



Ecological network plan: fragmentation of habitats and gene flow in populations of saproxylophagous beetle species



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Project:

- ➔ „Management of Fennoscandian wooded meadows (6530*) and two priority beetle species: planning, public participation, innovation", financed by LIFE-Nature program of European Commission.



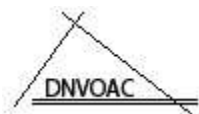
Project promoters :



Institute of Systematic Biology,
Daugavpils University



Latvian Nature Conservation Agency



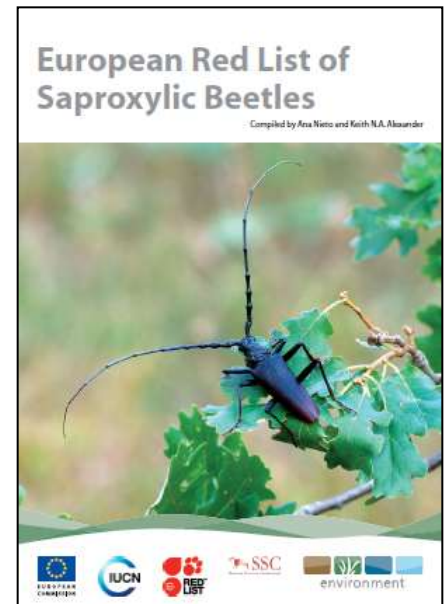
Southern Latgale NGO Support
Centre



Project Action:

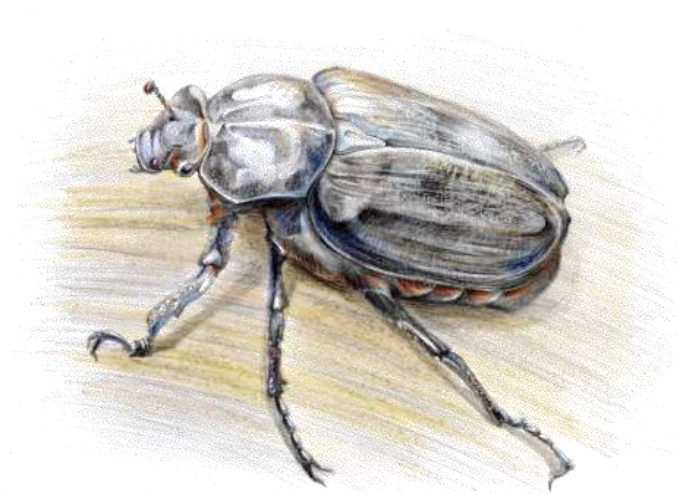
- Development of plan for ecological network for conservation of rare saproxilophagous beetles and suitable habitats

Nearly 11% of saproxylic beetles in Europe are threatened. Almost 14% of the assessed beetles are thought to have significantly declining populations. Altogether 125 species occurring in the Latvia are included in European Red List of Saproxylic Beetles (including both project target species *Osmoderma barnabita* and *Phryganophilus ruficollis*).





- *Osmoderma barnabita* is near threatened because it is entirely dependent upon veteran trees as it inhabits decaying heartwood. This is a very specific habitat type which is already highly fragmented and subject to continuing significant decline.



