

April 1983

Field Evaluation of Trap Components for the Introduced Pine Sawfly, *Diprion Similis* (Hymenoptera: Diprionidae)

H. A. Thomas
USDA Forest Service

Follow this and additional works at: <https://scholar.valpo.edu/tgle>



Part of the [Entomology Commons](#)

Recommended Citation

Thomas, H. A. 1983. "Field Evaluation of Trap Components for the Introduced Pine Sawfly, *Diprion Similis* (Hymenoptera: Diprionidae)," *The Great Lakes Entomologist*, vol 16 (1)
Available at: <https://scholar.valpo.edu/tgle/vol16/iss1/3>

This Peer-Review Article is brought to you for free and open access by the Department of Biology at ValpoScholar. It has been accepted for inclusion in *The Great Lakes Entomologist* by an authorized administrator of ValpoScholar. For more information, please contact a ValpoScholar staff member at scholar@valpo.edu.

**FIELD EVALUATION OF TRAP COMPONENTS FOR THE
INTRODUCED PINE SAWFLY, *DIPRION SIMILIS*
(HYMENOPTERA: DIPRIONIDAE)**

H. A. Thomas¹

ABSTRACT

Three sizes of the Conrel Delta trap, a yellow cardboard tube trap, and the Pherocon II standard trap generally used in detection surveys were evaluated. Tests were run for 41 days in the summer of 1980 and 35 days in the spring of 1981. The lure in all traps was the standard 38-cm cotton dental roll charged with 10 female equivalents of crude virgin female pheromone extract. In 1980, all test traps outperformed the standard Pherocon II model. In 1981, the Pherocon II traps captured more males than any of the others. The catch in the Delta traps appeared to be roughly proportional to their size.

An additional test in 1981 evaluated three types of cigarette filters compared with the dental roll as the pheromone dispenser. After 79 days, the cigarette filter-baited traps were still capturing sawflies whereas the traps baited with the dental rolls stopped catching males after 51 days.

Following discovery of the introduced pine sawfly, *Diprion similis* (Hartig), in western North Carolina (Drooz et al. 1979), detection surveys were carried out along the Blue Ridge Parkway² and subsequently in a 20,700-km² area encompassing contiguous portions of North Carolina, Tennessee, and Virginia.³ The surveys were conducted with a trap system consisting of the Pherocon® II trap (Zoecon Corp., Palo Alto, CA), baited with a dental roll (No. 2, 1-1/2" [38 cm] Johnson & Johnson, New Brunswick, NJ) charged with 10 female equivalents (FE) of crude pheromone extracted from virgin female sawflies in the laboratory. The choice of the trap, the pheromone, and the dispenser was based on experience with these components by researchers at the University of Wisconsin (H. C. Coppel, pers. comm.) (Jewett et al. 1978, Casida et al. 1963, Kraemer et al. 1979).

To obtain further information that may improve detection surveys, sawfly responses to different types of traps and pheromone dispensers were evaluated in a study established in the infested area at Linville, North Carolina, during 1980 and 1981.

METHODS AND MATERIALS

Two types of traps were compared to the white Pherocon II as the standard. These were the orange Delta® trap in three sizes, 183, 230, and 305 mm long, and a yellow tube trap made by removing the ends of the familiar quart ice-cream container, spraying the outside

¹ USDA Forest Service, Southeastern Forest Experiment Station, Research Triangle Park, NC 27709. The use of proprietary names does not constitute an official endorsement by the USDA or the Forest Service.

² Ghent, J. H., and H. A. Thomas. 1979. The distribution of the introduced pine sawfly along the Blue Ridge Parkway. Unpublished Office Rep. No. 79-1-29. USDA For. Serv., SE Area, S&PF, FPM, Asheville, NC.

³ Ghent, J. H., C. G. Stone, and A. M. Buchanan. 1981. Distribution of the introduced pine sawfly in the southern Appalachians. Unpublished Office Rep. No. 81-1-58. USDA For. Serv., SE Area, S&PF, FPM, Asheville, NC.

with chrome-yellow paint (Seymour's, Inc., Sycamore, IL) and coating the inside with Tac-Trap® (Animal Repellants, Inc., Griffin, GA). Thus we would obtain information on the effect of three colors as well as the effect of size on catch capability. Each trap was baited with a No. 2 dental roll charged with 10 FE of crude pheromone extract. Traps were placed 15 m or more apart, approximately 2 m above ground on branches of eastern white pine, *Pinus strobus* L. The sequence of distributing the traps was random with respect to type of trap, and the positions of the traps were rearranged at least twice during the study.

In 1980, two traps of each type were deployed along the southwest side of a field at Linville. We trapped for 41 days, from 7 July to 18 August. The 1981 trap site was approximately 5 km north of the 1980 location. Three traps of each kind were deployed, one of which contained no bait. We trapped for 35 days, from 6 May to 10 June.

