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Prediction of forest fauna in the area of Börzsöny Mountains, biotic data analysis

Content

1. Introduction

The fauna of Börzsöny - a system comprising protected and/or species of Community importance with a short, concise description, a list of protected and/or species of Community importance, compiled with a list of nature conservation indicators, and national or regional nature conservation indicators. highlighting and evaluating species of significant importance.

The methodology of the biotic data analysis was based on the Hungarian National Biodiversity Monitoring System's methodology.

Taxonomic classification of the discussed units:

ARTHROPODA
- Saproxylic insects (Coleoptera)

VERTEBRATES
- Birds (Aves)
- Mammals (Mammalia)
  - Erinaceomorpha
  - Soricomorpha
  - Bats (Chiroptera)
  - Rabbits (Lagomorpha)
  - Rodents (Rodentia)
  - Carnivores (Carnivora)
  - Artiodactyla

2. Birds (Aves)

Nearly half of the members of the Hungarian bird fauna (440 species) occur more or less regularly in the Börzsöny Mountains. The number of regularly or occasionally nesting species is around 120. However, species richness is severely limited by the fact that, except for a few smaller stagnant waters, typically of artificial origin or maintenance, there is virtually no wetland in the area.

Börzsöny is a somewhat neglected or rather misunderstood area in Hungarian ornithological research. In the decades before the turn of the millennium, the mountains were (recognized) solely in terms of birds of prey species (NAGY 1998, VARGA et al. 1999). In addition to the small number of informative publications, the research material processing the entire avifauna (manuscript type) was produced only during the preparation of the Danube-Ipoly National Park, but its emphasis also reflects the previous approach (VOJNITS 1993). Other bird species previously considered valuable from a conservation point of view, such as the Tetrastes bonasia, the Cinclus cinclus or the Monticola saxatilis, can only be traced back to the establishment of the Börzsönyi Landscape Protection Area almost half a century ago. inborn materials - or not even mentioned in them! Unfortunately, the most recent scientific publication on zoology (VOJNITS - CSÓKA 2014) also provides little support, and the validity of the information contained in it is almost four decades ago.

In recent decades, how professional data is published has also changed: instead of written and classically referenced literature, Hungarian field birds also publish their observation data via a website. Accordingly, the source of the faunistic data of the bird species is the interactive Internet ornithological database operated by the Pest District Ornithological Circle (PKMK): http://www.birding.hu (with data between 2000–2020; 6009 data) and the Danube-Ipoly National Park Directorate biotic database (OBM - status as of June 2, 2020; 26,842 data).

The bird species occurring in the design area come from 13 fauna areas. Nearly half of the species (40%) are pale arctic fauna, but European and European-Turkestan species are also present to a significant extent (32% in total). Holarctic (9%) and Old World (6%) elements are much smaller, and the species of the remaining fauna areas all account for less than 5%.

According to the latest data sheets of the World Conservation Union (IUCN), the bird species in Börzsöny belong to the Least Concern category, except four species. The red kite (Milvus milvus) and the bald eagle (Circus macrourus), which are very rare in the design area, are classified in the Near Threatened (NT) category. Both the great goda (Limosa limosa) and the former regular nesting falcon (Falco cherrug), which has been a rare guest in recent decades, both fall into the Vulnerable category.

According to the system of BÁLDI et al. (1995), the endangerment of the Hungarian bird fauna allows for a much more detailed approach. According to its classification, 19 of the 34 bird species among the 74 most endangered terrestrial vertebrates in Hungary have been confirmed in the planning area so far. Among the species that are slightly better than these but still highly

endangered (protected and/or of Community importance) are 32 species. A total of 26 species are considered to be moderate and 62 species are considered to be at low risk.

Name	Scientific name	Level of protection	Nature conservation value (HUF)	BD Annex	Priority
Black Stork	*Ciconia nigra*	SP	500000	I.	2
European Honey Buzzard	*Pernis apivorus*	SP	100000	I.	3
Red Kite	*Milvus milvus*	SP	500000	I.	2
White-Tailed Eagle	*Haliaeetus albicilla*	SP	1000000	I.	2
Short-toed Snake-eagle	*Circaetus gallicus*	SP	1000000	I.	2
Lesser Spotted Eagle	*Clanga pomarina*	SP	1000000	I.	2
Imperial Eagle	*Aquila heliaca*	SP	1000000	I.	2
Golden Eagle	*Aquila chrysaetos*	SP	500000	I.	2
Saker Falcon	*Falco cherrug*	SP	1000000	I.	2
Peregrine Falcon	*Falco peregrinus*	SP	500000	I.	2
Corn Crake	*Crex crex*	SP	500000	I.	2
Stock Dove	*Columba oenas*	P	50000	II.	3
Eurasian Eagle-Owl	*Bubo bubo*	SP	500000	I.	2
Ural Owl	*Strix uralensis*	SP	100000	I.	3
Black Woodpecker	*Dryocopus martius*	P	50000	I.	3
Middle Spotted Woodpecker	*Dendrocopte s medius*	P	50000	I.	3
White-backed Woodpecker	*Dendrocopo s leucotos*	SP	250000	I.	2
Gray Wagtail	*Motacilla cinerea*	P	50000	0	3
White-throated Dipper	*Cinclus cinclus*	SP	500000	0	2
Common Firecrest	*Regulus ignicapilla*	P	25000	0	3
Red-breasted Flycatcher	*Ficedula parva*	SP	100000	I.	2
Collared Flycatcher	*Ficedula albicollis*	P	25000	I.	3
Common Raven	*Corvus corax*	P	50000	0	3
Rock Bunting	*Emberiza cia*	SP	100000	0	3

Table 1: The most important bird species from the Börzsöny Mountains sub-area of the DINPD

Bird species of national importance (priority = 2)

- Black Stork (Ciconia nigra): Its domestic population is 350–400 pairs, of which 3–8 pairs nest in the Börzsöny. It prefers closed, large-scale forest stands with stream valleys.
- White-Tailed Eagle (Haliaeetus albicilla): A domestic population of around 300 pairs is on the rise. In recent years, he has appeared as nesting in the mountains: a couple of poets near Hont.
- Short-toed Snake-eagle (Circaetus gallicus): 1-2 pairs of the domestic herd of barely 50 pairs nest regularly in the mountains.
- Imperial Eagle (Aquila heliacal): its domestic population of around 200 pairs is also significant in Europe. The last domestic nesting pair lives in Börzsöny in a mountainous area.
- Peregrine Falcon (Falco peregrinus): This cosmopolitan species has been breeding in Hungary since 1997. He was one of the first to settle in Börzsöny, where he has been present in increasing numbers ever since. 10% of the Hungarian population of 50–70 pairs live in the mountains.
- Eurasian Eagle-Owl (Bubo bubo): Only 80 pairs are known in the country, of which 3–5 pairs nest in Börzsöny. It is a bird of rocky habitats, abandoned mines, but in some places, it is also believed to spend time in twig nests.
- White-backed Woodpecker (Dendrocopos leucotos): a significant part of its domestic population of about 250–750 pairs (approx. 100–120 pairs) lives in Börzsöny! At the domestic level as well, it is one of the most important highly protected species in the mountains, the preservation of which is a primary task!
- Red-breasted Flycatcher (Ficedula parva): lives in 40–65 pairs in Hungary. Börzsöny is the most important area for the species, the population here is 30–50 pairs. It is also a dominant species at the domestic level; the protection of its habitats is of paramount importance!