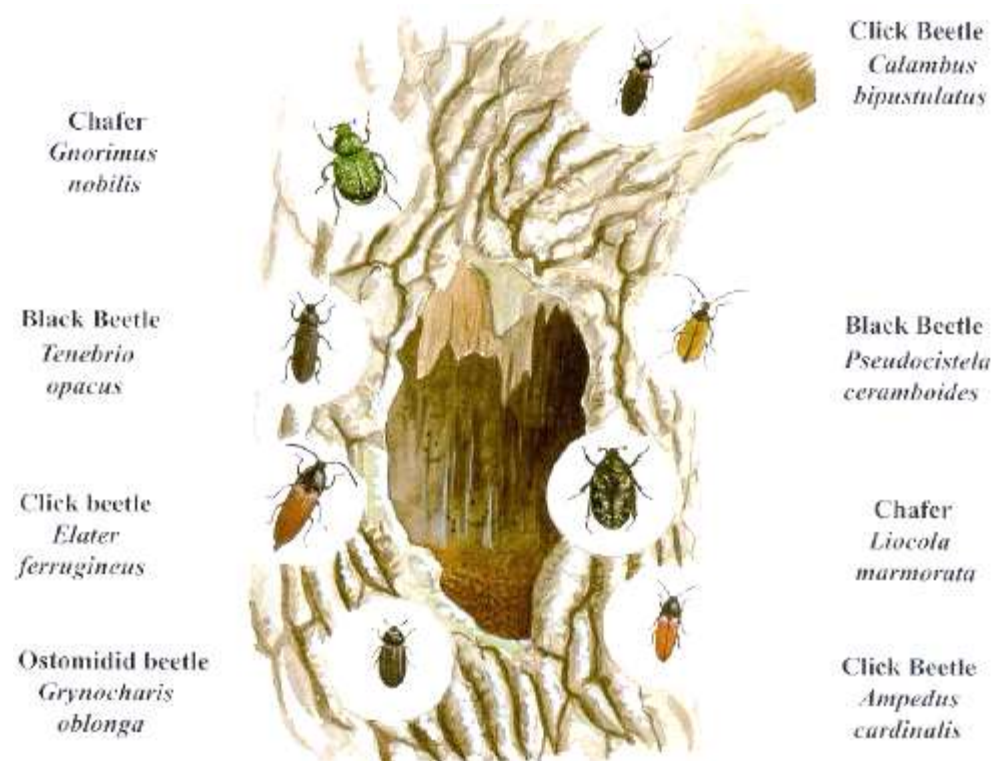
O. barnabita Motschulsky, 1845

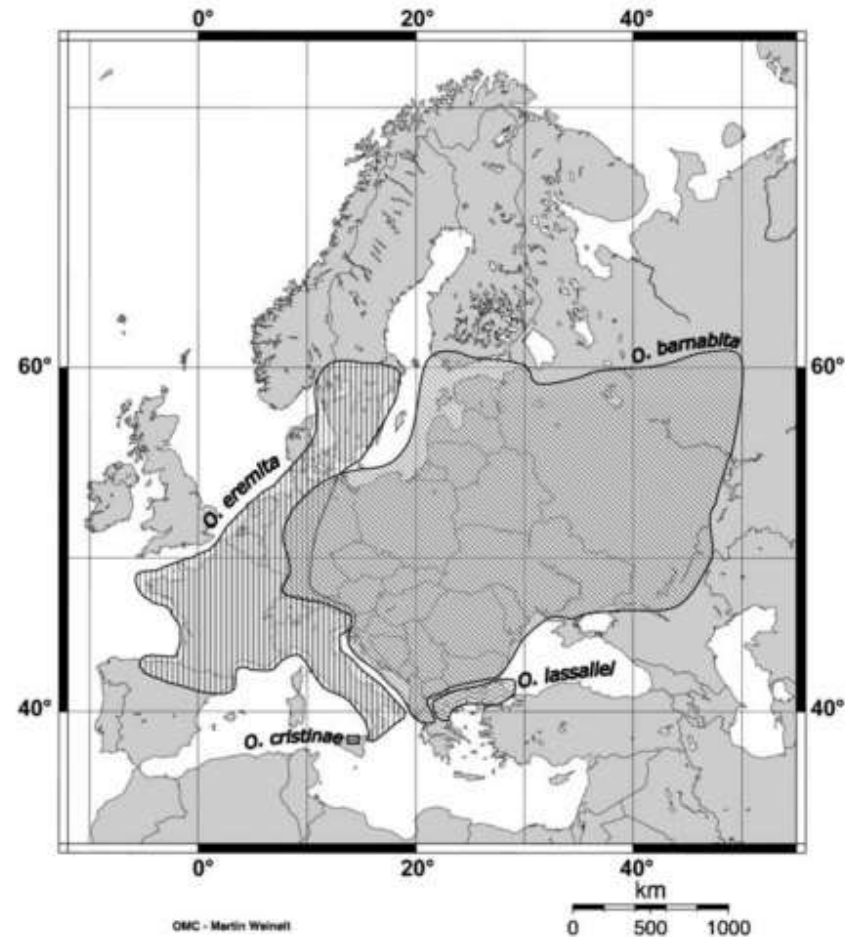


O. barnabita Motschulsky, 1845 habitat



→ Hermit beetle (*O. barnabita*) as an Umbrella species





Geographical ranges of the *Osmoderma eremita* complex in Europe (Audisio et. al, 2007)

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- *Phryganophilus ruficollis* considered a relict of primeval forests, known from few scattered localities, everywhere believed a great rarity, collected in single individuals.



P. ruficollis (Fabricius, 1798)



P. ruficollis (Fabricius, 1798) habitat



- The ecological network plan will consist of planning and management recommendations for nature management plan developers, spatial planners for municipal spatial plans as well as detailed maps with optimal and possible habitat structures for reaching favourable conservation status
- The practical development of ecological network plan include remote sensing, field research and DNA analysis for hermit beetle (*Osmoderma barnabita*) to analyse structure of populations and metapopulations.





Research methods:

- Before field works remote sensing data and cartographic material was analysed





Research methods:

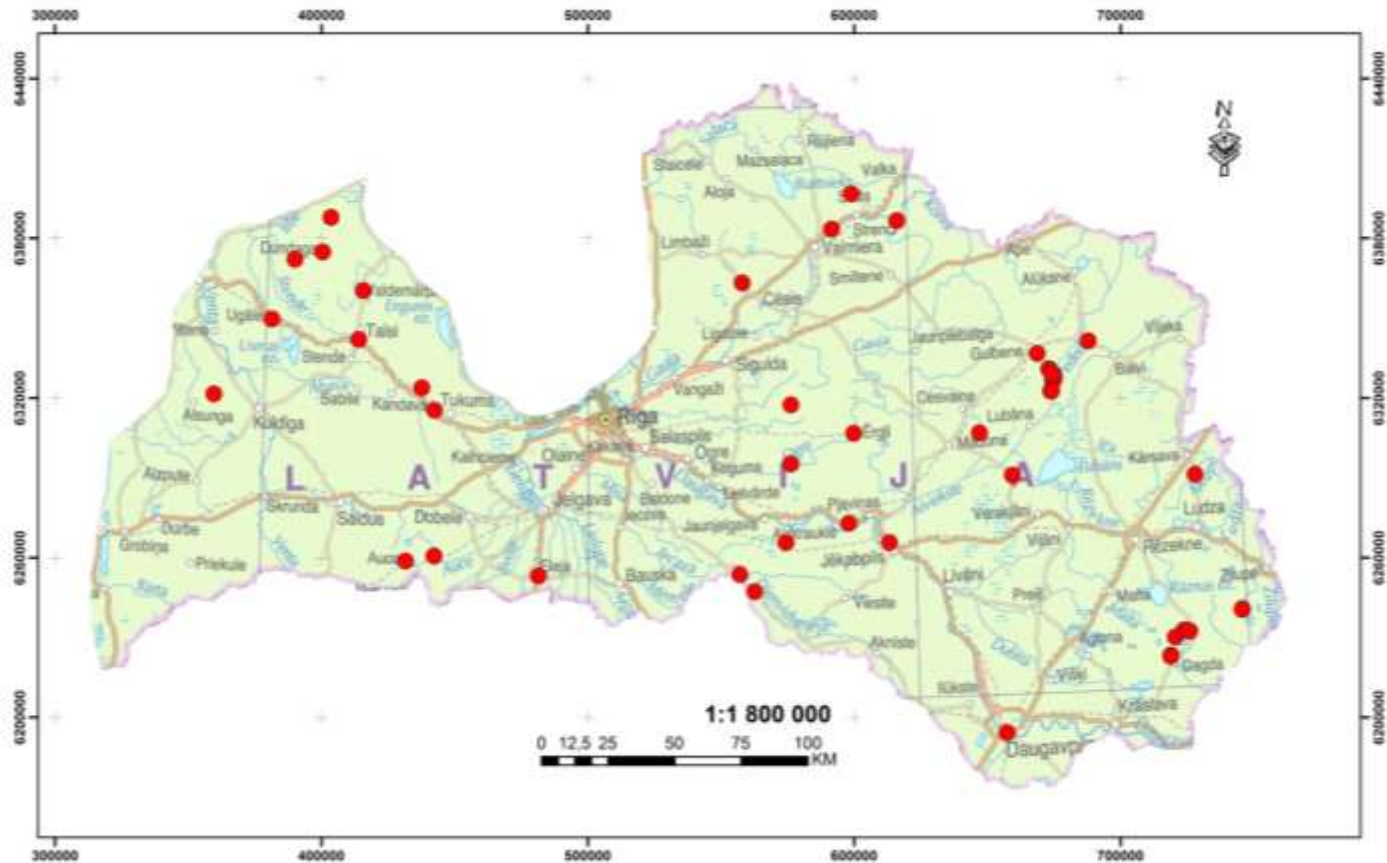
- The permit issued by the Latvian Nature Protection Board was obtained. It allows the collection of invertebrates during field research;
- To carry out the field research of *Osmoderma barnabita* pheromone traps with pheromone (R)-(+)-gamma-Decalactone have been used.



- To clarify the time when beetles flying season starts, we placed several «control traps» in well-known localities every year;
- When first individuals emerged in control traps, we placed pheromone traps also in other localities.



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Pheromone traps were mounted in 37 locations (148 hollow trees).

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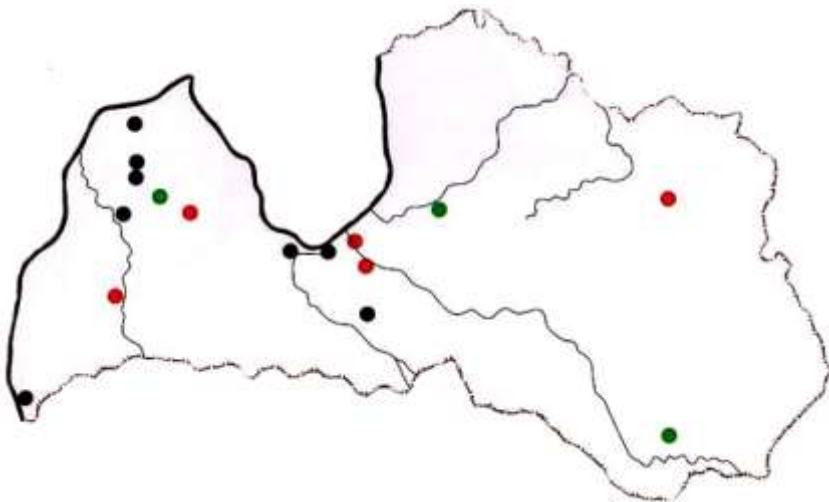


