Does it matter where to conduct conservation measures for saproxylic insects?

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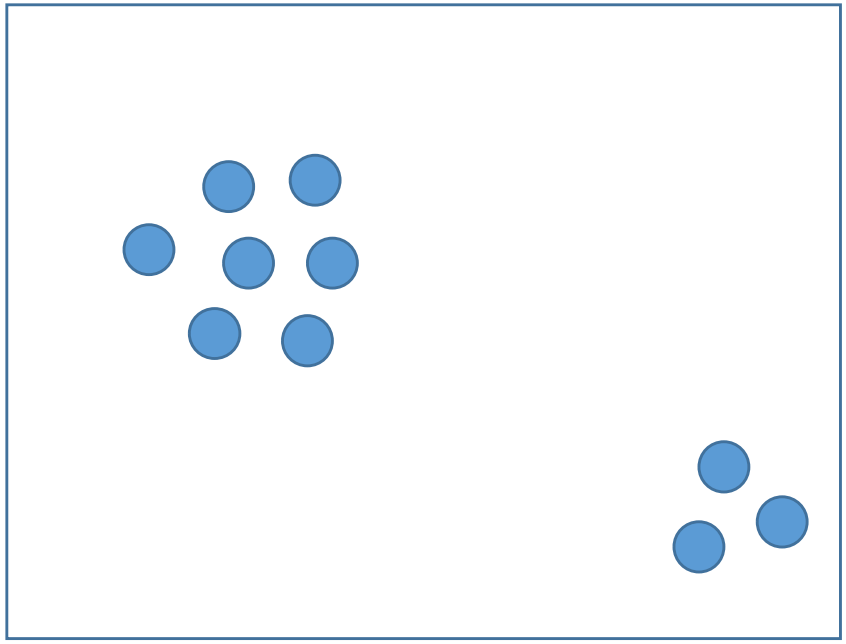
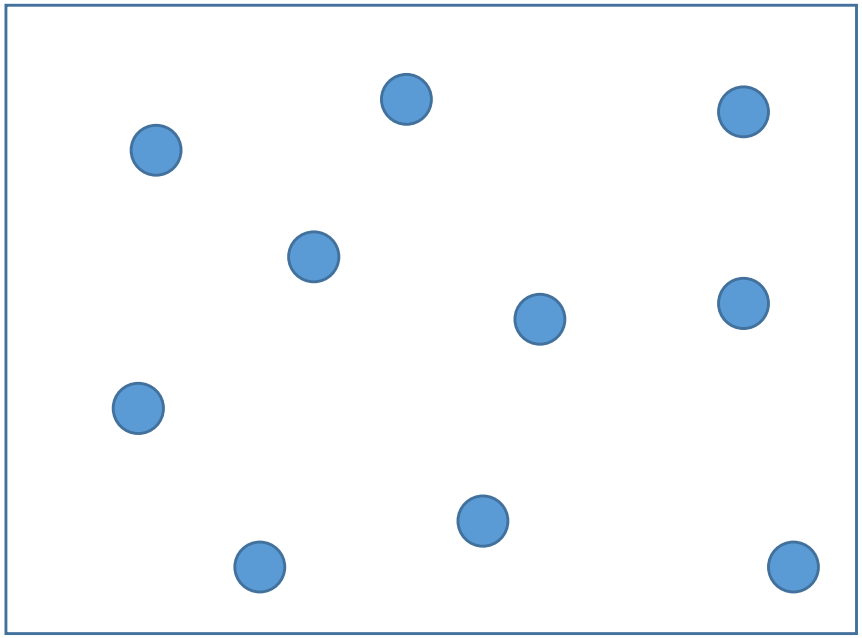
The spatial distribution of habitat in landscapes

