

ATTRACTION OF THE LOVEBUG, *PLECIA NEARCTICA*
(DIPTERA: BIBIONIDAE) TO ANETHOLE

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Plecia nearctica Hardy is the lovebug that motorists frequently encounter as a serious nuisance when traveling in southern states. The insects are smashed against windshields obscuring the vision of motorists. Cars may overheat when radiators become clogged and the smashed insects damage car paint if the body fluids are not removed soon after contact (Callahan & Denmark 1973). The insect was first described by Hardy (1940) from Galveston, Texas, who reported it to be widely spread, but more common in Texas and Louisiana than other Gulf Coast states. It has now progressed

to all states bordering on the Gulf of Mexico, as well as Georgia, South Carolina, and parts of Central America. It was first collected in Florida in 1949 and today is found throughout Florida (Denmark & Mead 1992).

Several studies have been conducted on adult attractants and adult sampling for lovebugs. Callahan & Denmark (1973) observed large numbers of lovebug adults congregating at intersections, traffic lights, and filling stations. Their data showed that lovebugs were attracted to automobile exhaust fumes irradiated with 3600 Å UV light. Whitesell (1974) observed adults flying to heat sources such as recently parked, warm cars and engines. His data showed that greater numbers of lovebug adults were caught on a heated box than on sound, exhaust, or control boxes. A mobile trap mounted on top of a car has been used to measure population density of adult lovebugs on highways (Sharpe 1974). In field tests, visual observations were used by Leppla et al. (1974) to measure rhythmic activity of adult lovebugs. Thornhill (1976) marked adult lovebugs with an ultraviolet dust and used large, white sticky traps to recapture the adults in order to measure the dispersal of the adults. Callahan et al. (1985) postulated that lovebugs are attracted to highways by automobile exhaust fumes. They tested irradiated automobile exhaust fumes and their components as attractants for adult lovebugs. Of the five different aldehydes tested, formaldehyde and heptaldehyde were the most attractive. In this report, I provide data on the attraction of adult *P. nearctica* to anethole and the use of anethole baited sticky traps to sample adult populations of *P. nearctica*.

Cherry et al. (1996) reported on the attraction of adult beetles of *Anomala marginata* (Robinson) to anethole in Japanese beetle traps. During the course of that study, I observed adult lovebugs hovering in large numbers around Japanese beetle traps baited with anethole. However, since Japanese beetle traps are designed to capture heavy-bodied insects such as beetles, I decided to see if lovebugs would be attracted to anethole in sticky traps which are more suitable for catching smaller insects. Yellow sticky traps (Pherocon AM, no bait) made by Trece, Inc. Salinas, California were used in these tests. Ten pairs of traps (anethole versus control) were set-up at ten different locations on the Everglades Research and Education Center at Belle Glade, Florida. Traps at each location were 10 m apart and hung one m above the ground on metal rods. A sponge (3 by 3 by 3 cm) was wedged into each trap. Control traps were unbaited and each anethole trap had 10 ml of anethole poured into the sponge. The anethole was obtained from Acros Organics, Fairlawn, New Jersey and was greater than or equal to 99 percent. Tests were conducted when large numbers of adults were observed flying at the research center. Six tests were conducted during April-May, 1996 and 1997 (see Table 1). Traps were exposed for 24 h in each test and then covered with clear cellophane and taken to a laboratory. Lovebug adults on each trap were counted under microscopic examination. The sex ratio of adults on the traps was determined by scraping 100 adults from different control traps and 100 adults from the anethole baited traps. These adults were placed in gasoline to dissolve the adhesive from the trap and then sexed using characters described by Denmark & Mead (1992). Statistical differences in adult numbers of control versus anethole baited traps in each of the six tests were determined using paired t-tests (SAS 1996). A two by two contingency table using Chi-square analysis (Dixon & Massey 1969) was used to determine if the adult sex ratio was significantly different in control traps versus anethole baited traps.

Data in Table 1 show that significantly more adult lovebugs were caught on sticky traps baited with anethole than unbaited control traps in all six tests. By far, the most lovebugs caught on any date occurred in both control and anethole traps on May 1, 1997. Reasons for the large catches during that test are not known for sure. However,

TABLE 1. ADULT *P. NEARCTICA* CAUGHT ON YELLOW STICKY TRAPS BAITED WITH ANETHOLE.

Date ^a	Control ^b			Anethole ^b		
	Mean	SD	Range	Mean ^a	SD	Range
May 16, 1996	3.0	3.5	0-11	186.5	99.0	48-291
May 20, 1996	2.2	2.7	0-7	75.3	50.5	7-153
May 29, 1996	7.5	4.6	0-14	88.7	46.1	14-141
April 15, 1997	11.4	7.5	2-22	113.4	55.6	24-225
April 17, 1997	5.6	2.3	3-11	101.4	34.5	51-151
May 1, 1997	258.8	85.5	123-368	887.8	199.2	648-1240

^aDate of start of test. Traps exposed for 24 h.

^bAdults per trap. Paired t-test (SAS 1996) showed significantly ($P < 0.01$) more adults were caught on anethole baited traps than controls during all six testing dates.

field observation indicated large numbers of adults were flying that day probably due to large populations and calm winds which did not hinder flight. The sex ratio was 49:51 (M:F) in the control traps and 46:54 (M:F) in the anethole baited traps. Chi-square analysis showed that there was no significant difference (Chi-square = 0.3, 1 d.f., $P > 0.05$) in the sex ratio of adults in control versus baited traps. Anethole is an essential oil found in plants (Morrison & Boyd 1973) and adult lovebugs are known to feed on different plants (Hetrick 1970). Previous studies have shown anethole to be attractive to diverse insects such as bees (Ladd & Tew 1983), scarabs (Cherry et al. 1996), and wireworms (Lehman 1932).

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SUMMARY

Significantly more adult lovebugs were caught on sticky traps baited with anethole than unbaited control traps in six tests. These data show that sticky traps baited with anethole can be used as a simple and efficient sampling tool for adult *P. nearctica*.

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