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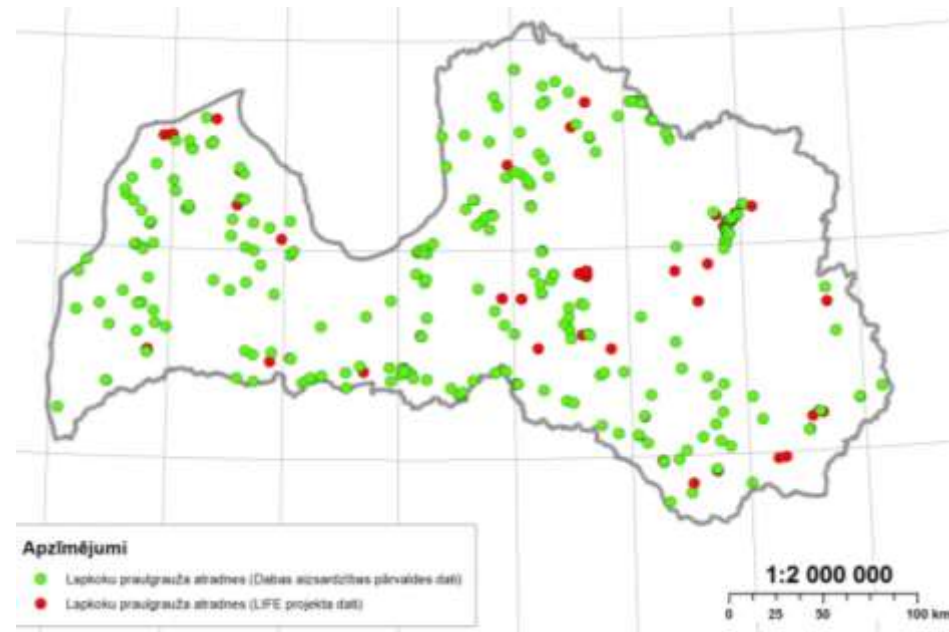


Results

- In total 246 individuals (108 males and 138 females) from 32 localities were sampled during investigations. 27 of localities were newly discovered.

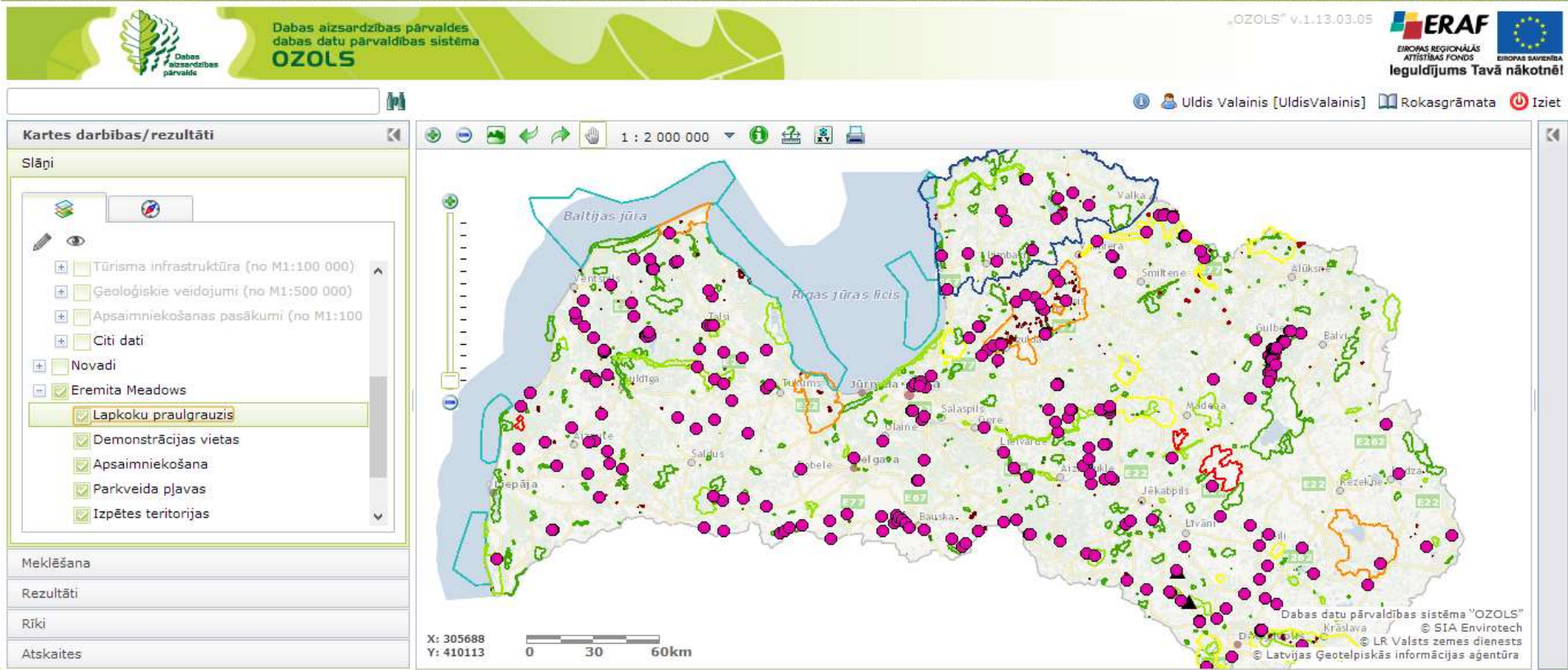


1998





→ Mapping and development of interactive GIS database of hermit beetle



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Hermit beetle habitats in Latvia*

