

# Pine Shoot Beetles *Blastophagus piniperda* L. and *B. minor* Hart. Associated with Outbreaks of the Pine Beauty Moth (*Panolis flammea* Schiff.)

Skirmantas Vaivada

Lithuanian Forest Research Institute

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## Abstract

Numbers of pine shoot beetles *Blastophagus piniperda* and *B. minor* trapped in pheromone traps within a pine beauty moth (*Panolis flammea*) outbreak area were significantly greater in zones with total 100% defoliation ( $26.8 \pm 10.4$  and  $5.8 \pm 2.0$  beetle/trap, both species respectively) as compared to undefoliated stands ( $1.8 \pm 1.3$  and  $1.4 \pm 1.0$ ) and zones with moderate 50% ( $3.7 \pm 1.5$  and  $3.3 \pm 1.2$ ) and heavy 75% defoliation ( $6.1 \pm 2.4$  and  $1.8 \pm 0.9$ , respectively). Peak flight of *Blastophagus piniperda* was observed in the last part of April, whereas *Blastophagus minor* was trapped at constant but small numbers for approximately a month up until the middle of May.

**Keywords:** *Blastophagus piniperda*, *Blastophagus minor*, pheromone traps, defoliation, *Panolis flammea*

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## Introduction

An outbreak of the pine beauty moth (*Panolis flammea* Schiff.) occurred recently in southern Lithuania pine stands and covered 44800 ha in 2000; an area of 4000 ha was totally defoliated. Pine trees can usually withstand a single total defoliation, however such stressed forests provide an opportunity for attacks by bark beetles and population expansion, which can result in a high risk for tree mortality. The key management option in Lithuania is to eliminate trees that are stressed by defoliation or freshly attacked by bark beetles and by using selective or clear cutting. However residual stands can provide an additional food source for pine bark beetles thus reducing the success of forest sanitation measures

The objective of this study was to assess the population levels and to determine the flight periodicity of the common (*Blastophagus piniperda* L.) and lesser (*B. minor* Hart.) pine shoot beetles in forests that suffered different degrees of defoliation. This will provide us with a rationale for determining the best management options for reducing the risk of attacks by bark beetles on residual living trees.

## Material and Methods

Pine shoot beetles were trapped in barrier traps made of transparent polyethylene film and baited with Tomodor® commercial lure (Z.D. Chemipan, Poland). Pheromone traps were placed in the clear cuts within pine beauty moth outbreak areas in southern Lithuania. Thirty-five traps were placed at least 50 m apart from each other and 50 m from the edge of the stand defoliated by the pine beauty moth. The study was conducted in zones with four damage categories: undamaged control, moderate (50% defoliation), significant (75% defoliation) and heavy (100% defoliation). Traps were set out on 4 April and checked every 10-14 days for a period of four months. Differences among damage zones were tested using Student's T-test (Campbell 1989).

## Results

The study was conducted in the year following pine beauty moth damage. Population levels of pine shoot beetles appeared to be low (Table 1) on all experimental sites. Captures of *B. piniperda* ranged from  $1.8 \pm 1.3$  beetles per trap in control sites to  $26.8 \pm 10.4$  in totally defoliated stands. Captures of *B. minor* were much lower – from  $1.4 \pm 1.0$  to  $5.8 \pm 2.0$  beetles/trap during the whole season.

**Table 1.—Mean number of captured beetles/trap\***

Defoliation	<i>Blastophagus minor</i>		<i>Blastophagus piniperda</i>	
100%	5.8±2.0	a	26.8±10.4	a
75%	1.8±0.9	b	6.1± 2.4	b
50%	3.3±1.2	b	3.7± 1.5	b
0%	1.4±1.0	b	1.8± 1.3	b

\*numbers in the column, followed by same letter, did not significantly differ when tested with Student-t

Even at these low population levels, bark beetle number were related to the degree of defoliation on the study sites. Numbers of both species were significantly higher in traps located in totally (100%) defoliated stands as compared to captures in control and partially defoliated (50-75%) stands. There was no significant difference in the numbers of pine shoot beetles captured in control stands vs. stands that were partially defoliated although captures of *B. piniperda* clearly showed a trend to increase with increasing damage.

In 2000, pine shoot beetles initiated flight in the middle of April. Seasonal periodicity of bark beetle captures averaged over all levels of defoliation indicate that peak flight of *B. piniperda* occurred during the last 10 days of April and declined rapidly in May, while *B. minor* was captured at a constant but smaller number for approximately a month, and ended around the 20th of May. This flight pattern in 2000 differed significantly from the long-term average; in Lithuania, *B. piniperda* is reported to initiate flight in March and *B. minor* begins flight activity a few weeks later (Valenta 2000).

## Conclusions

- Numbers of pine shoot beetles *B. piniperda* L. and *B. minor* Hart. captured in pheromone traps within pine beauty moth outbreak areas were significantly greater in zones with 100% defoliation (26.8±10.4 and 5.8±2.0 beetle/trap, both species respectively) as compared to undamaged stands (1.8±1.3 and 1.4±1.0) and zones with moderate 50% (3.7±1.5 and 3.3±1.2) and heavy 75% defoliation (6.1±2.4 and 1.8±0.9, respectively).
- Peak flight of *B. piniperda* was observed around the last week of April, whereas *B. minor* Hart was captured at a constant but smaller number for approximately a month up until the middle of May.

## References Cited

- Campbell, R.C. 1989.** Statistics for biologists. Third edition. Cambridge University Press.
- Anonymous. 2000.** Annual report on sanitary condition of state forests. Forest Protection Station, Kaunas. p.16-38.
- Valenta, V. 2000.** Bark beetles. In: Manual of forest protection (ed. A. Ziogas). Kaunas, Lututė. p. 135-163.