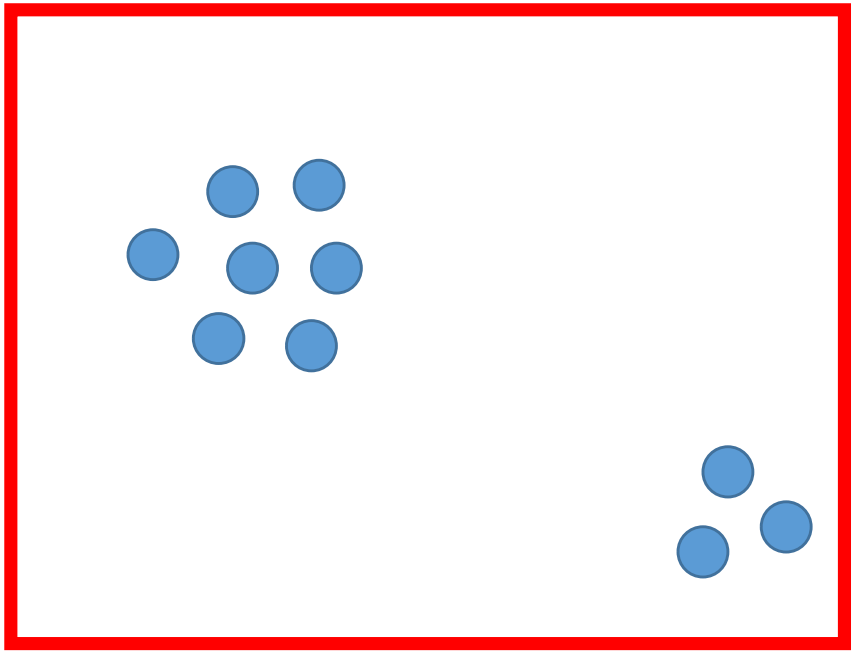
Habitats can be aggregated or evenly distributed within landscapes

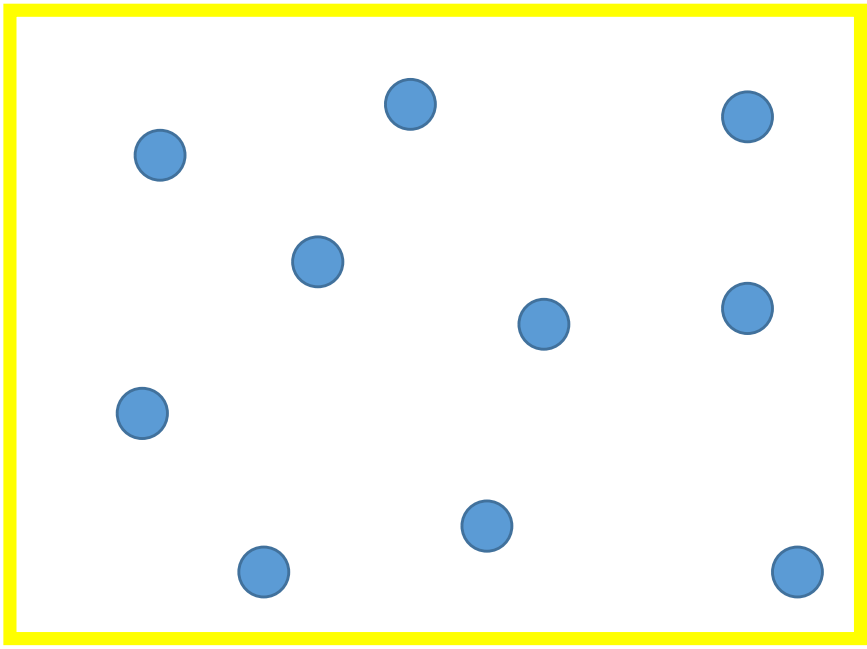




The spatial distribution of habitat in landscapes

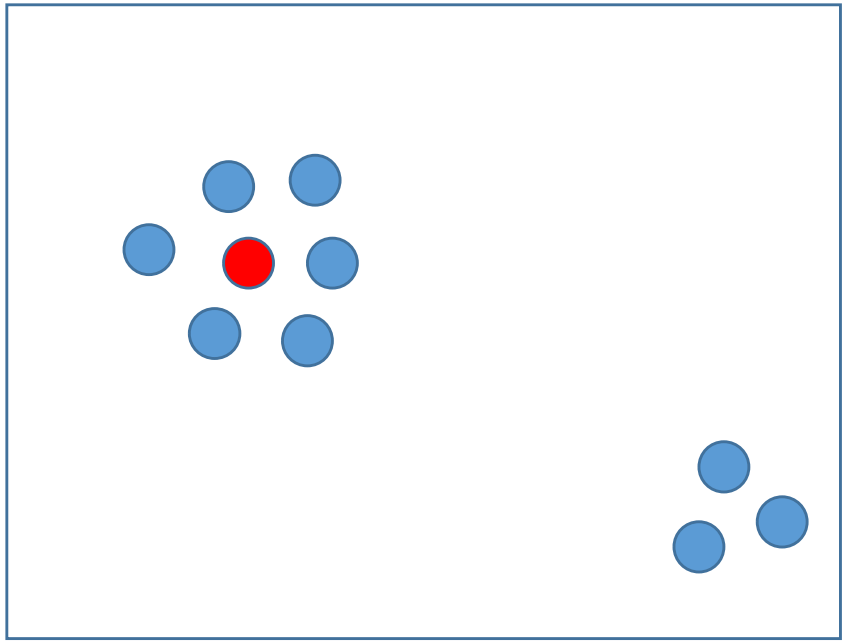
Replicated studies of landscapes and landscape-level measures of biodiversity as those below are extremely rare