Habitats	%
Oak forests	21%
Rural parks	20%
Wooded meadows	14%
Alleys and rows of trees	10%
Mixed oak, elm, ash forests of river floodplains	10%
City squares and parks	10%
Forests of slopes, screes and ravines	7%
Secular trees	6%
Black alder wetland forests	1%
Cemeteries	1%

*According the species action plan (2005) and LIFE+ project «EREMITA MEADOWS» data



Hermit beetle inhabited tree species in Latvia*

Tree species	%
<i>Quercus robur</i>	~48%
<i>Tilia cordata</i>	~31%
<i>Acer platanoides</i>	~19%
<i>Ulmus glabra, U. laevis</i>	~3%
<i>Fraxinus excelsior</i>	~2,5%
<i>Aesculus hippocastanum</i>	~2%
<i>Alnus glutinosa</i>	~1%
<i>Pinus sylvestris</i>	~0,5%

*According the species action plan (2005) and LIFE+ project «EREMITA MEADOWS» data



→ Marking experiment with hermit beetles in 2013.

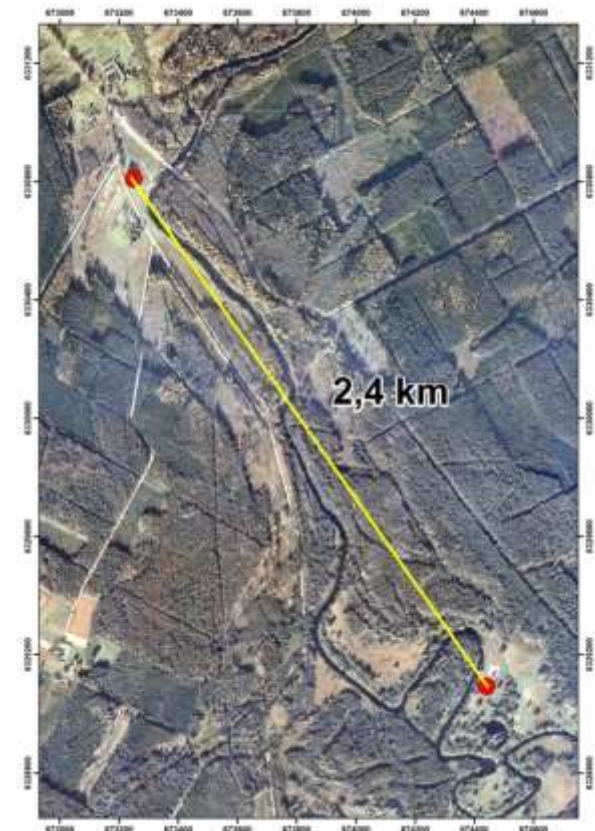
During this study pheromone traps were placed in 11 hollow trees. In total we captured and marked 27 individuals