In September 1981, three types of cigarette filters (Liggett & Myers Tobacco, Inc., Durham, NC) were tested against the dental roll as the pheromone dispenser in a separate test at another site. The filters, made of cellulose fiber, were designated A (= 24.2 mm dia.), B (= 24.1 mm dia.), and C (= 20.6 mm dia.). Type A was paper wrapped; B and C were fiber wrapped. Both the rolls and the filters were treated with 10 FE of sawfly pheromone and placed in Pherocon II traps. The traps were visited every 8–10 days and returned to the laboratory after 79 days. Each treatment and the control were replicated twice; their positions were rearranged twice during the study.

RESULTS AND DISCUSSION

The average number of sawflies captured by type of trap, adjusted for duration of the trapping period in the two years are given in Table 1. In 1980, visual defoliation estimates in the trapping area indicated that the sawfly population had declined considerably from its high level and was characterized as moderate. Under these conditions, all test traps captured more sawflies than the standard Pherocon II model. In 1981, the population had further declined and was estimated to be light. Then, the Pherocon II trap caught the most males. The yellow tube trap captured virtually nothing. In both years, the numbers of sawflies captured in the Delta traps appeared to be positively correlated with trap size. In the 1981 control traps, no sawflies were captured.

A direct comparison of catch data from year to year is inappropriate because of the confounding factors of year, location, and population level. The 1980 data failed to show a detectable difference in response of male sawflies to any of the three trap colors, white, yellow, or orange. The difference in construction among the traps of different colors may be less important than weather or microenvironment affecting flight in the immediate vicinity of the traps. The hovering, zigzagging flight of male sawflies approaching the pheromone source may increase the likelihood of contact with trap surface, and thus may explain why the larger traps caught more sawflies.

Table 1. Number of male *Diprion similis*/trap/day captured in three types of traps in 1980–81,^a Linville, NC.

Trap type	Summer 1980 ^b	Spring 1981 ^b
Pherocon II	1.07	2.6
Delta 183 mm	1.54	0.25
230 mm	5.79	0.91
305 mm	6.32	1.24
Yellow tube	1.63	0.01

^a Trapping periods: 41 and 35 days, respectively.

^b Average of total number of sawflies in two replications per type of trap.

In the test evaluating the release of lure from dental rolls, all the cigarette filter-baited traps outperformed those baited with the standard dental roll (Table 2). All replicates of filters except one outperformed the dental roll by a factor of 2X or more. One replicate of filter B did relatively poorly in comparison with all other filter replicates, yet captured sawflies at a rate about equal to the mean of the dental roll replicates. The latter stopped attracting after 51 days. All filter replicates were still active at the termination of the test (79 days).

The results show that the Pherocon II or the Delta traps are suited to trapping *D. similis* and, when ease of use is considered, the Pherocon II can adequately provide qualitative information about the population. If trapping-out were the objective, a larger trap may be advantageous.

The cigarette filters appear to offer an improvement over the conventional dental rolls. Not only did they appear more efficient in pheromone release, but are much less expensive. No detectable difference could be seen however between the filter specifications and their efficiency as lure dispensers; all the filters appeared similar in the number of sawflies trapped.

Table 2. Number of male *Diprion similis* in traps with pheromone released from filters or dental rolls, Linville, NC, 1981^a

	Day									
	6	16	25	37	44	51	59	65	73	79
Dental roll	3.5	12	6.5	6.5	1.5	1	0	0	0	0
Filter A	8.5	24	5.5	156	143.5	37	17.5	3.5	7	15.5
B		11	8.5	119.5	28	27.5	24	3	1.5	7.5
C		24	14.5	205	59.5	53.5	27.5	9.5	7.5	13.5
Control	0	0	0	0	0	0.5	0	0	0	0

^a Numbers are the average of total number of replicates.

ACKNOWLEDGMENTS

The valuable assistance of Carolyn Stone and Ashley Buchanan in the field work is gratefully acknowledged as is the donation of Delta traps by the Conrel Corp. and the cigarette filters by Liggett & Myers Research Department.

LITERATURE CITED

- Casida, J. E., H. C. Coppel, and T. Watanabe. 1963. Purification and potency of the sex attractant from the introduced pine sawfly, *Diprion similis*. *J. Econ. Entomol.* 56:18-23.
- Drooz, A. T., C. A. Doggett, and H. C. Coppel. 1979. The introduced pine sawfly, a defoliator of white pine new to North Carolina. USDA For. Serv. Southeast. For. Exp. Sta., Asheville, NC. Res. Note SE-273, 3 p.
- Jewett, Douglas, Fumio Matsumura, and Harry C. Coppel. 1978. Preparation and use of sex attractants for four species of pine sawflies. *J. Chem. Ecol.* 4:277-287.
- Kraemer, M., H. C. Coppel, F. Matsumura, T. Kikukawa, and K. Mori. 1979. Field responses of the white pine sawfly, *Neodiprion pinetum*, to optical isomers of sawfly sex pheromones. *Environ. Entomol.* 8:519-520.