

THE EFFECT OF HEIGHT OF PHEROMONE-BAITED TRAPS ON CATCHES OF THE AMBROSIA BEETLE, *TRYPDENDRON LINEATUM*

T. L. SHORE

Agriculture Canada
Pacific Forest Research Centre
506 West Burnside Road
Victoria, B.C. V8Z 1M5

J. A. MCLEAN

University of British Columbia
Faculty of Forestry
2075 Wesbrook Mall
Vancouver, B.C. V6T 1W5

ABSTRACT

Pheromone-baited sticky traps were suspended at five heights in five locations to determine the optimum height for catching the ambrosia beetle *Trypodendron lineatum* (Oliv.). Maximum catches were obtained on traps at, or just below, the height of the surrounding underbrush.

RESUME

Des pièges à phéromones utilisés pour le dénombrement des populations ont été accrochés à cinq hauteurs, en cinq endroits, pour déterminer la hauteur optimale de capture du scolyte birayé (*Trypodendron lineatum* [Oliv.]). Le nombre maximal de captures a été obtenu à la hauteur du sous-bois environnant ou juste au-dessous.

INTRODUCTION

Ambrosia beetles cause losses to the forest industry by boring "pinholes" into logs and green timber. Pheromone-baited traps have been used in recent years for surveying and mass-trapping ambrosia beetles in timber sorting and processing areas (Borden and McLean 1981, Lindgren and Borden 1983, Shore and McLean, in press). In order to improve future trapping efforts, an experiment was established to identify the effect of trap height on catches of *T. lineatum*.

METHODS AND MATERIALS

Twenty-five survey traps, each consisting of 0.64 cm wire mesh formed into a cylinder 20 cm in diameter and 46 cm in length attached at the top to a plywood disk, were coated with Stikem Special® (Michel and Pelton Ltd., Emeryville, Calif.). On 21 May 1980 five traps were suspended from a rope in each of five locations. In each group of five, the bottom of the traps were at 0.0, 1.0, 2.0, 3.0 and 4.0 m above the ground. Each trap was baited with two Conrel® fibres (Albany International Co., Needham, Mass.) containing lineatin, the aggregation pheromone of *T. lineatum* (MacConnell *et al.* 1977; Borden *et al.* 1980) giving a combined release rate of approximately 20 micro grams per day. The average height of understory vegetation surrounding the traps was measured. Beetles were removed from the traps on several occasions, identified as to sex and counted. The experiment was concluded on 5 August (76 days). The total number of beetles of

each sex caught on each trap was determined. In order to remove differences due to locations and sexes the numbers at each of the five trap heights were converted to the proportion of total beetles of each sex caught at each location. All subsequent analysis was done on this variable.

RESULTS AND DISCUSSION

A total of 5,493 beetles was trapped. The ratio of male to female *T. lineatum* was 1.24:1.00; the stronger response to the pheromone by the male reflects the fact that the female is the first-attacking and pheromone-producing sex in this species. In order to determine if the response to trap height was consistent between the sexes the proportion of each sex (as determined above) caught on each trap was tested using a t-test for paired comparisons. No significant difference was found between the sexes ($P > 0.05$); therefore, they were combined in subsequent analyses.

The percentage of the total number of beetles caught at each location by trap height is shown in Table 1. Analysis of variance of this variable showed there were significant differences between trap heights at the .05 probability level. A multiple comparison test showed significant differences between the highest trap height (4.0-4.5m) at which the fewest of beetles were caught and the second lowest trap height (1.0-1.5m) where the most beetles were caught (Table 1). Considerable differences between locations in the distribution of beetles by trap height were evident. While traps in the 1.0-1.5m height

TABLE 1. Percentage of total number of *Trypodendron lineatum* caught in each location at each of five trap heights.

Trap Height (m)	Location					Mean ¹
	1	2	3	4	5	
0.0 - 0.5	19.2	6.9	39.4	9.6	14.7	18.0 ab
1.0 - 1.5	35.9	47.0	30.8	12.4	31.7	31.6 a
2.0 - 2.5	25.6	22.5	16.1	21.0	43.0	25.6 ab
3.0 - 3.5	12.6	11.3	9.1	30.8	8.8	14.5 ab
4.0 - 4.5	6.7	12.3	4.6	26.2	1.8	10.3 b
Total number caught	1264	408	864	1844	1113	
Avg. height of underbrush (m)	1.2	1.2	1.5	4.0	3.0	

¹Means followed by the same letter are not significantly different. Student-Newman-Keuls test, $P < 0.05$.

class ranked first or second in percentage of beetles caught in four locations, location 4 showed a different distribution entirely. Examination of the average height of surrounding underbrush provided a possible explanation for these location differences. In locations 1, 2 and 3, where the underbrush was 1.5m or less in height, traps in and below this height class caught the highest percentage of beetles. Loca-

tions 4 and 5 had much higher understory vegetation surrounding the traps, and in both cases traps in the height class just below the top of the underbrush caught the most beetles. These results suggest that *T. lineatum* responds optimally to pheromone-baited traps placed at, or just below, the height of the surrounding vegetation.

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