Bird species of regional importance (priority = 3)

- European Honey Buzzard. (Pernis apivorus): 5–7% of the domestic population of 800–1000 pairs spends in Börzsöny, mainly in oaks.
- Stock Dove (Columba oenas): Its domestic herd is around 10,000 pairs. A common species of the beech zone of Börzsöny, a significant part of the Hungarian population lives here.
- Ural owl (Strix uralensis): Its domestic population fluctuates between 100 and 300 pairs, 10% of which can be found in Börzsöny. It is a bird in the beech zone, but its feeding requires grasslands wedged between forests.
- Black Woodpecker (Dryocopus martius): Part of its domestic population of about 10,000 pairs lives in Börzsöny. It is a common species that spends mainly on beeches and beech-mixed stands.
- Middle Spotted Woodpecker (Dendrocoptes medius): has a domestic population of 16,000–22,000 pairs. It is a typical and common species of the oak forests of Börzsöny, indicating the quality of the habitat.

- Gray Wagtail (Motacilla cinerea): 300–600 pairs live in Hungary and the min. 10–20% in Börzsöny. Habitat quality indicators are found in almost all watercourses.
- Firecrest (Regulus ignicapilla): over 10% of the domestic population of 400–500 pairs nest in Börzsöny. Binds to (installed) lucos files.
- Collared Flycatcher (Ficedula albicollis): A significant part of the domestic population of 76,000–81,000 pairs lives in the mountains. It is also a common, common breeding species in beeches and oak-dominated stands.
- Common Raven (Corvus corax): 4,000–6,000 pairs live in Hungary. It is a common nesting species in Börzsöny, but we do not have accurate data on its population. It nests mainly in the beech zone, it typically prefers undisturbed forest stands.
- Rock Bunting (Emberiza cia): 10–20% of the domestic population of 500–750 pairs live in Börzsöny. Nesting of rocky habitats and andesite grasslands.

3. Mammals (Mammalia)

3.1 Erinaceomorpha

The only local species listed here, the Northern white-breasted hedgehog (Erinaceus roumanicus), which occurs sporadically in the deciduous forests and more open habitats of Börzsöny, is a protected but non-community interest species and has no special nature conservation significance.

3.2 Soricomorpha

Species in the area of Börzsöny (based on captures, visual observations, and owl sputum analyzes) has been confirmed. These are mostly species of animals that live a hidden lifestyle and are active at night, moving in the soil and algae level, in dense riparian vegetation or underground, and our knowledge of their occurrence and frequency in the area is therefore relatively incomplete. Sharks usually avoid closed forests but are more likely to be found in open and mosaic habitats, grasslands, bushes, wooded stands (in the vicinity of mountain ranges, and the vicinity of the internal clearing meadows of Börzsöny). While bicolored shrews (Crocidura leucodon) and Lesser white-toothed shrew (Crocidura suaveolens) - occur in relatively drier habitats, common shrew (Sorex araneus), dwarf terns, marshy meadows, highland meadows, and various wetlands. The Eurasian water shrew (Neomys fodiens) also lives close to water, living in the vicinity of forest lakes, small water bodies and water-bearing alders (partly also penetrating the surrounding forests). Finally, we refer to the presence of the European mole (Talpa europaea), which is widespread in Hungary, and which can be found everywhere in the grasslands and forests of Börzsöny (except for the rocky parts).

A total of 6 protected species are known to occur in the design area, but none of them are highly protected and of common importance. Based on the evaluation (prioritization) performed based on domestic occurrences and frequency data, only 1 species may have a special nature conservation significance.

Magyar név	Tudományos név	Level of protection	Nature conservation value (HUF)	HD Annex	Priority
Eurasian water shrew	*Neomys fodiens*	P	50000	0	0

Table 2: The most important conservation species of the Börzsöny Mountains subdivision of DINPD

3.3 Bats (Chiroptera)

A total of 24 protected and/or Community importance bat species are known to occur in the design area (Annex X), including 6 highly protected species - Mediterranean Horseshoe Bat (Rhinolophus euryale), Greater Horseshoe Bat (Rhinolophus ferrumequinum), Western barbastelle (Barbastella barbastell), Bechstein's bat (Myotis bechsteinii), Pond bat (Myotis dasycneme), truncated-eared bat (Myotis emarginatus). (All bat species are protected in Hungary!) 9 species of community importance are present, in addition to the already mentioned highly protected species, they also include the Lesser horseshoe bat (Rhinolophus hipposideros), the Lesser Mouse-eared bat (Myotis blythii), and the Greater mouse-eared bat (Myotis myotis). Based on the evaluation (prioritization) based on the Hungarian occurrences and frequency data, a total of 16 species have a special nature conservation significance.

Name	Scientific name	Level of protection	Nature conservation value (HUF)	BD Annex	Priority
Mediterranean Horseshoe Bat	*Rhinolophus euryale*	FV	250000	II., IV.	2
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*	FV	100000	II., IV.	3
Lesser horseshoe bat	*Rhinolophus hipposideros*	V	50000	II., IV.	3
Western barbastelle	*Barbastella barbastellus*	FV	100000	II., IV.	3
Alcathoe bat	*Myotis alcathoe*	V	50000	IV.	3
Bechstein's bat	*Myotis bechsteinii*	FV	100000	II., IV.	3
Lesser Mouse-eared bat	*Myotis blythii*	V	50000	II., IV.	3
Brandt-denevér	*Myotis brandtii*	V	50000	IV.	3
Pond bat	*Myotis dasycneme*	FV	100000	II., IV.	3
Geoffroy's bat	*Myotis emarginatus*	FV	100000	II., IV.	3
Whiskered bat	*Myotis mystacinus*	V	50000	IV.	3
Natterer's bat	*Myotis nattereri*	V	50000	IV.	3
Kuhl's pipistrelle bat	*Pipistrellus kuhlii*	V	50000	IV.	3
Soprano pipistrelle	*Pipistrellus pygmaeus*	V	25000	IV.	3
Brown long-eared bat	*Plecotus auritus*	V	50000	IV.	3

Parti-coloured bat	*Vespertilio murinus*	V	50000	IV.	3

Table 3. The most important bat species in the Börzsöny Mountains subdivision of DINPD.