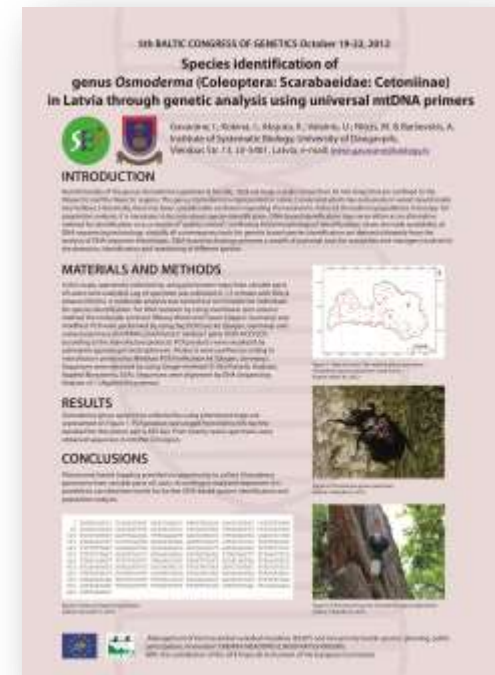
Results of marking experiment

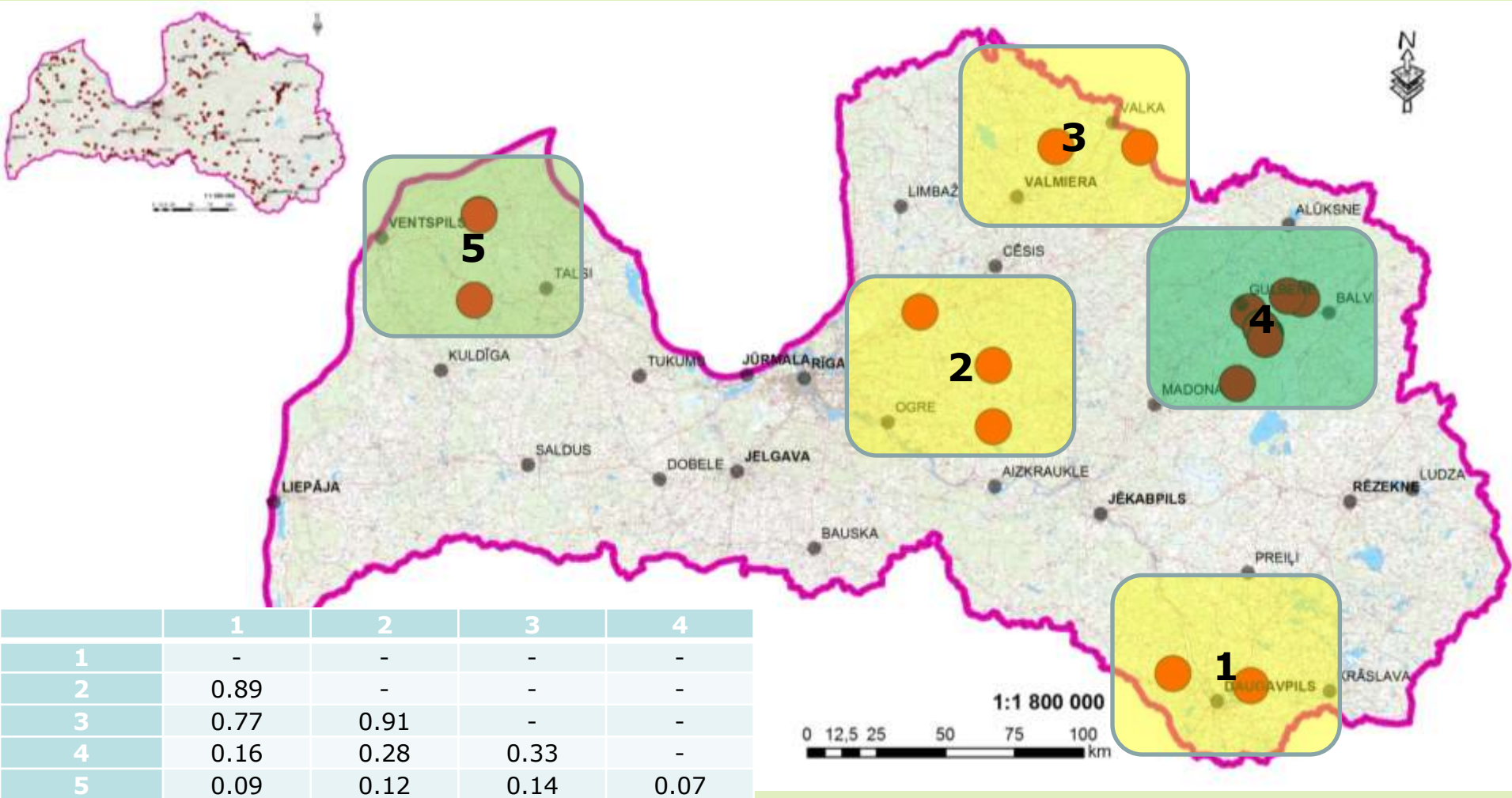
- Three individuals (2 males and 1 female) were recaptured during our experiments. One of the specimens was found 2.4 kilometers from the place where it was released. It is longest registered dispersal distance using the capture-mark-recapture method.





Results of studies of *Osmoderma* genus specimens







Implemented practical activities during project for Ecological network plan of saproxylophagous beetle species

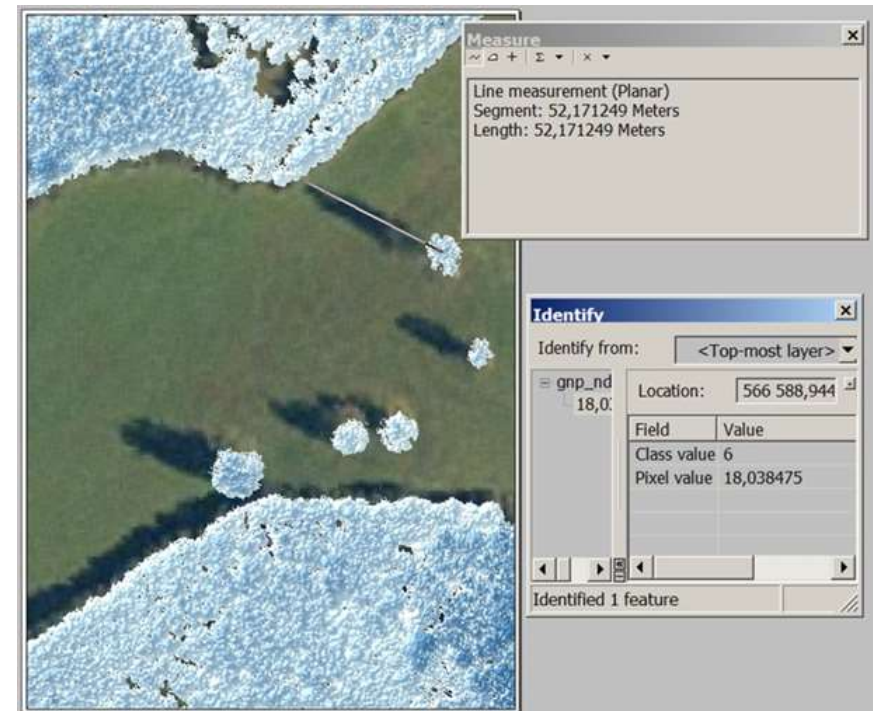
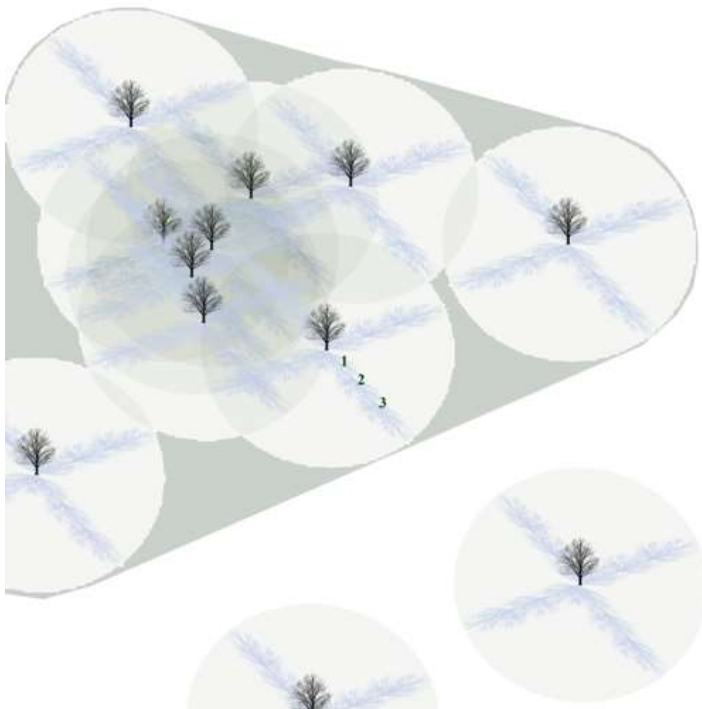


