Catches of the European spruce bark beetle to different types of pheromone traps in Tatranská Javorina – preliminary results 2012

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Abstract

The experiment was carried out in 2012 on the plots in the High Tatra National Park (TANAP) – district Tatranská Javorina where the population density of European spruce bark beetle *Ips typographus* L. (Coleoptera: Curculionidae, Scolytinae) has reached epidemic level. In total 40 traps of four different types were used to observe the swarming dynamic of *I. typographus* and effectiveness of differently placed pheromone traps (outer traps, traps in the middle of the line). Results showed that beetles had produced two generation per year. Lindgren funnel trap and our prototype LOS trap were identified as the most effective pheromone traps for capturing *I. typographus*. The hypothesis that the number of beetles captured in traps placed on the outer side of the trap line will be higher wasn't confirmed.

Introduction

The ongoing bark beetle outbreak in Tatranská Javorina is the result of the unmanaged areas with the highest level of protection. Bark beetles also overflowing from the Polish side of High Tatras where population density is also in epidemic level and active management is forbidden. We choose this area intentionally to meet our aims.

The aims of our experiment were (i) to observe the swarming pattern of *I. typographus*, (ii) to compare the effectiveness of the four types of pheromone traps, (iii) to evaluate our hypothesis of the positive effect of the outer pheromone trap on number of caught beetles. We were expecting higher number of caught insects due to wider attraction angle of pheromone trap.

Data and methods

Ten trap lines were deployed in the forests of Tatranská Javorina. Each trap line consisted of four types of traps ((Theysohn (T), Ecotrap (E), Lindgren funnel trap (L) and prototype LOS (P)) spaced 20m apart. Each trap was baited with a Pheroprax pheromone lure that was replaced every fifth week, first since 9th May. The pheromone traps were emptied every week (together 20 weeks × 40 traps = 800 samples) and also the position of the each traps was changed in the trap line. The catches were stored in Zip-Loc bags at temperature below 0°C in the laboratories of the Forest Protection Service in Banská Štiavnica.

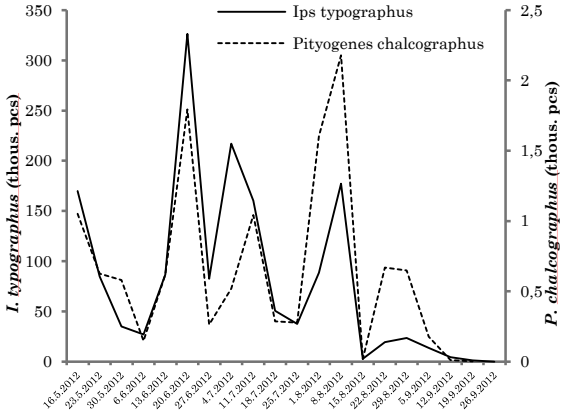
Pheromone trap catches were dried, cleaned and selected insect (bark beetle) species were determined.

Results and discussion

The swarming periods of two species of bark beetles are illustrated in Fig. 1. The swarming dynamic of *Pityogenes chalcographus* was also evaluated due to large number of caught beetles.

As it's shown on Fig. 1, the swarming period started at the end of the May and the peak of the first generation was reached at the end of June. The swarming of second generation started at the beginning of the August. Catches of *I. typographus* correlated well with catches of *P. chalcographus.*

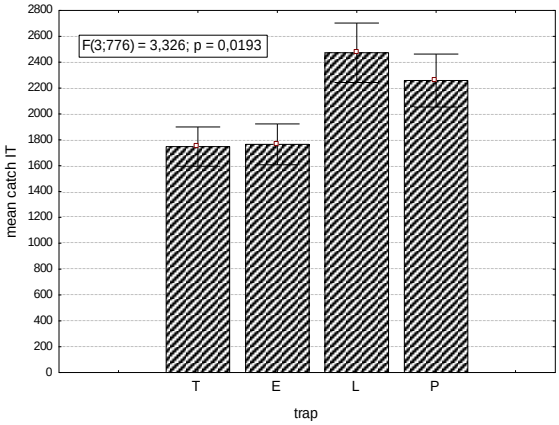
Fig. 1 Swarming patterns of *I. typographus* and *P. chalcographus* in year 2012



Mean effectiveness of four types of pheromone traps is illustrated in Fig. 2. Trap catches were significantly higher in L type (30%) compared to T and E types, and 9% higher compared to P type. Pheromone traps E and T achieved similar effectiveness. There was significant difference recorded between mean catches in L a T type (ANOVA, Tukey HSD test, p=0,048). We expected higher number of caught beetles in P type. It was built on the base of L type; we enlarged trap's effective area. This type will be modified and the

experiment will be carried out again in 2013. Galko et al. (2010, 2011a, 2011b) was comparing the trap catches between different types of pheromone traps in the area of Low Tatras, (Galko et al., 2010), High Tatras (Galko et al. 2011a) and Poľana Mts. (Galko et al. 2011b). The results shown that in Low Tatras Mts. the L type had 16.4% higher catches compared to T type and in High Tatras Mts. 20% higher. There were compared three trap types (T, E, L) in Poľana Mts.. The L type had here 30% higher catches compared to T type and 26.7% higher compared to E type. Traps in all experiments were spaced 20m apart. There are no other known studies or data comparing the L type trap with other commercially used pheromone traps in Slovak conditions.

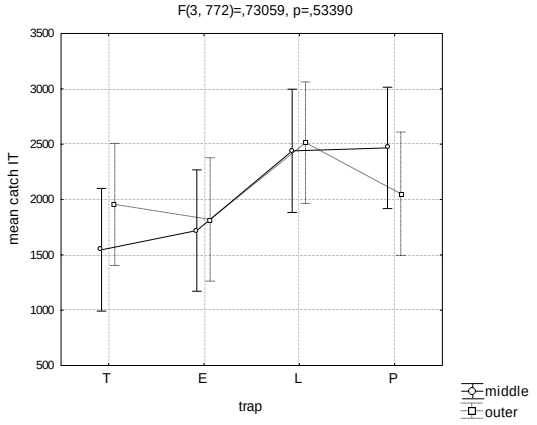
Fig. 2 Mean catches of *I. typographus* according to pheromone trap type



We expected the higher number of caught *I. typographus* beetles in outer traps compare to traps placed in the middle of line. This hypothesis wasn't supported (Fig. 3).

The mean weight of active volatile substance evaporated from one lure was 2g.

Fig. 3 Outer side effect of trap position



Conclusion

In total we captured more than 1.6mil. bark beetle imagoes. Two swarming periods of *I. typographus* and *P. chalcographus* were illustrated and described. The most effective trap type was the Lindgren funnel trap and the second was the LOS prototype. Pheromone traps Ecotrap and Theysohn achieved similar effectiveness, although this was 30% lower compared to Lindgren funnel trap and 22% lower compared to LOS prototype trap. Results indicate that there were no significant differences between the catches of outer and middle line pheromone traps.

Acknowledgements

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