or tubs). DO NOT leave the weevils in direct sunlight, as heat kills.


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***Sorting the weevils:*** The weevils will have to be sorted from the vacuumed debris. An easy way to achieve this is to let the weevils sort themselves in a 'separator box', which is simple and inexpensive to make. Cut a rectangular hole at one end of a sealed cardboard box (ca. 2 cu ft). Tape or glue the opening of a large, clear, plastic bag around the hole so that the bag hangs on the outside of the box. Cut open the closed end of the bag and dump collected debris with weevils into the box through the opening so that a 1-2 inch layer covers the bottom of each box. Add a damp paper towel and a few hound's-tongue leaves to


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the bag and twist-tie the end closed. Leave the boxes in a bright location with diffuse light (e.g., a shed with windows) for 24 hrs, during which time the weevils will crawl toward the light of the box hole and accumulate in the bag.

***Preparing the weevils for field release:*** Remove the weevils from the plastic bags by letting them drop into a container. The weevils will play dead for a few moments by drawing their legs tight under their bodies. This will allow you to quickly count and sort them ready for shipment. **Tip: a heaping tablespoon of weevils is approximately 100.** Place 100 (i.e., enough for one release) per 0.5-1.0 litre plastic or cardboard container with a tight-fitting lid. Line each container with a dry paper towel, add a few hound's-tongue leaves, and punch a few small air holes in the lid with a large needle. Ideally, take the weevils immediately to the field for release, placing the containers in a cooler with ice packs during transport so that the weevils do not overheat. However, if immediate release is not possible, the weevils can be refrigerated in their containers for up to a week. As described, cool them down and warm them up gradually before and after refrigeration to reduce mortality.


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