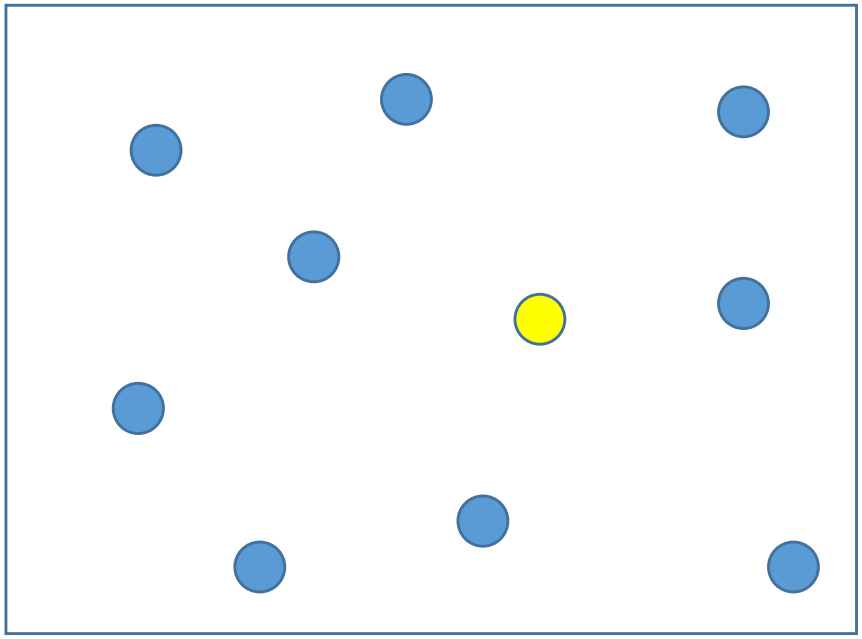




The spatial distribution of habitat in landscapes

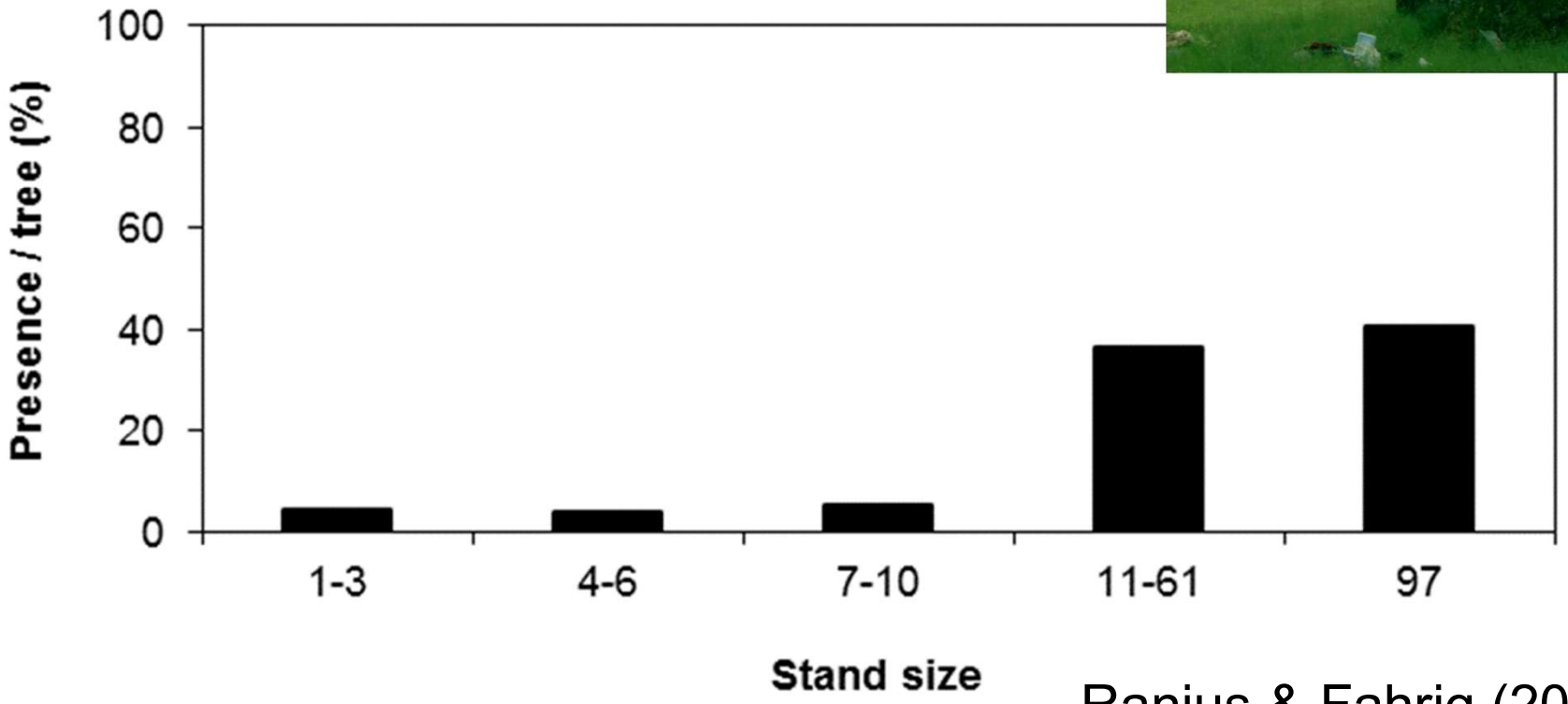
However, several replicated studies on patches occurring in various landscape contexts, i.e. asking if (for instance) red circles harbor more species than yellow ones?





Thresholds

Occurrence patterns of beetles inhabiting hollow oaks – *Tenebrio opacus* the clearest example



Ranius & Fahrig (2006)
Scand J For Res 21: 201-208

Colonisation-extinction dynamics by repeated surveys of *Osmoderma eremita*

Colonisations and extinctions over 25 years