3.4 Rabbits (Lagomorpha)

Of the 2 domestic species of rabbits, only the hare (Lepus europaeus) lives in Börzsöny. Its specimens are mainly found in open or mosaic habitats on the outskirts of the mountains, but they also appear sporadically inside the mountains ("forest rabbit"). Game species that can be hunted.

3.5 Rodents (Rodentia)

A total of 6 protected rodent species of protected and/or Community importance are known to occur in the design area (Annex X), including 1 highly protected species - the Forest dormice (Dryomys nitedula). Of the species of Community importance, 1 species is present, namely the Eurasian beaver (Castor fiber). Based on the evaluation (prioritization) based on domestic occurrences and frequency data, only 2 species have a special nature conservation significance.

Name	Scientific name	Level of protection	Nature conservation value (HUF)	BD Annex	Priority
Eurasian beaver	*Castor fiber*	V	50000	II., IV.	3
Forest dormice	*Dryomys nitedula*	FV	100000	0	2

Table 4. The most important rodent species in the Börzsöny Mountains subdivision of DINPD

3.6 Carnivores (Carnivora)

There are up-to-date data on the permanent or intermittent occurrence of a total of 7 protected and / or Community prey species in the design area, including 5 highly protected species - grey wolf (Canis lupus), wild cat (Felis silvestris), Eurasian otter (Lutra lutra), Eurasian lynx (Lynx Lynx), brown bear (Ursus arctos) are species of community importance, except the wildcat. Based on the evaluation (prioritization) based on the Hungarian occurrences and frequency data, a total of 4 species have a special nature conservation significance.

Name	Scientific name	Level of protection	Nature conservation value (HUF)	BD Annex	Priority
Wild cat	*Felis silvestris*	FV	250000	IV.	3
Eurasian lynx	*Lynx lynx*	FV	500000	II., IV.	2
Grey wolf	*Canis lupus*	FV	250000	II., IV.	2
Brown bear	*Ursus arctos*	FV	250000	II., IV.	2

Table 5: The most important predatory species in the Börzsöny Mountains subdivision of DINPD

3.7 Even-toed ungulates (Artiodactyla)

Among the species belonging to the taxonomic unit, no protected and/or species of community importance occur in the area of Börzsöny. The animal species to be included are the wild boar (Sus scrofa), the roe deer (Capreolus capreolus) and the red deer (Cervus elaphus), the mouflon introduced in the 1960s mouflon (Ovis aries), and, more recently, the fallow deer (Dama dama) from the surrounding hills. - game species that can be hunted, which cause nature conservation problems mainly due to their habitat use and increased population.

4. The saproxylic beetle survey

4.1. Introduction

The assignment consisted of two subtasks. Under the contract, Task A was to provide data on areas with little faunistic data in DINPD databases, focusing primarily on conservation-relevant and protected saproxylic beetle species. The second task, B, was to tour 160 sample hectares designated in the mountains and to survey the habitat types there, based on the methodology developed in advance. As our knowledge of the target group has so far focused primarily on attendance-lack data, the aim was to develop and test a methodology that has not yet been applied and approaches the topic from a different perspective. We hope that the results expected from this research will provide a more complex picture of the relationship and relationship between dead beetle species and individual forest areas compared to other background data.

4. 2. Antecedents of the research

A similarly comprehensive faunistic study was carried out in the area of Börzsöny in 2016, targeting the saproxylic, i.e. dead-toothed, beetle species. The staff of the Hungarian Museum of Natural History collected a significant amount of data, mainly on the more easily accessible forest areas, typically the parts accessible by car. A total of 351 saproxylic beetle species were identified by the researchers. Of these, 39 species were protected, 2 highly protected, and 6 Natura 2000 marker species (Merkl 2016). Preliminary consultations at that time did not define the area to be explored, so sampling was subjective. On the one hand, we targeted well-thought-out, more valuable, deadwood-rich areas - steeper, free from forestry interventions - in the hope of rarer and more valuable species. On the other hand, we also recorded data on many particularly common species, often from roadside piles. This assignment was more specific than before, both in terms of site designation and species surveyed. On the one hand, a significant part of the designated, data-deficient areas was far from easily surveyed, roadside forests, and on the other hand, it was clear at the beginning of the survey that it should focus on protected and rare species.

4. 3. Material and method

For the faunistic part of the task, the Client had previously designated a total of about 2,100 hectares of forest of various ages and conditions, which did not have many biotic data in the DINPI database.

Before concluding the contract for the Habitat Assessment, Part B, we developed a data sheet containing the most typical types of beetle habitats together with the Client. Habitat types were designated in each case by a protected / NATURA 2000 species or group of species, and their characteristics and companion species of the marker species were defined. The aim in

defining each type was to make it identifiable, even with some practice later for non-professionals.

1. Cerambyx-type standing tree: characteristics: Standing dead or dying tree. The aperture and passages of a Great Capricorn beetle (Cerambyx cerdo) are usually on standing, freshly dead, or still partially alive wood, bark separations are possible. Wood species: oak species, sweet chestnut. A condition that has existed for decades. It can be examined visually.

2. Gasterocercus-type standing tree: Standing dead tree. The round holes of the Gasterocercus depressirostris, perpendicular to the trunk of the tree, are individuals of dead oaks, freshly or long-dead, typically easily separated from the bark. Habitat disappearing in a shorter period (<5 years). It can be examined by invasive methods (decomposition).

3. Rosalia-type standing tree: Standing and lying dead tree, fresher. Thick (at least 20 centimetres in diameter) beech trees that are largely or completely (but not very long ago) dead, especially in the southern exposure, in a forest stand, or in an incompletely enclosed stand (part of the trunk must be sunny). The bark is present at first, later it falls, but the bark also shows the outcrops of the Rosalia longicorn (Rosalia alpina). Due to the chemical properties of beech, it disappears earlier (~ <7 years). It can be examined visually.

4. Cucujus-type standing or lying tree: Bark standing or lying dead tree. Also included are dead, often standing but recumbent strains whose bark is still intact but can be stretched by simple means or by hand. It usually develops in a shady, cool place. The surface under the bark is relatively "clean", not covered with thick humic debris, not woven with hyphae, and the sapwood and gesture are completely hard, with almost no passages of saproxylic. Flat larvae of the scarlet beetle (Cucujus cinnacinnabarin found in such places. Suitable habitat type for short periods (<5 years). It can be examined by an invasive method (bark decomposition).

