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AN IMPROVED SCREEN CONE TRAP FOR MONITORING ACTIVITY OF FLYING INSECTS

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INTRODUCTION

Eckenrode and Chapman (2) described a galvanized screen cone trap for monitoring activity of cabbage maggot, *Delia radicum* (L.) (Diptera: Anthomyiidae), adults in the field. Subsequently, the traps have been used to monitor activity of the onion maggot, *D. antiqua* (Meigen) (3), and the seedcorn and bean seed maggots, *D. platura* (Meigen) and *D. florilega* (Zetterstedt), respectively (5). Pike and Glazer (4) used traps of similar design to monitor emergence of adults of *Fumibotys fumalis* (Guenee) (Lepidoptera: Pyralidae) in peppermint.

The traps, as originally described, are difficult to build because the components are soldered together, and the traps must be replaced after three to four summers' use because of rusting. We report here a modified version of the trap that is easierto build, more durable, and more versatile.

TRAP CONSTRUCTION AND USE

For each trap, 2 cones were cut with scissors from a 1.7 by 0.8 m piece of aluminum window screen (36 squares per cm^2) using templates (Fig. 1A). The sides of the large cone were joined with 10 aluminum pop rivets (3.2 by 3.2 mm) using a strip of aluminum (1 mm by2.5 cm by0.7 m) with holes (3.2 mm diam) every7.6 cm as a backup plate (Fig. 1B). The rivets were inserted after laying the backup strip over a grooved strip of wood (5 by 10 by 74 cm strip of wood; 1 cm wide by 2 cm deep by 74 cm long groove) clamped in a vise, and stapling the two overlapping edges of the screen onto the wood over the backup strip. The sides of the smaller cone were joined with four aluminum pop rivets (3.2 by 3.2 mm) and standard aluminum backup plates.

Insects were collected in inverted wide mouth pint canning jars, which were attached to the small cones. For each trap, a lid ring sprayed with polyurethaneora rust proofing paint to retard oxidation, was glued to the small, inverted cone with a water insoluble glue (e.g., Seal-All, Allen Products Corp., Detroit, MI). The glue was discontinuous around the lid ring to allow drainage of condensation in the jar. The collecting jar was screwed into the lid ring, and the small cone was placed over the opening in the top of the large cone. Insects moving up the large cone are trapped in the jar.

To monitor emergence, a trap was placed in a shallow circulartrench in soil, and soil was packed around the base of the trap. To increase the stability of the emergence trap, a strip of wood (0.8 m by 2.5 by 1.5 cm) was screwed onto the inner side of the large cone opposite the aluminum backup strip (Fig. 2).

To monitor flight and oviposition activity, four wooden legs (1 m by 2.5 by 1.5 cm) were screwed onto a trap (Fig. 3). Each leg was anchored to the ground by driving a large nail into the ground through a hole in a bent strip of aluminum (2.5 by 15 cm) attached to the leg with two wood screws (Fig. 1C). A space of 8-10 cm was left between the bottom of the trap and the ground for flies to enter the trap. Colored boards or baits can be placed within the trap to attract insects (1).

When collecting live insects, a circular piece of aluminum screen was inserted into a lid ring, and the jar of live insects was transferred to the screened lid ring. Positively phototactic insects usually remain in the top of the jar during transferring. Insects can be killed by squirting a few ml of chloroform onto a tissue inserted into the collecting jar or by leaving a small piece of Shell No-Pest Strip™ in the jar.

