



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

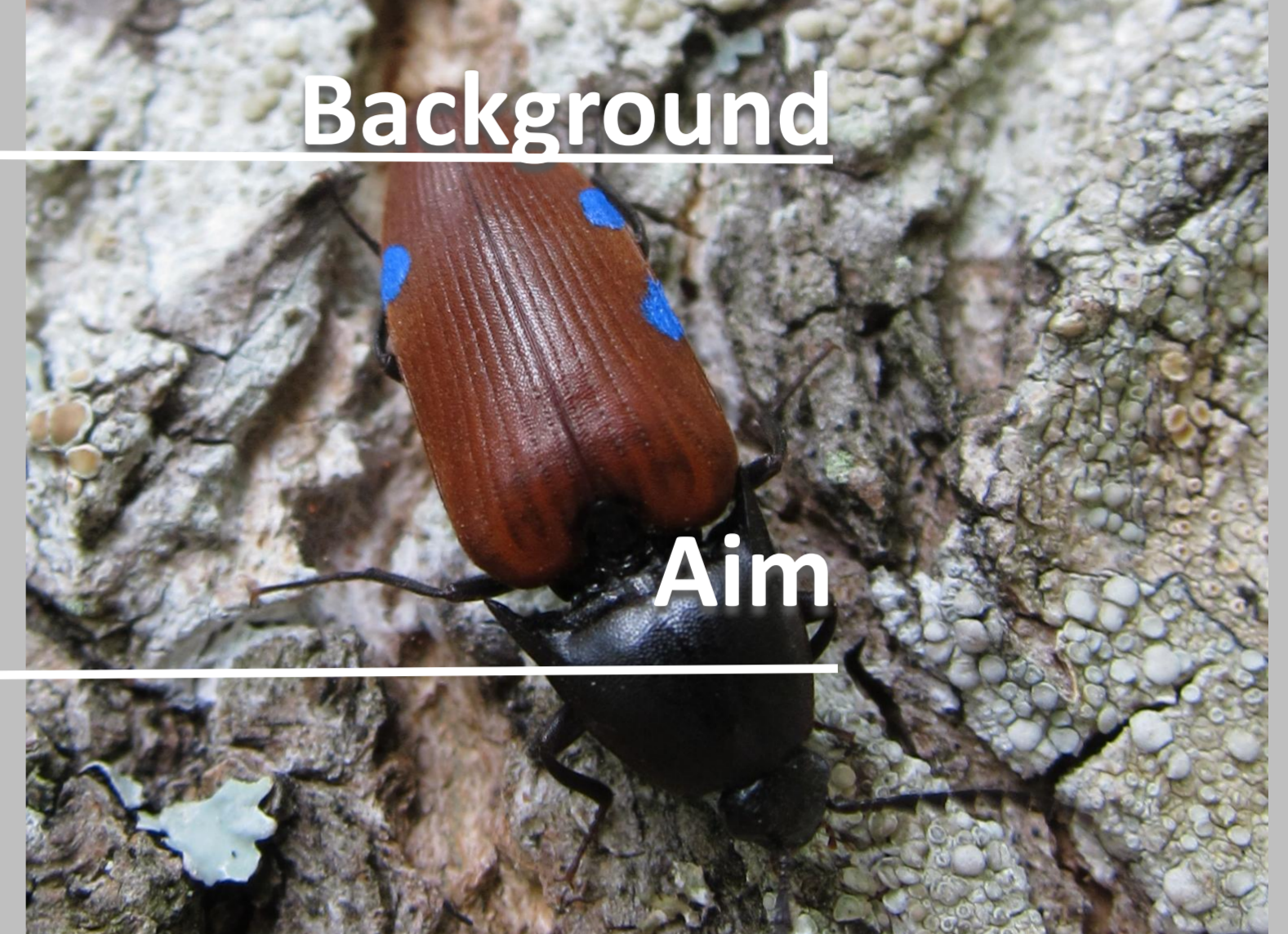
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The European red click beetle, *Elatér ferrugineus* L., is associated with old hollow deciduous trees. As a result of severe habitat fragmentation caused by human disturbance, it is threatened throughout its distribution range.

