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Kenneth F. Raffa
University of Wisconsin

David W. A. Hunt
University of Wisconsin

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USE OF BAITED PITFALL TRAPS FOR MONITORING PALES WEEVIL, *HYLOBIUS PALES* (COLEOPTERA: CURCULIONIDAE)

Kenneth F. Raffa and David W. A. Hunt[1]

ABSTRACT

Pitfall traps baited with ethanol and turpentine serve as an effective tool for monitoring pales weevil (*Hylobius pales*) populations. Males and females are equally attracted to this bait. Neither component alone showed any attractiveness. The presence of a pine stem for weevil feeding does not affect the number or sex ratio of captured weevils. The potential of using attraction to baited traps as a sampling method for pales weevil is discussed.

The pales weevil, *Hylobius pales* (Herbst), is a major pest of young pine plantations throughout eastern North America (Lynch 1984). The larvae feed in the roots of pine stumps and adults damage seedlings by girdling the tender stems at the base. A related species, the large pine weevil, *Hylobius abietis* (L.), has been collected in pitfall traps baited with ethanol and turpentine in Scandinavia (Tilles et al. 1986 a,b). We conducted trapping studies during the summer of 1987 to determine if this method could be used to monitor *H. pales* populations in infested stands.

MATERIALS AND METHODS

The traps were placed in a stand of Scotch pine, *Pinus sylvestris,* located in Marquette Co., WI. The stand was about 15 years old, and was undergoing very high mortality due to the pine root collar weevil, *Hylobius radicis* Buchanan.

The trap was a modified version of that described by Tilles et al. (1986 a,b). Twenty cm long × 10 cm i.d. sections of PVC pipe were drilled with eight 6 mm diameter holes spaced equidistantly around the perimeter of the pipe. The pipes were then inserted vertically into the ground with the lower end at a depth of 16 cm and the holes at ground level. The pipe was capped at both ends with plastic lids. As weevils enter the holes, they fall to the bottom of the pipe and are trapped. Liquid Teflon® was applied to the inner surface of the pipe to prevent escape. A wire that passes through two 2 mm holes drilled at ground level serves as a brace for baits. The above ground portion of the trap was painted black to provide a tree-trunk silhouette.

Turpentine and 95% ethanol were added separately to two 12 × 35 mm 0.5 dram glass vials. The release rates were 200 mg and 40 mg per 24 hours, respectively, at 22°C. The turpentine (Sunnyside Corp., Wheeling, IL) consisted mostly of monoterpenes, of which the relative proportions were: alpha-pinene (52.45%), beta-pinene (41.35%), beta-phellandrene (2.0%), limonene (1.05%), camphene (0.85%), myrcene (0.65%), and unknown (0.65%), as determined by gas liquid chromatography using the method of Raffa and Steffeck (1988).

Eight baited and eight control traps were sampled and baits replenished weekly from 17 July until 8 September. Gender was determined by the method of Wilson et al. (1966).

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[1]Department of Entomology, University of Wisconsin-Madison, Madison WI 53706

RESULTS AND DISCUSSION

Adult pales weevils were captured in each of the eight baited traps, with an average of 9.1 (SEM = 2.4) per trap. Only one weevil was captured in the control pitfall trap. These results show a strong attraction for ethanol-turpentine combinations ($t = 3.72$, $P < 0.007$), which agrees with Fatzinger et al.'s (1987) observations using flight traps. Although this experiment was only intended to evaluate the utility of the ethanol-turpentine combination, related experiments indicate that neither ethanol nor turpentine alone is attractive. At a nearby site where we monitored *H. radicis* activity, 7 *H. pales* were collected in ethanol-turpentine baited traps, while none were collected in traps containing ethanol alone, turpentine alone, pine stems, stems plus ethanol, stems plus turpentine, or unbaited controls (N = 40 traps per treatment, Hunt and Raffa, in press).