5. Sinodendron-type recumbent deadwood: Older recumbent deadwood. White or yellowish-red rotting (but 2-3 rotting on a 6-point rotting scale), thick (at least 20 centimetres in diameter) strains, mainly beech, tall ash, and hornbeam, sometimes other deciduous species, but their fauna is much poorer. They are mainly found in places where the dead tree lies in the shade. In the case of beech, they are often formed by the fallout of Rosalia-type strains. Medium-term habitat type (5-10 years). It can be examined invasively (decay of deadwood).

6. Eurythyrea-type lying dead tree: A larger lying dead tree found in the oaks of the southern sides. They are often caused by the fallout of Cerambyx-type strains. Along their longitudinal cracks, moisture seeps into the sometimes Metallic Wood-boring Beetle (Eutrythyrea quercus), so they are twofold in terms of saproxylic species: the outer, exposed-to-sun-covered mantle of the bark of the bark is still hard. The inside is sufficiently protected so that the summer heat does not dry out completely and the rainwater does not flood it too much. Thus, red rot can start under favorable conditions. A condition that has existed for

decades. The fauna of the outer gesture mantle can be examined visually, the inner gesture part in an invasive way (decay of deadwood).

7. Ampedus-type strain. Lying dead tree, more rotten. Characteristic red-rotting, large-diameter deadwood, mainly oaks, ash, alder, bird cherry. They typically lie in more shady, humid places, with rot not only starting inside the bony hard outer gesture mantle but also visible from the outside. The bark is barely present on such strains, the rotten material can be disassembled by hand into plate-block pieces. Shorter or longer condition depending on the tree species. It can be examined invasively (decay of deadwood).

8. Protaetia-type nest: A nest standing on a tree. They are usually located at a higher height of the tree trunk but sometimes reach ground level. It occurs in almost any deciduous tree species in mountain forests. They can form on the outside (from mirror spots, injuries, in place of broken branches, in stumps), but also from the inside, from the dead gesture of old trees. The layers of their village, which range from a few millimetres to a few centimetres, are soft (rotting white or red), dismantled by hand, but behind it, the nest wall is hard to the living part of the tree. The shrubs of the Protaetia species that develop here are on the border of the soft and hard parts, and by consuming the hard part, they increase the volume of the nest. Falling rodents, their moors, and the remnants of their transformation enrich the substrate of the bottom of the nest, in which many mourning beetles, acorns, and other beetle species live. A condition that has potentially persisted for decades. It can be examined non-invasively by dredging.

9. Lacon-type nest: A nest standing on a living or dead tree. Red rot cavities that form mainly in oak species (possibly beech). They are dry and dusty at the top, but at the bottom, they contain large amounts of wood that are roughly homogeneous, wet, dark red, and can be broken down by hand. They can be in contact with the ground or higher. It is characterized by a large mass of white fungal filaments. The habitat is maintained for a variable period. It can be examined invasively (the original habitat cannot be restored during dredging).

10. Limoniscus-type bark: Usually a living tree, native. They are formed in oaks, maple species, less often in beech and ash, always in contact with the ground level. The bottom consists of dark-colored, wetter-drier, clayey and muddy lumps and masses soaked in tree sap. This debris often contains significant amounts of animal debris (insect remains, larval and pup skin, bones, hair, and feathers of small mammals, birds, and occasionally the remains of larger animals introduced by predators). From the upper layers of the burrow, the dark juices of the living tree are constantly dripping, giving the characteristic texture of the debris. It can be examined non-invasively by dredging.

The results could be identified based on the description of each type, but the presence of the marker species was not required in all cases. In practice, this meant that e.g. the Eurythyre standing/lying dead tree is only a “hit” if the characteristic flight openings of the species are found on the barkless, older oak trunk. De pl. in the case of the Ampedus standing/lying/piece of wood, larvae of several Ampedus species (acorns), possibly depleted by “infestation” with the Aesalus scarabaeoides (Figure 1) or the Gnorimus variabilis (Figure 2) the definition of the

type, so it's worth a hit. In the case of the Rosalia standing/lying dead tree, the criterion is the characteristic flight opening of the species, but in the case of Limoniscus it is “sufficient” if the substrate is necessary for its development, possibly co-species occurs. Thus, it is not necessary to disturb the habitat until the marker species is present, but the habitat type can be indicated faster and with less disturbance.

Figure 1: Aesalus scarabaeoides larvae ad imago

Figure 2: Gnorimus variabilis larvae ad imago

Figure 3: – Ischnodes sanguinicollis and Margarinotus merdarius

4. 4. Field sampling

As a task, I was constantly looking for potentially protected species and their life tracks during the tour of the areas and the designated one hectares. I recorded the location of each species on a GPS device, after the field days I entered it in the attached Excel spreadsheet with the following data: Hungarian name, Latin name, date, coordinate, detector and determinant, type of occurrence (larvae, imago, etc.).

I traversed the 160 areas marked in Problem B with sufficient thoroughness, from which I made a GPS track. During the tour, the habitat types were surveyed (10 species) indicated on the field data sheet (Table 1), estimated their number according to the given scale (AE), and the amount of each dead tree category - fresh/old logs, barked / barkless lying/standing deadwood I also gave. The comment section, briefly described each area, possibly suggested further faunistic studies if classified the habitat as valuable, or assumed the occurrence of additional "good" species.

SAMPLE PLACE ID: 034 2021.06.17	2021.06.17			
HABITAT CATEGORY IS NOT YET GOOD NO LONGER	**NO**	**NOT GOOD YET**	**GOOD**	**NO LONGER GOOD**
CERAMBYX FA			C	
GASTERO FA			B	
ROSALIA AHF				

Table 6: Example of filling in the field datasheet

On each field day, I recorded a track with GPS, which I attach as an appendix to the report.

4.5. Sampling methods

4.5.1 Observing adults drawing outdoors

I visually searched for adults drawing outdoors in potentially suitable habitats for each species. For example, in beeches, I was primarily looking for adults of the mountain beetle and the beech tree beetle on their dead host plants. In old oaks, I searched for active individuals of great heather and large stag beetle. Finding beetle species that live for a short period and only for a specific period is high weather, time of day, and period-dependent task. For example, I did not find an alpine woodpecker until July 12, even though I visited old beech forests, which is a typical habitat of the species. The first specimens, however, then appeared en masse, and their swarming lasted until about the end of July. And living with a big stag beetle and a great heroic squirrel, I usually noticed it in the late afternoon. If the afternoon was not in a middle-aged or old oak grove, I did not encounter any living specimens of the above two species. These beetles are relatively common in the Börzsöny area, but the above problem is exaggerated for the much smaller and rarer species. For example, Grynocharis oblonga and Pycnomerus terebrans (Figure 4) are relatively rare species of beetles that occur during the appropriate period, such as in the sultry, late afternoon period, during the peak period of their swarm, up to trees. this has happened on one occasion during research. But they tend to lead a more hidden lifestyle and can only be found with a thorough and time-consuming search. Due to the difficulties given as an example, I focused mainly on finding the outlets and the destroyed specimens and their remains. They can be detected for a long time, regardless of the time of day and the weather, and their short drawing period does not affect their detection.