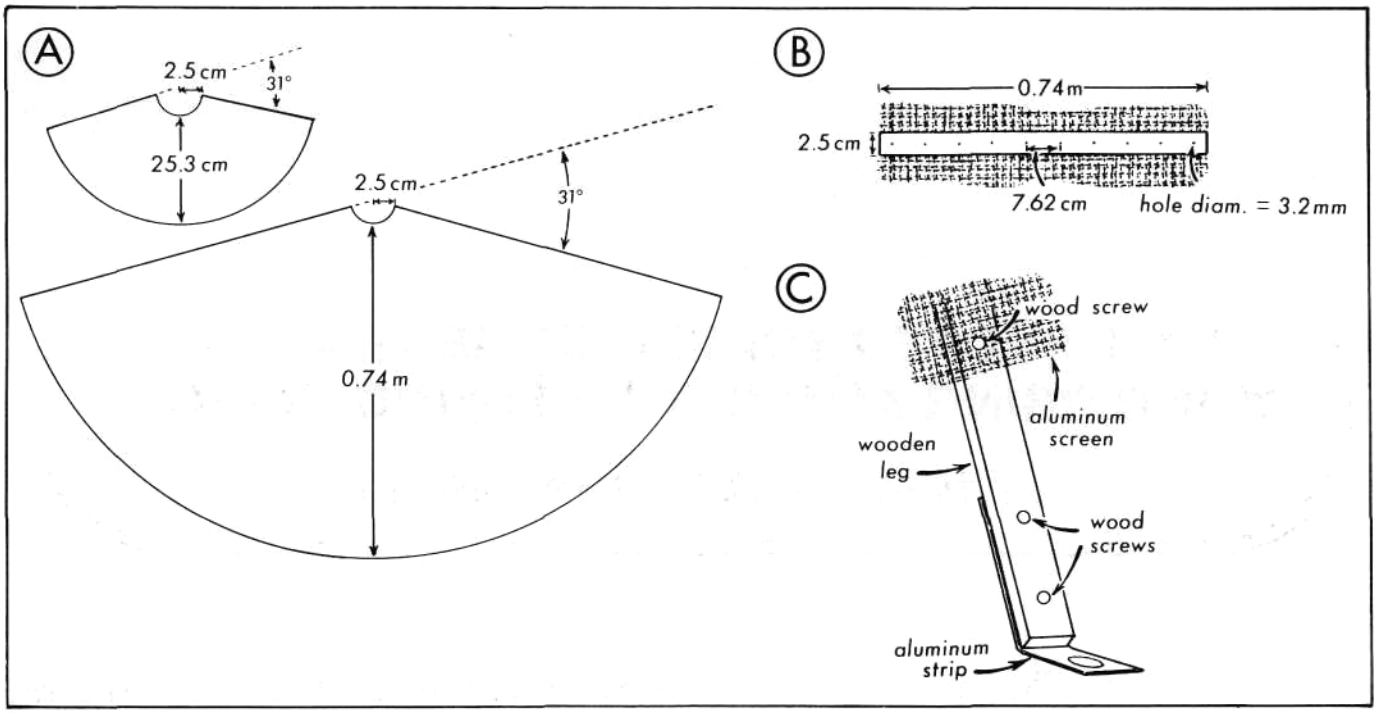

Figure 1. Templates for constructing the traps. A. Screen cones. B. Backup strip. C. Leg.

Figure 2. Emergence trap in the field.

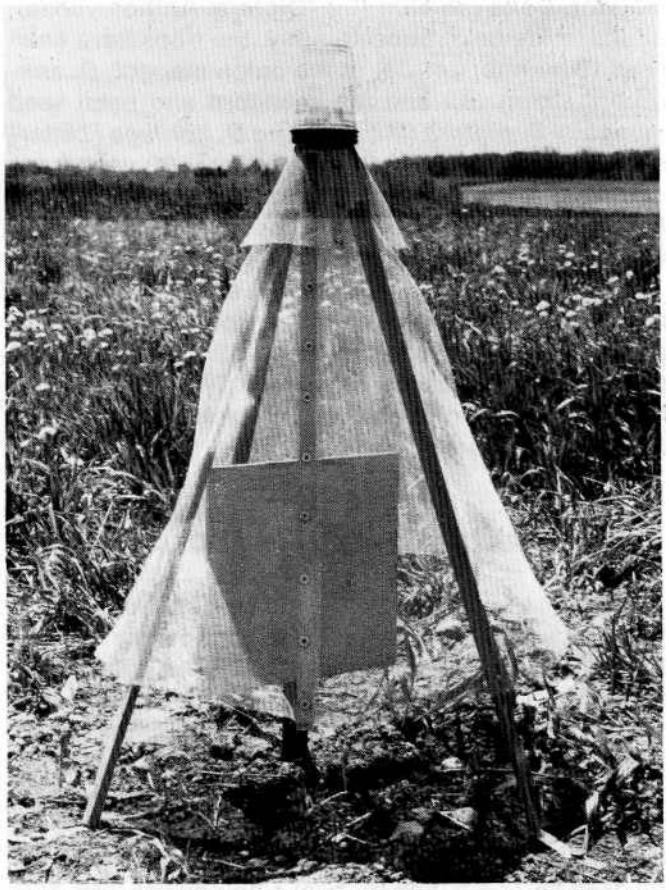

Figure 3. Trap used to monitor Delia spp. activity in the field.

DISCUSSION

In 1982, the original version of the trap cost about $7.00 for materials and required about 0.6 man-hours to build. Cost of materials for the modified emergence trap was about $6.00, and the trap required about 0.4 man-hours to build. Durability of the traps has been greatly increased by using aluminum components because the traps do not rust. Sixty emergence traps used continuously in the field for 2 years and 3 flight activity traps used for 2 summers showed no signs of deterioration. Conventional traps used for this length of time required replacement because of extensive rusting. The aluminum traps are easily constructed, and the basic trap is easily modified to use for several different purposes.

CONCLUSIONS

Screen cone traps constructed from aluminum components are easy to build and last longer than conventional traps. Uses for the traps include monitoring activity and time of emergence of flying insects. The aluminum traps have been used extensively for monitoring activity of seed maggots.

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