The sex ratio of pales weevils collected in ethanol-turpentine baited pitfall traps was 52.5% female and 47.5% male. This is not significantly different from a 50:50 sex ratio (Chi Square = 3.92), indicating there is no preferential degree of attraction based on gender. This ratio also closely approximates weevil emergence data from infested stumps at this site (Hunt and Raffa, in press). The presence of a pine stem on the bottom of the trap so as to allow weevil feeding does not appear to affect either total trap catch or sex ratio. We collected 18 and 34 weevils, respectively, during two consecutive weeks of peak weevil movement when the eight ethanol-turpentine baited traps did or did not have pine stems. Because the tests were not conducted simultaneously, this conclusion must be treated with caution. However, we did not observe the dramatic increase in trap catch that coincides with *H. abietis* feeding (Tilles et al. 1986a). The data from the week during which pine stems were provided are not included in the ethanol-turpentine vs. control comparisons reported above.

Of all trapped weevils, 74.9% were caught in July, 25.5% were caught in August, and 0.01% were caught in September. The period of peak capture corresponds to the minimum period of *H. radicis* activity (Wilson and Millers 1983, Raffa and Hall 1988).

Our results demonstrate that pitfall traps baited with ethanol and turpentine provide an effective means of trapping adult *H. pales*. Future studies will be aimed at estimating the relationship between trap catch and tree damage. If this relationship is strong, then trap catches could be incorporated into Integrated Pest Management of the pales weevil. Because of the difficulties associated with sampling root pests accurate timing of insecticide application can be difficult. Therefore traditional approaches have relied on highly persistent chemicals (Lynch 1984). An easy and reliable sampling method such as the one described here may allow for the effective and more focused use of chemicals that degrade more quickly, and the development of more accurate economic threshold levels.

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LITERATURE CITED

Fatzinger, C. W., B. D. Siegfried, R. C. Wilkinson, and J. L. Nation. 1987. *Trans*-verbenol, turpentine, and ethanol as trap baits for the black turpentine beetle, *Dendroctonus terebrans*, and other forest Coleoptera in North Florida. J. Entomol. Sci. 22:201–209.

Hunt, D. W. A. and K. F. Raffa. Attraction of the pine root collar weevil, *Hylobius radicis*, and the pitch-eating weevil, *Pachylobius picivorus* (Coleoptera: Curculionidae), to ethanol and turpentine in pitfall traps. Environ. Entomol. (in press).

Lynch, A. M. 1984. The pales weevil, *Hylobius pales* (Herbst): A synthesis of the literature. J. Georg. Entomol. Soc. 19:1–34.

Raffa, K. F., and D. H. Hall. 1988. Seasonal activities of the pine root collar weevil, *Hylobius radicis* Buchanan (Coleoptera: Curculionidae), in red pine stands undergoing decline. Great Lakes Entomol. 20:69–74.

Raffa, K. F., and R. J. Steffeck. 1988. Computation of response factors for quantitative analysis of monoterpenes by gas liquid chromatography, J. Chem. Ecol. 14:1385–1390.

Tilles, D. A., G. Nordlander, H. Nordheim, H. H. Eidmann, A. B. Wassgren, and G. Bergstrom. 1986a. Increased release of host volatiles from feeding scars: A major cause of field aggregation in the pine weevil *Hylobius abietis* (Coleoptera: Curculionidae). Environ. Entomol. 15:1040–1054.

Tilles, D. A., K. Sjodin, G. Norlander, and H. H. Erdman. 1986b. Synergism between ethanol and conifer host volatiles as attractants for the pine weevil, *Hylobius abietis* (L.) (Coleoptera: Curculionidae). J. Econ. Entomol. 79:970–973.

Wilson, L. F., and I. Millers. 1983. Pine Root Collar Weevil—Its Ecology and Management. USDA For. Serv. Tech. Bull. No. 1675.

Wilson, L. F., C. D. Waddell, and I. Millers. 1966. A way to distinguish sex of adult *Hylobius* weevils in the field. Canadian Entomol. 98:1118–1119.