Figure 4: Grynocharis oblonga and Pycnomerus terebrans)

4.5.2 Search for larvae and carcasses

Knowledge of the lifestyle of each saproxylic species is essential for the success of this type of faunistic study. Most species are only active for a few weeks, so it is much more practical to look for them in the larval form if the location of their development can be determined. Hairy stag beetles and coyote deer beetles (Sinodendron cylindricum) (Fig. 5) are very rare in the open, but their larvae are relatively easy to find in red and white rotting strains that are favorable to them, and even adult beetles are often found here. they rarely leave the stumps in which they developed. The species that develop in the woods also move little and are mainly hidden in the nest, often dying there. The larvae of the blue pimple (Fig. 6) or the larvae of the variegated scaly pimple, or their adults in good time - from August to March - are worth looking for almost exclusively at the site of their development.

Figure 5: Limoniscus violaceus corpse and a portrait of a male burrowing into a beech tree

Figure 6: Larvae and image of a Limoniscus violaceus

But the golden-haired scavenger (Necydalis ulmi). it is also more expedient to look for your adults, who live for a few weeks and are very difficult to get outdoors, in the form of a residue at the end of the season. Often, the remains of dozens of protected species can emerge from a single tree.

For example, in the warm-loving oak grove on the side of the Csarna Valley, the remains of five protected species in an older oak tree in just ten minutes of searching were found (Fig. 7). In the vicinity of the rotting stumps of old trees, it is worth looking for the carcasses of deer and flower beetle species that were destroyed in the previous season, or the rhino beetle, as they are much more likely to be found here (Figure 8).

Figure 7: remaining insect parts under a tree, on left to the right: Lucanus cervus, Lucanus cervus, Eurythyrea quercus and Dorcus parallelipipedus

Figure 8: remaining insect from an oak tree hole, on left to the right: Prionus coriarius, Dorcus parallelipipedus, Rosalia alpine, Necydalis ulmi, Protaetia aeruginosa, Tenebrio opacus and Neatus picipes

4.5.4 Detection of traces of life

In the case of beetle species that evolve through a characteristic fly-through in harder tree species, perhaps one of the most effective methods is to look for fly holes. The orifice of the oak ornamental beetle, adorned with glass-hard, barkless oak logs (Fig. 9), can remain in a well-identifiable condition for decades. The alpine woodpecker, which is always parallel to the longitudinal axis of the tree, has a characteristic shape (Fig. 10), which can be observed on beech, field maple, high ash, and hornbeam, proving the occurrence of the species in a given area for many years. The beech tree beetle is mainly identifiable on beech and hornbeam (Fig. 11), on the eight-point woodpecker linden species, on the ladder's woodpecker and relatives, on the oak species, and the walnut woodpecker

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Figure 9: Eurythyrea quercus and its flying holes

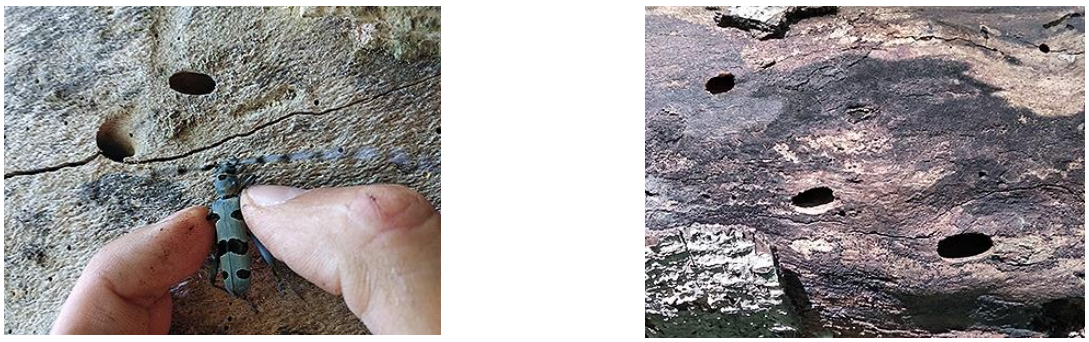

Figure 10 Rosalia alpina and its flying holes

Figure 11: Dicerca berolinensis and its flying holes

Figure 12: Cerambyx cerdo and its flying holes

4.5.3 Trapping

In the downy oaks of Rigó Hill in Nagymaros, I collected data using the wine trap method, among other things. Although this area was not included in the designated faunistic patches, I also recorded the data of rare and valuable species occurring and found it here in the species data table.

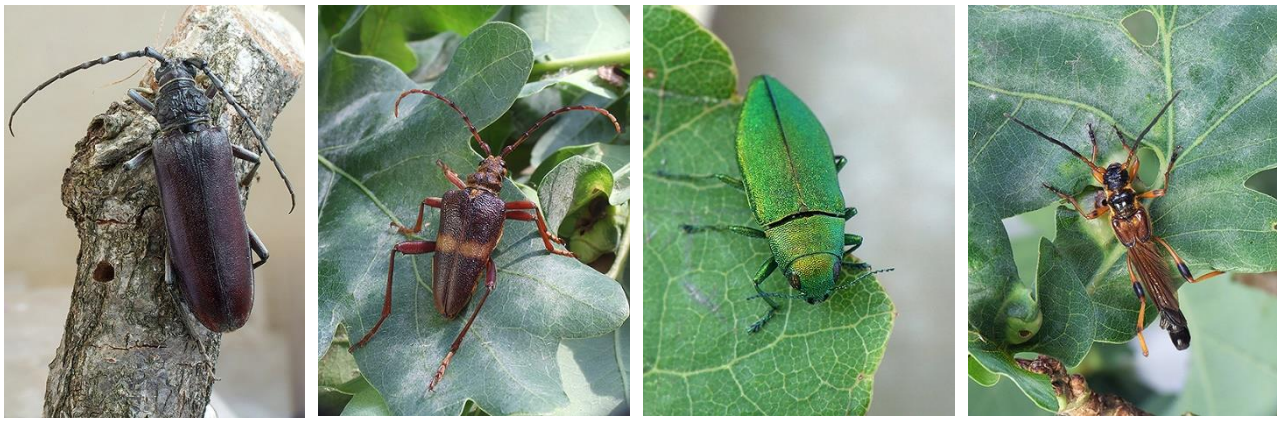

Figure 13: the protected beetles of the Rigó mountains, Nagymaros: Cerambyx cerdo, Akimerus schaefferi, Kisanthobia ariasi and Necydalis ulmi

5. Amount of work involved

I completed the task in 21 documented fields and approximately 12 office days between June 10th and September 1st, 2021. At first, I visited the sample areas two (rarely three) days a week, and then, as the swarming of the beetles declined — most of the species studied are drawn by the end of July — I switched to once a week. During the survey, I covered a total of about 5,000 hectares, covering an average of 15 km (rarely 20 km) per day on foot. Due to not only cost-effectiveness but also the size of the task and the late conclusion of the contract, I tried to make the field days as long as possible, in many cases exceeding eight hours a day. An early start in the summer heatwave made it easier to navigate difficult terrain, and prolonged working days increased the likelihood of encountering drawing species in the afternoon and early evening. I also recorded the coordinates of the protected and valuable species outside the sample areas, so much more than twice the amount of data undertaken in the contract was obtained (Figures 14–16).

