AN EXTRACTION METHOD FOR SAMPLING SMALL INSECTS FROM VEGETATION

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Extraction of small invertebrates from fresh vegetation samples can be tedious and lead to inaccurate determination of populations. For example, the New Zealand Flower Thrips, *Thrips obscuratus*, occurs in low densities over the flowering period of stonefruit (Teulon and Penman 1987), and visual searches of flowers give inaccurate population information. Accordingly a method was developed to extract thrips from flowers, which can be adapted for extraction of other small invertebrates.

For insect species that hide inside crevices, such as leaf sheaths or deep inside compact inflorescences, a dry, dynamic extraction method that stimulates them to crawl out of the vegetation is most efficient (Lewis 1973). Shirck (1948) developed an extraction method based on heating vegetation over funnels. It proved suitable for extracting thrips from onion plants and seed heads, lucerne, clover and bean plants (Shirck 1948). The method described here is similar to Shirck's but makes use of commonly available materials and is easily constructed.

A collection cylinder (100 long × 81mm dia.) was made by removing both ends of a one pint plastic pottle (Plastic Moulding Co. Hamilton, NZ). One end was enclosed with fine nylon gauze material. A petri dish (Gibco NZ Ltd, Auckland) was used as a lid to complete the cylinder (Figure 1).

The funnel was made from the neck and 20mm of the cylinder of a one litre plastic flask (dia. 79mm) (Plastic Moulding Co. Hamilton, NZ). The inside neck of the funnel was painted with Fluon (Whitford Plastics Ltd. Cheshire, England) to provide a slippery surface that facilitates insects falling into the collecting jar. A wire gauze square (mesh size, 2 × 2mm) was placed on a convenient lip inside the neck of the funnel to prevent plant material from falling through to the collecting jar (Fig 1). The collecting container was a 50ml glass pomade jar containing 15 mls of A.G.A. solution (60% ethanol, glycerol and acetic acid, in the ratio of 10:1:1). A.G.A. is a storage solution for thrips (Mound and Walker 1982). The collecting cylinder fitted snugly over the cylindrical portion of the funnel and was prevented from slipping further by another convenient lip. The funnel also fitted snugly into the collecting jar.

In the field, flower samples were placed inside the collection cylinder and the lid positioned. In the laboratory, the lid of the collection cylinder was removed and replaced by the funnel; the whole device was then inverted over the collecting jar.

The collection cylinder and funnel with collecting jar was then placed within an incubator at 50°C. With heat, both adult and immature thrips left the dehydrating flowers and were trapped in the A.G.A. solution in the collecting jar.

Table 1 details three calibration experiments using flowers collected from cherry and nectarine trees at full bloom and field collected female or male thrips. Twenty cherry or ten nectarine flowers were placed in each collection cylinder. Ten active adult thrips were added to half the cylinders (Treatment A), and no thrips to the other cylinders (Treatment B). All collection cylinders with funnel and collecting jar were placed in an incubator at 50°C for 24 hours. Percentage recovery was established using the following equation:

$$\% \text{ thrips recovered} = \frac{\text{No. recovered Treat. A} - \text{No. recovered Treat. B}}{\text{No. added Treat. A}} \times \frac{100}{1}$$

These results showed that this method was between 80 and 100% efficient for recovery of adult thrips from stonefruit flowers.

Proc. 41st N.Z. Weed and Pest Control Conf.

TABLE 1: The efficiency of thrips recovery by heat extraction from cherry and nectarine flowers.

Replicate	Treatment A		Treatment B	% recovered
	Thrips added	Thrips recovered	Thrips* recovered	
1. Cherry flowers female thrips				
1	10	12	1	
2	10	11	0	
3	10	11	1	
4	10	11	1	
5	10	9	1	
Total	50	54	4	100
2. Cherry flowers male thrips				
1	10	11	2	
2	10	6	0	
3	10	10	0	
Total	30	27	2	83.3
3. Nectarine flowers female thrips				
1	10	6	0	
2	10	8	0	
3	10	9	0	
4	10	9	0	
5	10	7	0	
6	10	9	0	
7	10	9	0	
Total	70	58	0	82.9

All thrips recovered were identified as *Thrips obscuratus* except for one *Thrips australis* female in experiment three.

* Includes only those of the sex tested.

Fig. 1: Apparatus for extraction of thrips from vegetation by heat.

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