MASS TRAPPING OF THE SPRUCE BARK BEETLE *IPS TYPOGRAPHUS* – CATCH EFFICIENCY OF BAITED TRAP-LOGS RELATIVE TO PLASTIC PHEROMONE TRAPS

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Introduction

Two types of trap devices, baited trap-logs and plastic pheromone traps, were used in Sweden for mass trapping of *Ips typographus* in 2007. We studied the catch efficiency of these two types of traps and factors that might influence the measured efficiency at two research stations in southern Sweden: Asa station is situated north of the city Växjö in central Småland, and Tönnersjöheden close to Halmstad at the west coast.

Methods

Experiment 1: Baited trap logs and plastic pheromone traps (NoveFelle) were set up at clearfellings in a paired design to evaluate their relative catch efficiency (fig. 1). The traps were set up at two clear-cuttings with six replicates at each clear-cutting. Two methods were used to estimate the catch efficiency of the baited trap logs, i.e. containers filled with water and containers with textile-covered bottoms and sides (fig. 1).

Experiment 2: The catch under six baited trap logs that were not treated with insecticide were compared with the catch under six insecticide-treated ones.

Experiment 3: Forty *Ips typographus* were placed individually on an insecticide (cypermetrin) treated log. The time until they fell off or flew away were recorded. To evaluate the acute effects of the insecticide the exposed beetles were immediately placed in textile covered containers to observe if they were fit enough to escape. To evaluate delayed effects all beetles were subsequently placed in containers. The mortality of the exposed beetles was compared to that of unexposed beetles.

Results and Discussion

In Experiment 1, for unknown reasons, the relationship between the relative trap catch under baited trap-logs and in plastic pheromone traps differed between the two sites. At Asa, the pheromone traps caught more beetles than baited trap-logs and on the other clear-cutting at Tönnersjöheden the trend was the opposite. At both sites, approximately half as many beetles were caught in the containers without water compared to in those with water.

In Experiment 2 it was shown that beetles frequently fall off from a log even without being poisoned, or alternatively they may have landed in the water directly. The catch was approximately half as large under the logs that were not treated with insecticide as under the insecticide treated logs.

In Experiment 3 we showed that most beetles stay on a log for more than one minute before they fall of or fly away. Fifteen percent of the beetles flew away from the log. Most (93%) of the exposed beetles managed to escape from textile-covered containers, i.e. the acute effects

of the insecticide were weak. However, most of the beetles died later from delayed effects of the insecticide.

Conclusions

It is difficult to estimate the catch efficiency of poisoned host material because some non-poisoned beetles will be caught if water filled containers, while beetles beetles will frequently escape if containers without water or poison are used. A disadvantage with both methods is that they will underestimate the catch since some poisoned beetles will fly away from the log and die elsewhere. On top of it, the catch efficiency differed between the two study sites due to unknown factors.

Our results show that previous studies have underestimated the methodological difficulties associated with measuring the catch efficiency of insecticide treated host material, e.g. the results can be substantially influenced by delayed poisoning effects. Future studies should take such factors into account.

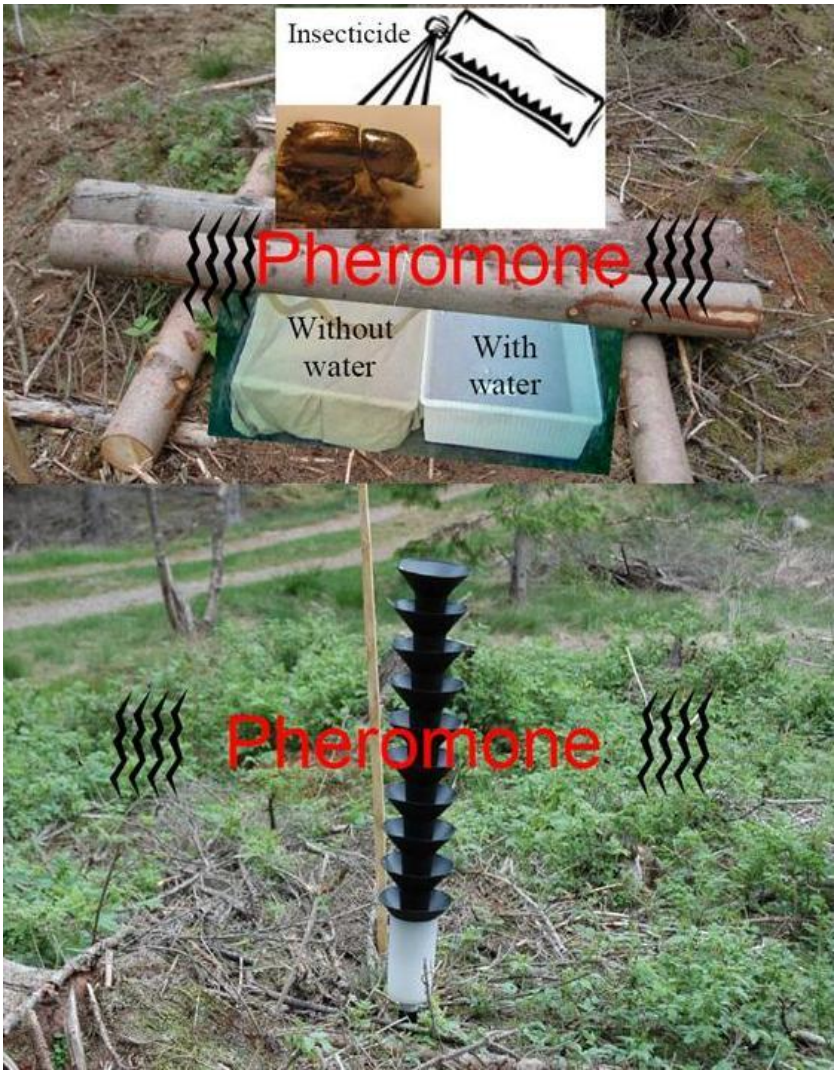

Figure 1. Trays used to collect spruce bark beetles that were attracted to trap logs baited with a pheromone dispenser and sprayed with insecticides (above) and the Norwegian pheromone trap “NoveFelle” used in the Swedish beetle monitoring program (below).