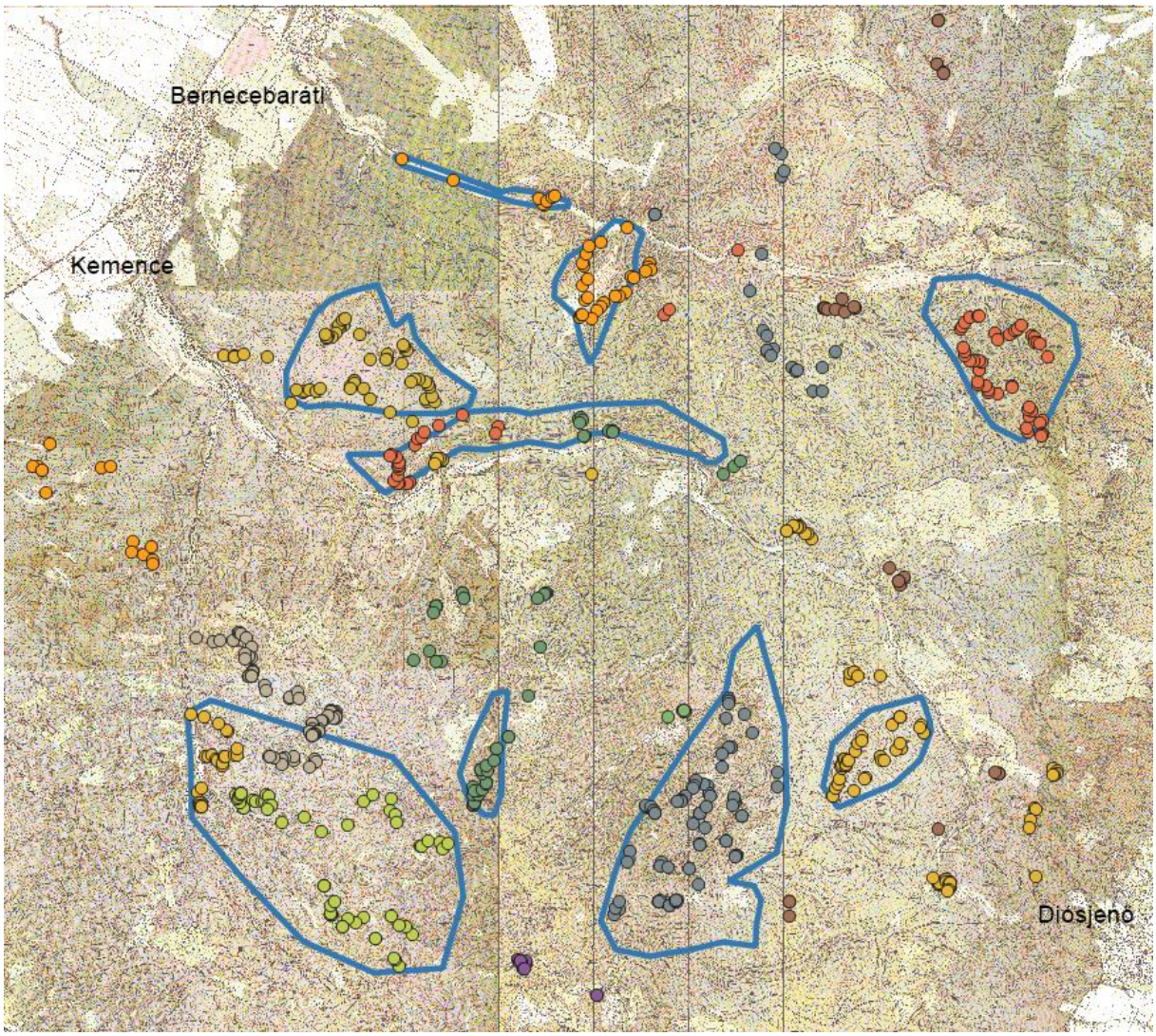

Figure 14: sample point in the Northern part of the Börzsöny mountains

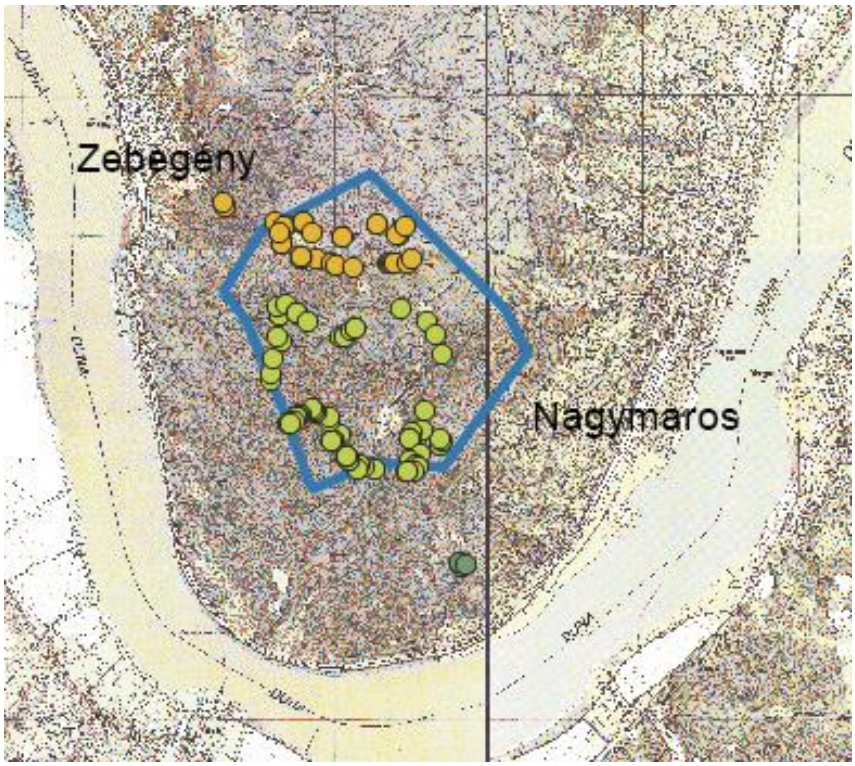

Figure 15: sample points in the middle part of the Börzsöny Mountains

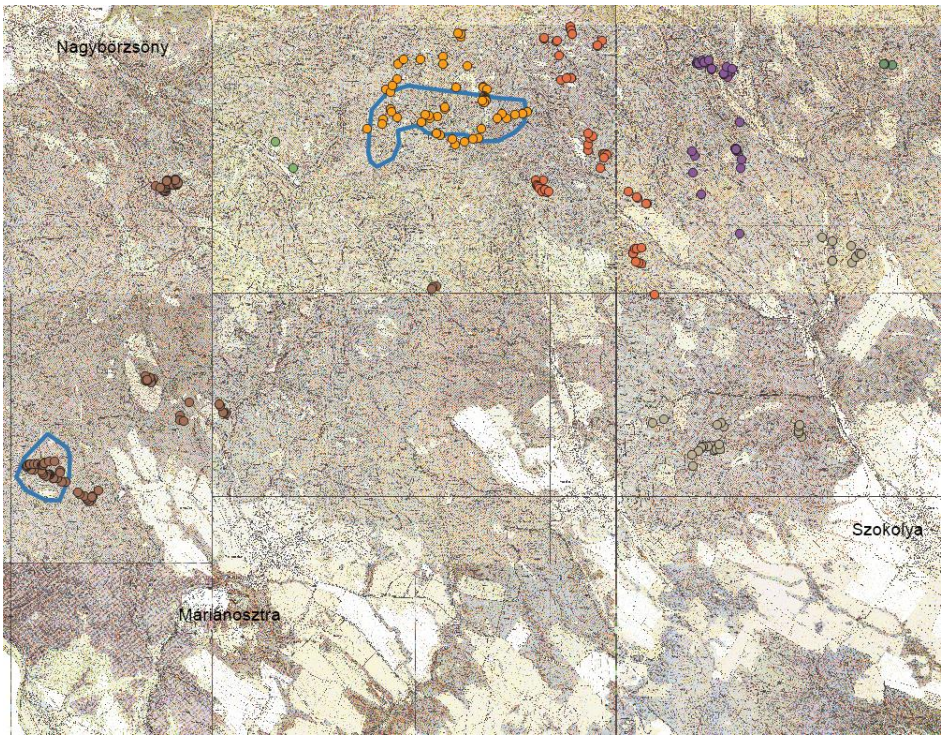

Figure 16: sample point at the Southern part of the Börzsöny Mountains

6. Results

Results Species numbers, protected and NAT 2000 marker species During the survey, I recorded 1190 data on a total of 107 saproxylic species, of which 38 are protected, including 6 NATURA 2000 marker species. I also recorded 13 occurrences of 6 protected but not saproxylic beetle species.

Scientific name	Level of protectin	Number of specimen
Acmaeodera degener	protected	2
Aegosoma scabricorne	protected	14
Aesalus scarabaeoides	protected	36
Akimerus schaefferi	protected	1
Ampedus quadrisignatus	protected	2
Camptorhinus simplex	protected	1
Cerambyx cerdo	protected, Natura 2000 species	141
Cerambyx scopolii	protected	5
Cerambyx welensii	protected	1
Coraebus fasciatus	protected	10
Cucujus cinnaberinus	protected, Natura 2000 species	29
Dicerca berolinensis	protected	59
Dorcus parallelipipedus	protected	73
Elater ferrugineus	protected	7
Eurythyrea quercus	protected	77
Gasterocercus depressirostris	protected	3
Gnorimus variabilis	protected	19
Kisanthobia ariasi	protected	1
Lacon querceus	protected	14
Lamprodila rutilans	protected	3
Limoniscus violaceus	protected, Natura 2000 species	36
Lucanus cervus	protected, Natura 2000 species	67
Necydalis ulmi	protected	3
Oryctes nasicornis	protected	1
Platycerus caraboides	protected	3
Protaetia aeruginosa	védett	38
Protaetia affinis	protected	4
Protaetia fieberi	protected	4
Protaetia marmorata	protected	10
Purpuricenus kaehleri	protected	2
Rhysodes sulcatus	protected, Natura 2000 species	2

Rosalia alpina	protected, Natura 2000 species	215