For conservation purposes, we need to know:

- which tree quality and tree species are important for *E. ferrugineus*.
- at what scale *E. ferrugineus* responds to the substrate.
- where in the landscape the suitable patches are.



- *E. ferrugineus* was sampled in a 40 km × 40 km area in Östergötland using a pheromone-based trapping method.
- Tree database containing 28,184 deciduous trees were used.
- Tree density was calculated and used to estimate at what scale the beetle responds to.
- The scales where tree density best explained beetle occurrence were used in predicting the beetle's potential distribution.

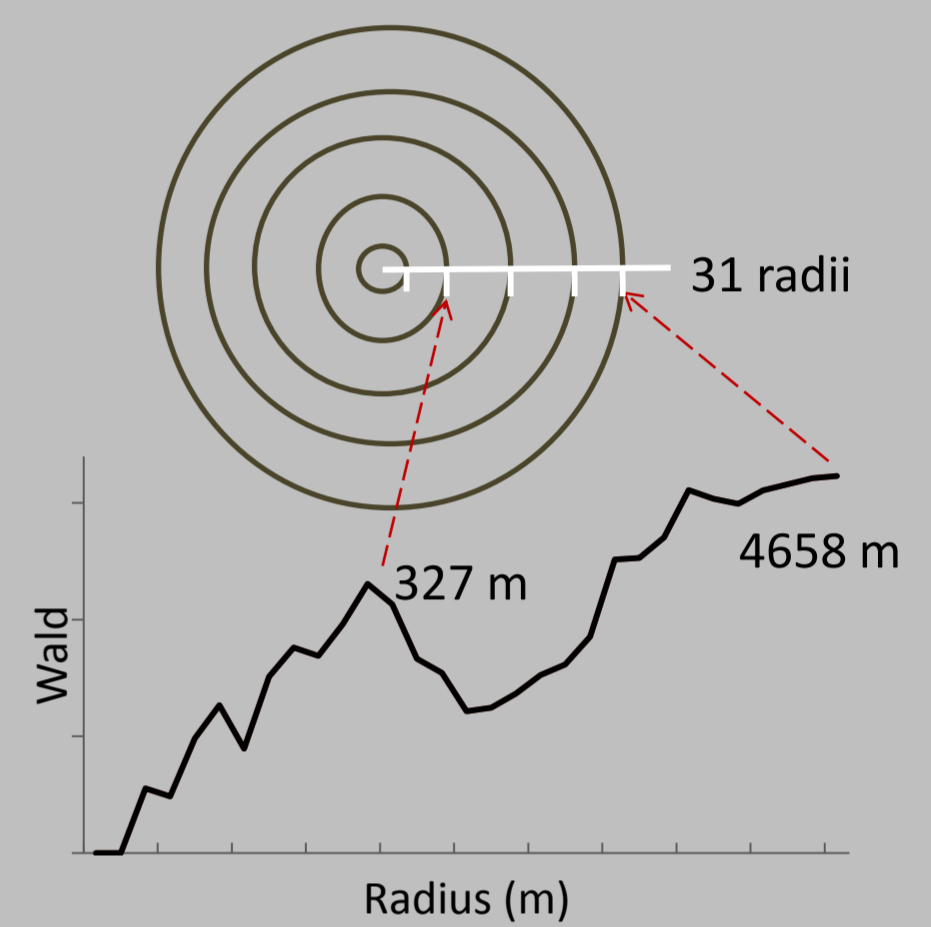


Figure 1: Tree density was calculated at various scales and used to estimate at what scale the beetle responds to. In this study the beetle responded to tree density at 327 m and 4658 m

- All tree types: hollow large, non-hollow large and hollow small trees, could explain the occurrence of *E. ferrugineus*.
- *E. ferrugineus* showed significant relationship with ***Quercus***, ***Carpinus***, ***Fagus***, ***Ulmus***, ***Acer***, ***Castanea***, ***Fraxinus*** and ***Tilia***. However, the occurrence of the beetle responded strongest to *Quercus* density.
- *E. ferrugineus* responded to the amount of oak trees at two scales, 327 m and 4658 m (Figure 1).
- The prediction map showed that amount of substrate at larger scale is important for the occurrence of the beetle (Figure 2).

