

Conclusion & conservation implication

Pheromone-based trapping method is very efficient.

The occurrence of *E. ferrugineus* responded strongest to oak density.

Other deciduous trees should also be included within a management plan as they are used by the beetle as a complement to the main oak habitat.

E. ferrugineus responds to tree density at various scales, therefore conservation planning of this species should focus on both small and large scales.



A funnel trap hung on an oak branch

Acknowledgements

Many thanks to my supervisors, Prof. Per Milberg, Assoc. Prof. Dr. Karl-Olof Bergman and Assoc. Prof. Dr. Heidi Paltto for their help and support during the study. Thanks to landowners for granting permissions to use their land and finally thanks to *Wala och Folke Danielssons fond* and *Stiftelsen Oscar och Lili Lamms minne* for the financial support.

Using sex pheromone and a multi-scale approach to predict the distribution of a rare saproxylic beetle



Contact information

Najihah Musa

snnmusa@gmail.com

Tel: +46 (0) 76 783 2048

Najihah Musa



Linköpings universitet

Master thesis in
Ecology and the
Environment
2012

Background

Woodland pastures are among the habitats most seriously affected by fragmentation. Many insects associated with hollow deciduous trees are therefore threatened. The European red click beetle, *Elaterrugineus* L., is one of the affected species, and mainly dependent on oaks. This beetle is rare and very difficult to sample using traditional trapping methods. Besides oaks, there were no previous studies which relate the occurrence of beetle with other deciduous tree species.

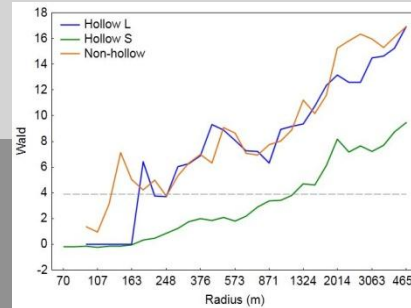
Aim

To find out which types of tree hollow and species that are important to *E. ferrugineus*, as well as to provide information on its potential distribution area.

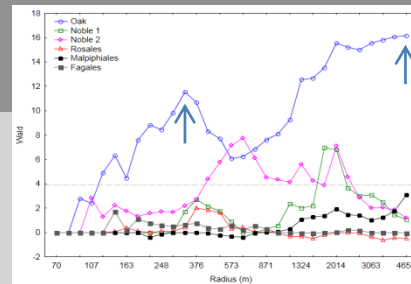
Method

This study used sex pheromones to attract beetles to the traps. A total of 99 traps were placed in a grid of 40 km × 40 km area in the province of Östergötland, Sweden. Database on deciduous trees in Östergötland were used to calculate tree densities at various spatial scales. These were related with the occurrence of the beetles and were then used to predict the potential distribution for *E. ferrugineus*.

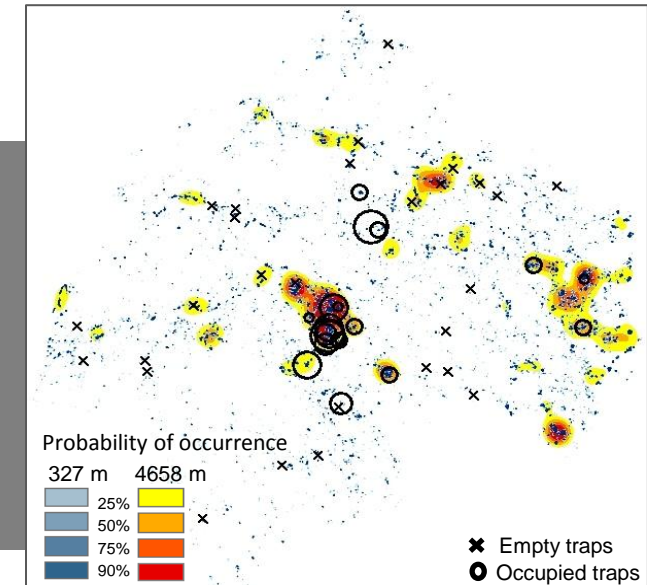
Results



- All tree hollow groups showed significant relationship. Strongest effect were showed by large hollow and non-hollow trees.



- The occurrence of *E. ferrugineus* was significantly correlated with the density of oaks, and two other deciduous tree groups: Noble 1 (hornbeam, beech, elm) and Noble 2 (ash, chestnut, maple, lime).
- The occurrence of the beetle responded strongest to oak density.
- The scales where oak density best explained the beetle's occurrence were at 327 m and 4658 m. These two spatial scales were used in predicting the beetle's distribution.



- The predictions were cross validated with beetle sampling data.
- The accuracy in predicting the distribution was 81% using 50% predicted probability of occurrence.
- The result indicates that the amount of substrates in smaller scale alone is not enough for the beetle to be present.
- The amount of substrate at larger scale is important for the occurrence of the beetle.