Saperda octopunctata	protected	16
Saperda scalaris	protected	23
Schizotus pectinicornis	protected	7
Sinodendron cylindricum	protected	29
Tenebrio opacus	protected	13
Trichoferus pallidus	protected	2

Table 2: Protected saproxylic beetle species found during the research

Approximately 50% of the measured data are from selected, data-deficient fauna patches, and some of the data are from one-hectare sample areas generated during or outside fauna patches during access to these areas.

7. Important species for the fauna

A significant part of the protected species found (38) are not rare beetles and are relatively easy to find based on their knowledge of their habitat. Based on the data of the Alpine Warbler (Rosalia alpina) 215, the Great Hornbill (Cerambyx cerdo) 141, or the Great Hornbill 67, we can assume that where there is a suitable habitat for them, their stable population occurs. The blue acorn (Limoniscus violaceus), previously known from a small number of sites (Fig. 6), now has some sites in Börzsö, and I have collected 36 data during the present research. Several protected species may be trapped en masse in red wine, but the application of this collection method was not the task of current research. Although all species of saproxylophagous species found in Börzsöny (Gnorimus variabilis, Protaetia aeruginosa, P. affinis, P. fieberi, P. marmorata) were found in the Börzsöny (Figure 15), they can be detected much more reliably and from several areas with wine traps. would be.

Figure 17: Protaetia aeruginosa, P. fieberi, P. marmorata) and P. affinis

This is also true for the protected night owl (Trichoferus pallidus), the blood warbler (Purpuricenus kaehleri) (Figure 16), and the protected species, which provide a lot of data without trapping, i.e. the great heather, the great stag beetle, and the to the mountain waffle.