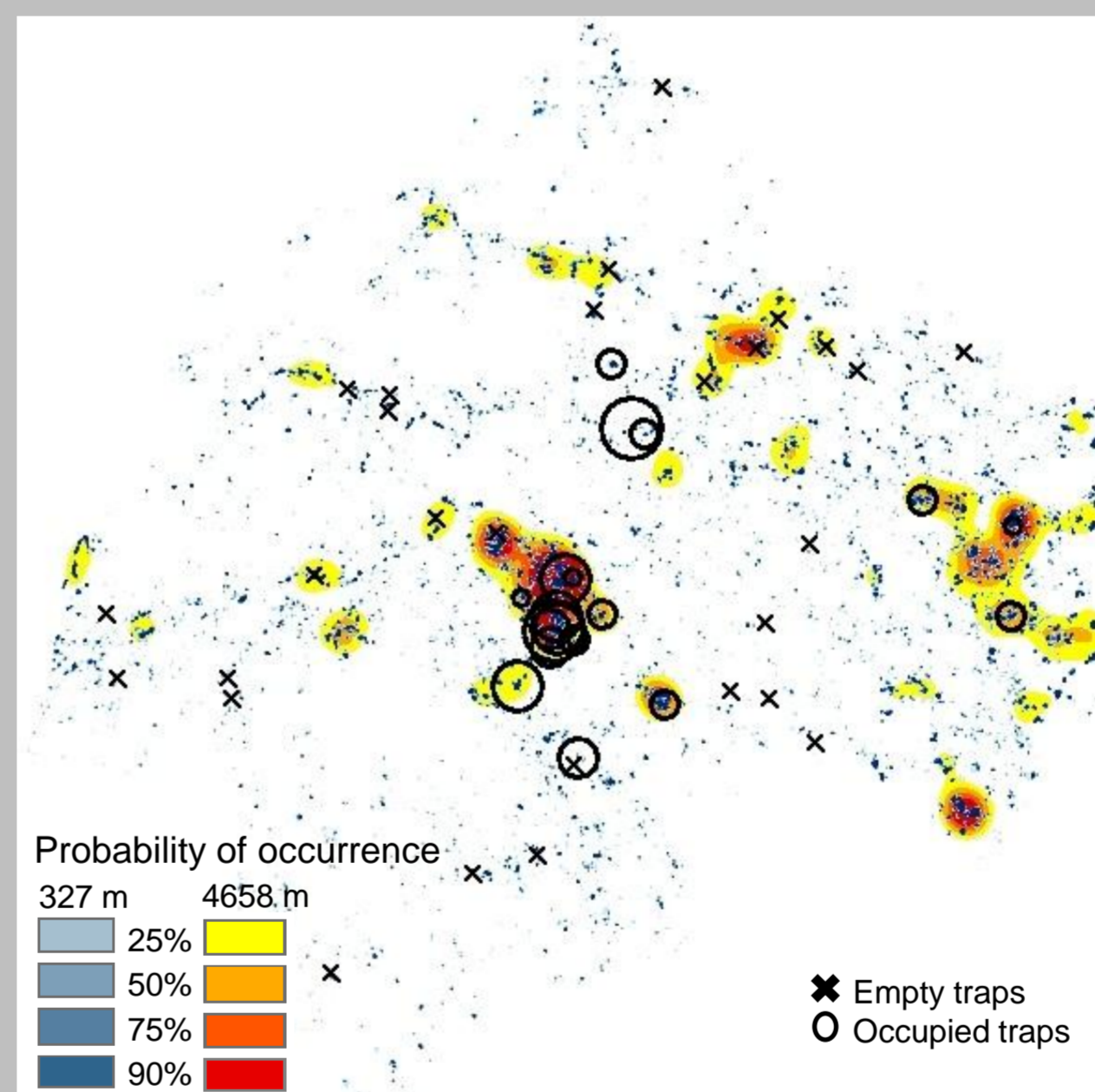
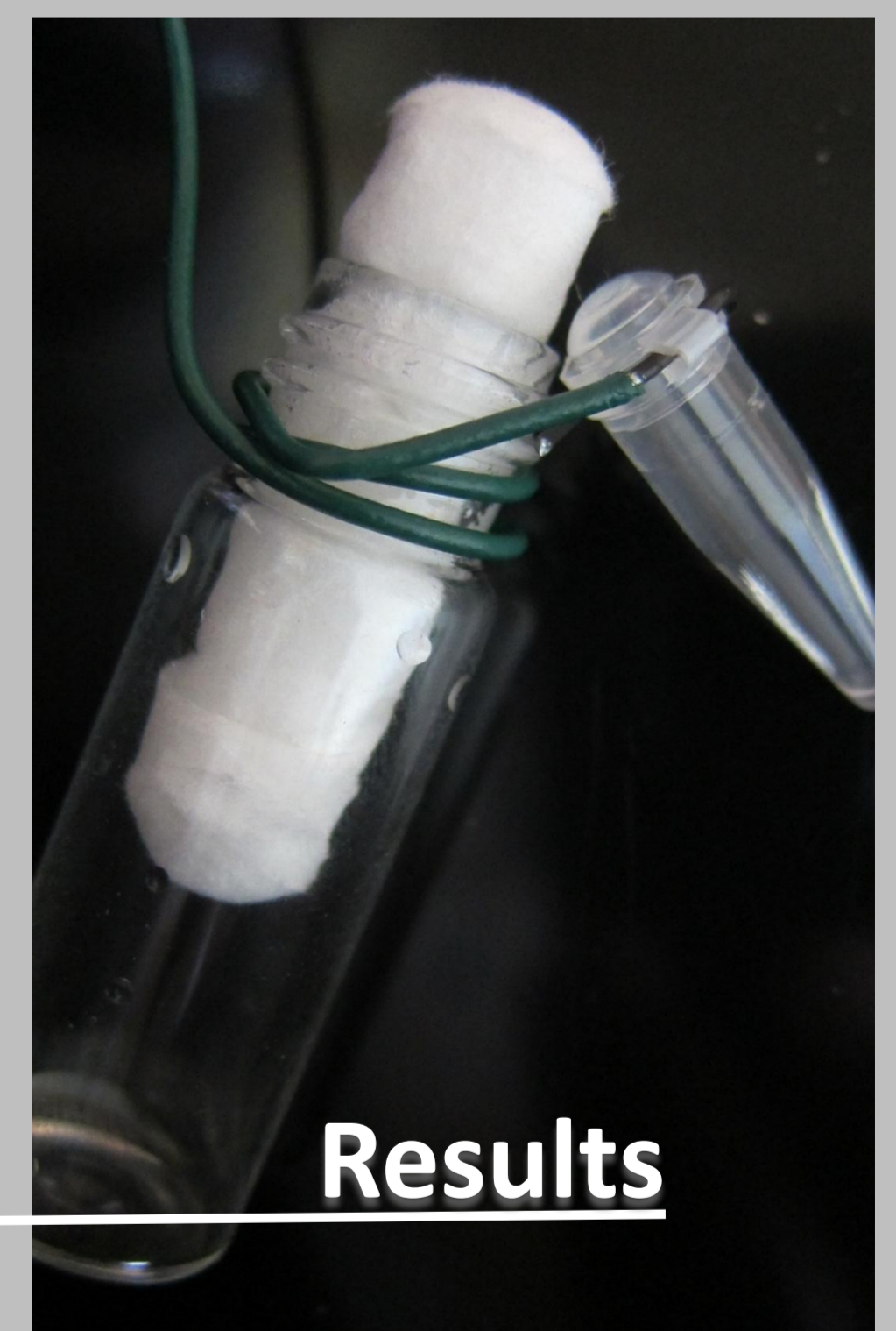


Figure 2: Prediction map on the distribution of *E. ferrugineus*. Predictions was 81% accurate based on oak densities. A binomial generalized linear model was used to predict beetle occurrence.



- Sex pheromone is a very efficient sampling method in attracting this beetle to the trap.
- In the conservation planning, priority should be given to *Quercus* as it best explains the occurrence of the beetle.
- Other deciduous trees should also be included as they can be a complement to oaks.
- Conservation planning of this beetle should focus on both small and large scales.