→ Training of nature rangers in biodiversity conservation in Fennoscandian wooded meadows (6530*) and old-growth forests





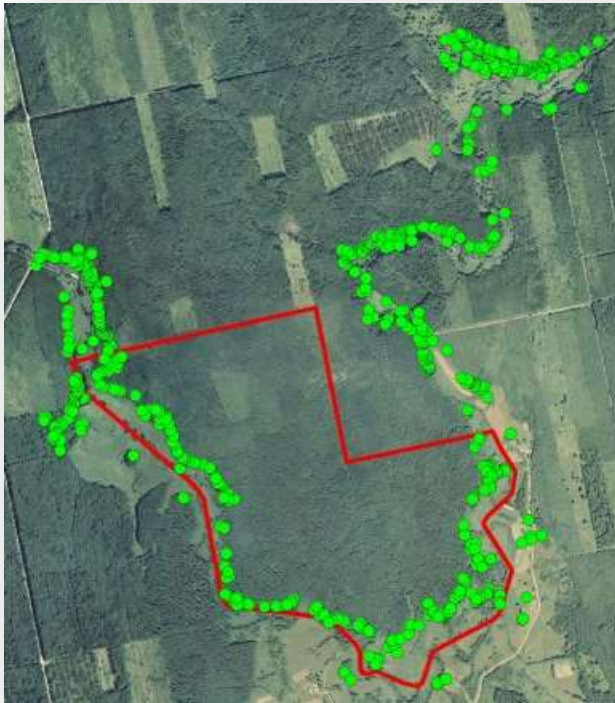
→ The methodology of detail habitat mapping developed