Colonisation rates increased with connectivity (60 m scale) and with characteristics reflecting early successional stages

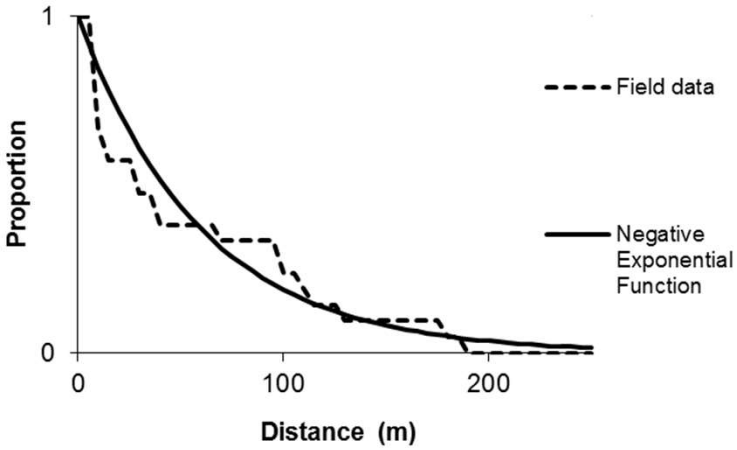
Extinction rates increased with large diameter

Lindman et al. (2020) Oecologia

Low colonization rates can explain the pattern

For *Osmoderma eremita*, most individuals remain in the same tree

Most dispersals to the nearest tree



Peltis grossa

Colonisations and extinctions over 10 years

Colonisation rates increased and extinction risks decreased with connectivity (100-200 m).

However, only when using connectivity based on information about species abundance. No relationship if only based on habitat.

