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AXLE GREASE AS AN ALTERNATIVE ADHESIVE FOR USE ON STICKY TRAPS

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One of the more frequently used methods of sampling flying insects is the sticky trap. These traps are often used to evaluate the type and size of prey available for aerial insectivores, such as bats and birds (e.g. Barclay 1991; Brigham 1992). Non-attractant sticky traps are favoured because they are considered relatively bias-free, yielding a more representative sample than attractant traps (Service 1976). Sticky traps are versatile in that they are simple to construct and operate, portable, and relatively inexpensive. When using these traps, it is possible to sample insects economically in similar or different habitats and at various heights within habitats (Kunz 1988).

Sticky traps work on the principle that the wind will carry slow-flying (less than 1 m/s) insects onto the trap or that airborne insects will adhere on contact during active flight (Southwood 1978; Kunz 1988). The most efficient sticky traps are cylindrical and are coated with products that are transparent, odourless, resistant to water, non-oxidizing, and able to retain their adhesive properties at extreme temperatures (Brigham and Smishek 1991). Although several adhesives are commercially available, one of the more commonly used is "Tangletrap" (BioQuip Products, Grand Rapids, MI 49504). However, it is difficult to remove intact insects from this adhesive (Ryan and Molyneux 1981).

Brigham and Smishek (1991) suggest that an alternative adhesive to Tangletrap may be automotive lubricating grease (Shell Darina Grease AX, Shell Canada, Limited, Toronto, Ont. M5W 1E1) commonly called axle grease. The grease is potentially preferable due to its substantially lower cost, effective water resistance, better retention of adhesive properties over long periods of time, and its solubility in ethanol. The purpose of this study was to compare the insect sampling efficiency of sticky traps coated with Tangletrap to traps coated with axle grease.

The Trap. Black PVC tubing was cut into cylinders (41 cm long and 10 cm in diameter). The traps were hung with monofilament fishing line (3.6 kg test) attached through two holes drilled in one end of each cylinder. Each trap was completely coated with a thin layer of adhesive.

Axle Grease versus Tangletrap. A pair of sticky traps were hung (20 cm apart) in five different habitats in the West Block of Cypress Hills Provincial Park, Sask. (49°34'N, 109°53'W). At each site, one trap of the pair was coated with Tangletrap, the other with axle grease; both were hung at the same height, ca. 1-2 m (depending on the location).

Insect samples were collected on 37 nights between 6 June and 27 August 1991. Before each sampling period, all adhering debris and insect parts were removed from the traps. In addition, after a heavy rain or wind storm, the debris and adhesive were completely removed and fresh adhesive was applied. After 24 h, all adhering insects were removed from the traps with forceps and preserved in 70% ethanol. The insects were identified to order, counted, and measured (length from head, excluding the antennae, to tip of abdomen). Insects of each order were divided into three size classes based on body length (<6.8 mm, 6.8-13.5 mm, and >13.5 mm). A two-tailed paired t-test (Zar 1984), with a 0.05 rejection criterion, was used to determine if the numbers of insects in each size class, collected on sticky traps coated with axle grease, were significantly different from those coated with Tangletrap.

In total, 1707 insects were caught on the traps. There was no significant sampling difference between adhesives for insects classified by order and size ($t = 0.67$, df = 20, $p>0.20$; Table 1) or for the three size classes taken individually (large $t = 0.74$; medium

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Table 1. Numbers of insects collected from sticky traps during the summer of 1991 in the West Block of Cypress Hills Provincial Park. Categorized by taxa and body length where AG represents axle grease and T represents Tangletrap

	<6.8 mm		6.8–13.5 mm		>13.5 mm	
Order	AG	T	AG	T	AG	T
Diptera	626	491	74	113	0	0
Lepidoptera	13	4	13	4	15	21
Coleoptera	49	41	9	15	0	0
Hymenoptera	18	16	11	14	1	1
Trichoptera	4	5	8	22	4	5
Homoptera/Hemiptera	27	26	1	1	0	0
Others	19	22	8	4	2	0

$t = 1.16$; small $t = 1.14$, where $p>0.20$ and $df = 6$ in all cases). Therefore, we conclude that axle grease and Tangletrap are equally effective adhesives for sticky traps.

Axle grease is easily applied in the field and is very economical. It has a higher degree of solubility in ethanol than Tangletrap which makes the preservation and removal of intact specimens for identification and measurement, especially soft-bodied insects such as aphids, much easier and more reliable. When using axle grease, the potential problem of keeping work areas and equipment free of adhesive was minimal.

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