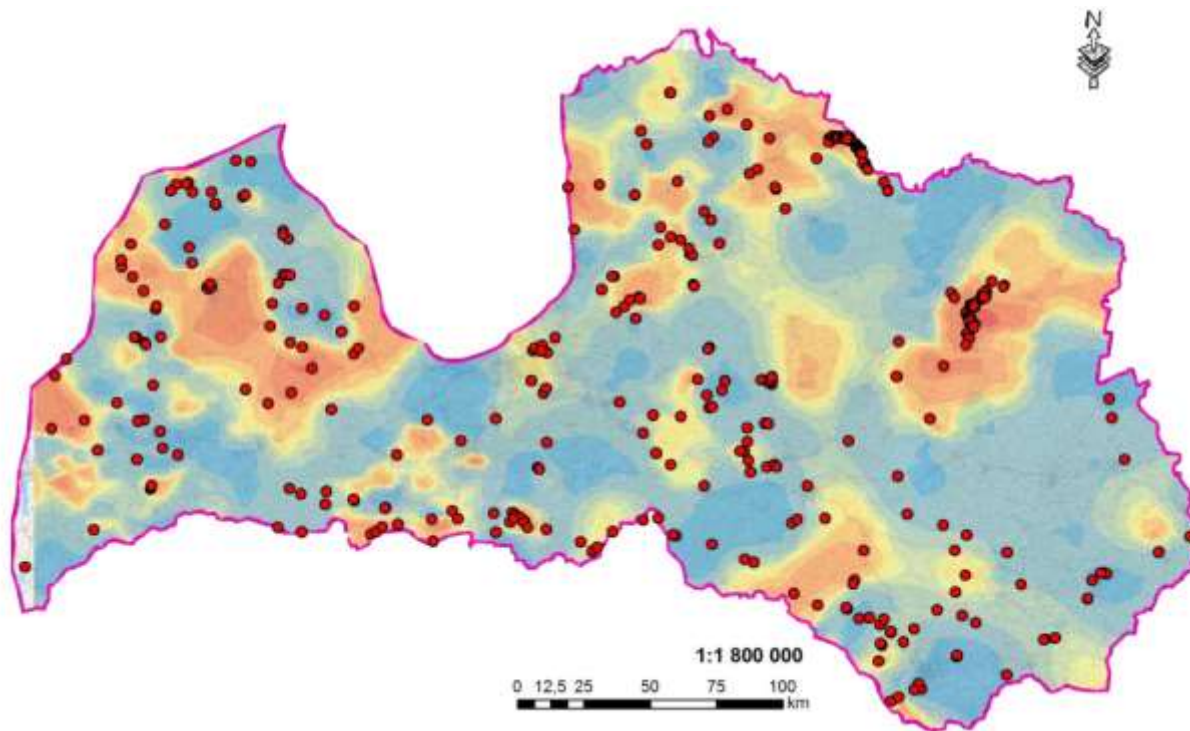


The scheme of determination of habitat poligone

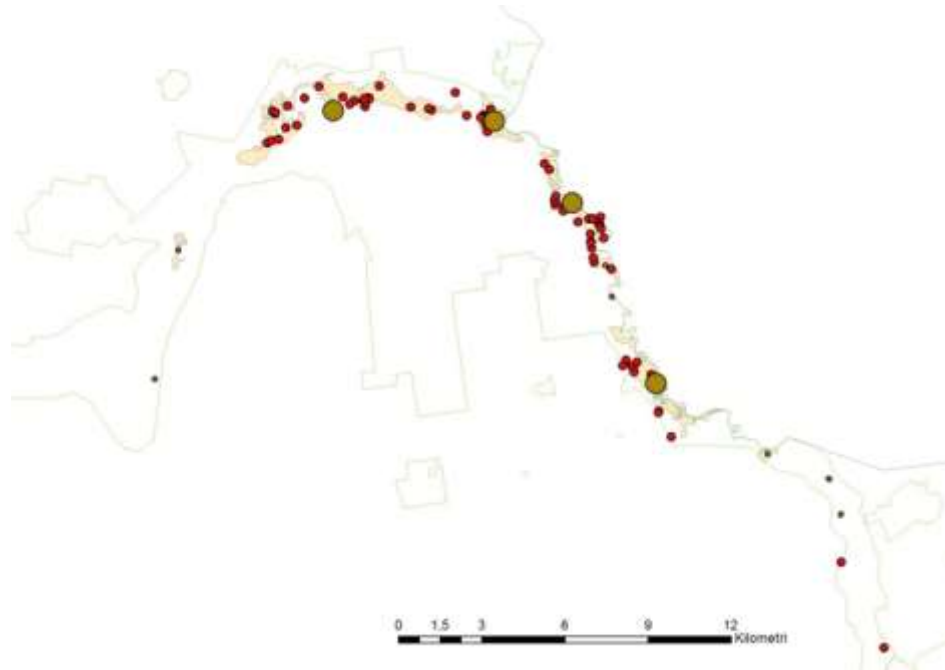


→ Methodology approbated by detailed oak mapping in nature reserves «Eglone» and «Lubānas mitrājs»(Pededzes lejtece)





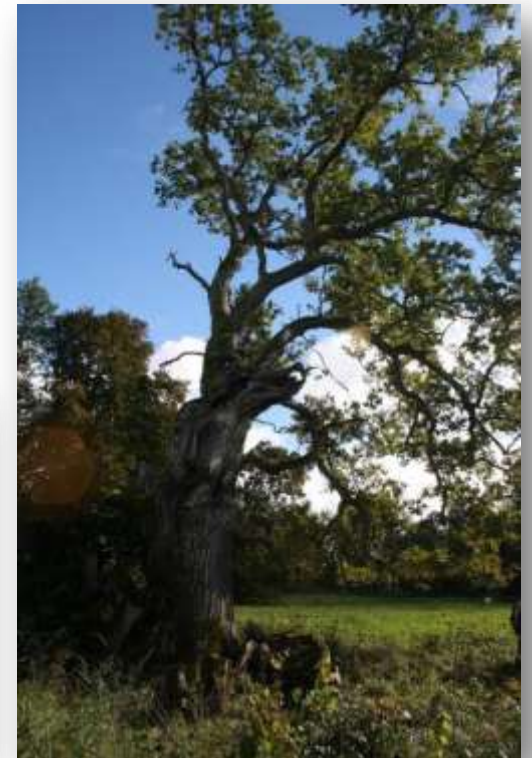
Map of Hermit beetle and suitable habitats distribution in Latvia



Detailed planning for hermit beetle (*Osmoderma barnabita*)
habitat management activities



- Restoration and primary mowing of Fennoscandian wooded meadows (6530*). The management of biologically valuable large dimension trees – habitats of *Osmoderma eremita*





➔ **Exhibition about Fennoscandian wooded meadows (6530*), *Osmoderma barnabita* and *Phryganophilus ruficollis***



Exhibition «Life in the tree» in Slītere National park



Thank You for attention!



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