Djupström et al., in prep

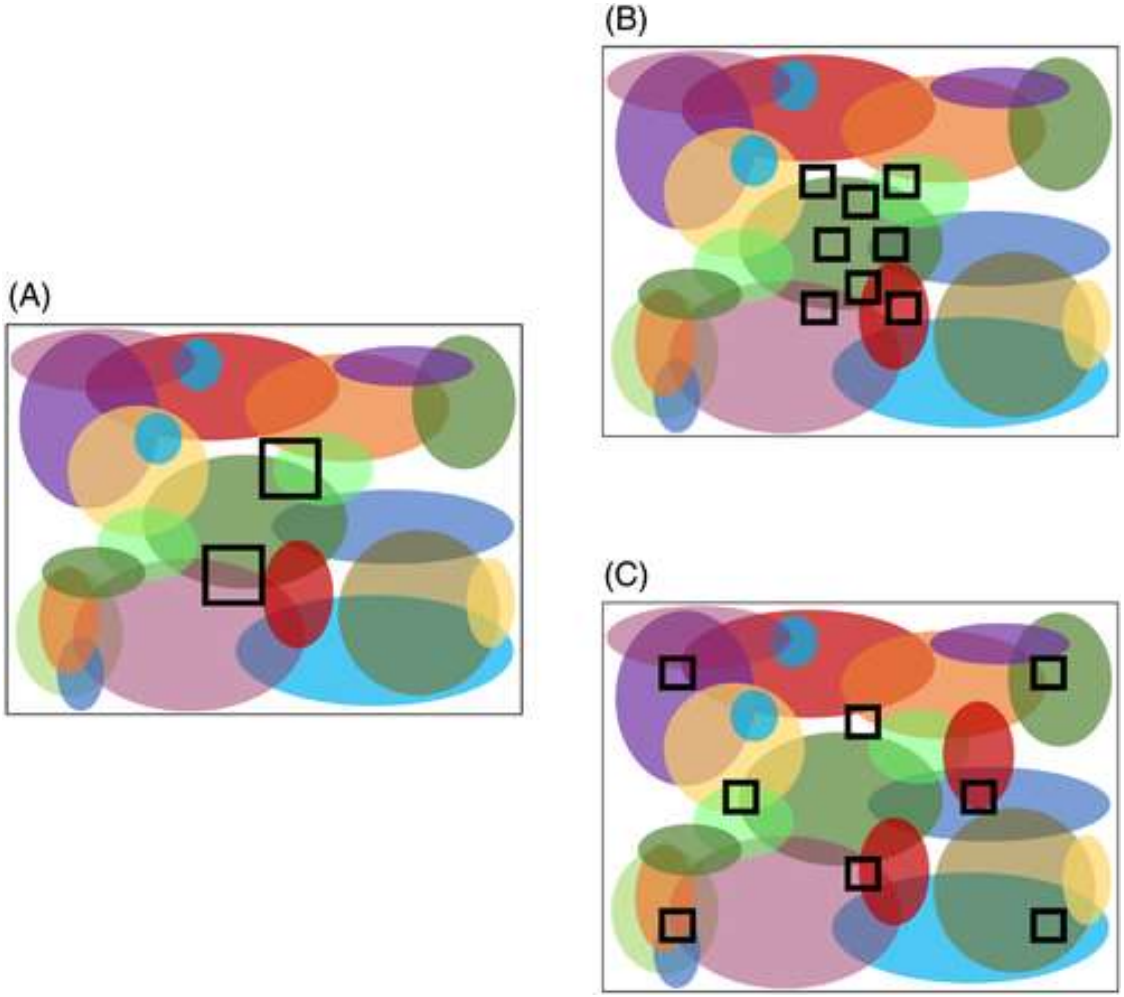
Other approach to study the effect of spatial habitat distribution: Effect of interaction between habitat amount locally and in surrounding landscape?

Rubene et al (2017) For Ecol Manage 399: 54-63:

With interactions (i.e. to increase local habitat amount generates a higher increase in species richness if more dead wood in surrounding landscape)

Seibold et al (2017) Ecology 98:1613-1622: No interactions

Is there any advantage with more evenly dispersed conservation?



Empirical support:

Müller & Gossner (2010 in Biological Conservation 143: 625-633

Rubene et al. (2015) in Biological Conservation 184: 201-208

Fahrig (2022) in Biological Reviews 97: 99-114

Conclusions

It is indeed important where habitat patches are situated

– they are more used by species of conservation concern if aggregated around dispersal sources

– could be difficult to know where the dispersal sources are - this may limits its practical implications

Conclusions

– they are more used by species of conservation concern if more dispersal sources in the surrounding

– you may pick more species if selecting habitat patches from all parts of a landscape

– Both aggregation of habitats and protection of areas from different parts of a landscape