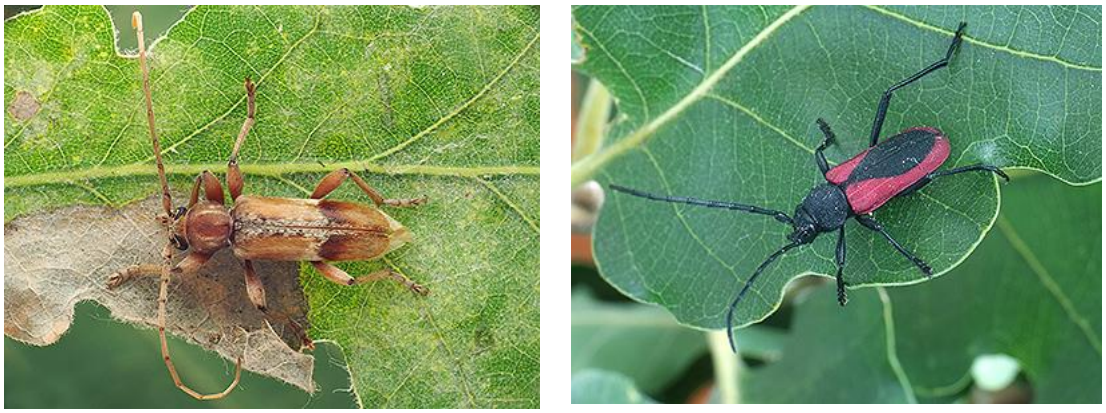

Figure 18: Trichoferus pallidus and Purpuricenus kaehleri

The above is also proved by the fact that the wine traps of Nagymaros - the area of which I have been researching for years, regardless of the assignment - captured almost all valuable saproxylic species that can be collected by this method in 2021 (Figures 12 & 15). The repeated avoidance of the Rhysodes sulcatus (Fig. 17) from the NATURA 2000 marker species, which pursues a hidden lifestyle, from the Szokolya: Iron Pot Valley and its new occurrence data from the Diósjenő: Nyír-meadow is a significant faunistic result.

Figure 19: Rhysodes sulcatus in its habitat at Vasfazék valley

Furthermore, the Olexa thorn-necked beetle (Hylis olexai) was also found in the Iron Pot Valley (Figure 18), which has only a few domestic data from Börzsöny. On the last day of the research, the typically early autumn false beetle (Hallomenus binotatus) was found (Fig. 18), which occurs only sporadically in Hungary.

Figure 20: Hylis olexai and Hallomenus binotatus

During the research, the European toothed beetle (Prostomis mandibularis) was found from three areas (Perőcsény: Csarna stream valley, Perőcsény: Drinó stream valley, Nagymaros, Szent-Mihály saddle) (Figure 19), a rarity known from Börzsöny since 2021. Together with its larvae, it occurs in red rotting stumps.

Figure 21: Larvae and imago of Prostomis mandibularis

The protected Ampedus quadrisignatus (Fig. 20) is sporadically known from the mountains, but its two recent data are also valuable hits. The above also applies to the Necydalis ulmi which develops in oak and beech horns, and its data on two dead specimens are an important faunistic result. The larvae of the Reitterelater dubius (Fig. 21) were found in two places (Letkés: Nagy-Galla, Kemence: Nagy-Oros-mercc). This species, like the willow snail, develops in large-volume bogs, typically those where many flowering beetle larvae have lived for a long time, and their faeces and rodents form a thick layer at the bottom of the burrow. It has been found several times in Hungary and abroad in a nest where the Osmoderma barnabita lives (Németh et al 2016).

Figure 22: Ampedus quadrisignatus and larvae

Figure 23: Reitterelater dubius and larvae

The larvae of the willow woodpecker (Elater ferrugineus) (Fig. 22) were found from 7 sites, while the larvae of the variegated woodpecker (Lacon querceus) (Fig. 23) were found from 14 sites.

Figure 24: Elater ferrugineus and larvae

Figure 25: Lacon querceus and its larvae

The plain corpse (Camptorhinus simplex) (Fig. 24) has only a little data in the mountains. I knocked the rare and protected species, which also flies well in the light, from dry oak near the Furnace on June 11th.

Figure 26: Camptorhinus simplex

The Eurythyrea quercus (Fig. 9) is a nationally rare species but is more and more extensive faunistic surveys, it appears that it is found in most of our sunny, dead-tree-rich, older oak forests. The 77 data collected during the research refer to outflows on barkless oak in all cases except for one dead animal. Much less data is known about the Acmaeodera degener; Although the Cucujus cinnaberinus is not a rare species, it is mainly characteristic of our soft groves and planted summers. In the course of the research, I found it relatively rare for a dead tree with a detached bark suitable for it, yet 29 larval data were found, mainly from under linden and beech bark (Fig. 25). The larva of the Schizotus pectinicornis lives in a similar habitat, the characteristic larva of which I encountered 7 times (Fig. 25).

Figure 25: Larvae of the Pyrochroa coccinea and Schizotus pectinicornis in the same habitat under the beech bark and Cucujus cinnaberinus larvae under the lime bark

From a beetle faunistic point of view, a notable result has been obtained that can be attributed to non-saproxylic beetles. Within the administrative boundary of the kiln, on August 2, a previously unknown Meloidae was found on the rocky grass near the Table Stone. The Stenoria analis, which occurs in several European countries, develop in the nest of bee species and is active in late summer. Without this assignment, the fauna of Hungary would not have been enriched with this species, a publication on the beetle is expected at the end of 2021.

8. General conclusions

The faunistic data collection defined in Task A, which requires a lot of expertise and time, should be continued, especially in the older forest stands, as this way we can get an increasingly accurate picture of the beetle fauna of the mountains.

By further fine-tuning the sampling protocol used in Task B, a methodology that examines this difficult target group can be developed and developed. Without having to rely on extremely difficult-to-determine absence data, the occurrence of individual species can be indicated by more complex habitat definitions. Furthermore, the recorded data, together with the data from the forest condition surveys, can provide a complex picture of each area.

In the excel table attached to the report, we indicated the promising habitats we visited during the assignment, and we think it is worth pursuing further faunistic studies. There is a good chance that valuable and interesting species can be found in these areas. Such areas can be divided into two types. Codings 1, 4, 11, 13, 15, 18, 19, 49, 61, 155 are typically older, oak-rich, sunny, steep, old steep oak areas where the beetle species found in such habitats would almost certainly occur using the wine trap method. Areas 16, 17, 27, 28, 35, 36, 39, 41, 79 are more closed, older beeches and debris slopes with many different types of deadwood, where you can find valuable species with a detailed search from autumn to early spring.

9. Literature

MERKL O. 2016: On the survey of dead beetle species in Börzsöny and selected parts of the Mátra within the framework of the tender (SH / 4/13) won in the Swiss-Hungarian Cooperation Program entitled "Multi-purpose assessment of the condition of forest communities in the Hungarian Carpathians". Research report.

NÉMETH T., LAUŠ B. & TALLÓSI B. 2017: New distributional data on Elateroidea (Elateridae and Eucnemidae) for Albania, Bulgaria, Croatia, Greece, Macedonia, Montenegro and Serbia. – Folia entomologica hungarica 78: 47–56.

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