Евразиатский энтомол. журнал 25(3)*: 164–175; прил. 4–12*
doi 10.15298/euroasentj.25.03.10

Diversity of beetles (Insecta: Coleoptera) in a drained peatland in the south-eastern Baltic region: an attempt at quantitative assessment

Разнообразие жесткокрылых насекомых (Insecta: Coleoptera) на осушённом торфянике в юго-восточной Прибалтике: попытка количественной оценки

V.I. Alekseev
В.И. Алексеев

Immanuel Kant Baltic Federal University, A. Nevskogo Str. 14, Kaliningrad 236016 Russia. ORCID: 0000-0003-4390-5443. E-mail: alekseew0802@yahoo.com
Балтийский федеральный университет им. И. Канта, ул. А. Невского 14, Калининград 236016 Россия.

Key words: Beetles, diversity, sampling, ecological indices, species richness.
Ключевые слова: жуки, разнообразие, отбор проб, экологические индексы, видовое богатство.

Abstract. In total 3181 individuals of 358 species from 49 families were recorded during a study of the fauna and abundance of beetles in an abandoned cut-over peatland in 2024. The data were obtained using various sampling methods and were then compared with each other and with the faunal materials collected during the previous year. Annotated species list is presented. Six ecological indices (the Margalef's and the Menhinick's species richness, the Berger-Parker dominance, the Simpson's dominant concentration, the Shannon-Weaver biodiversity, and the Pielou's evenness) were calculated for the general coleopteran assemblage, as well for assemblages sampled by different methods (pitfall trapping, sweeping by hand net in aquatic habitats). Different terrestrial biotopes studied by means of five pitfall lines were compared in terms of beetles' abundance, species richness, and diversity indices.

Резюме. В ходе исследования фауны и численности жуков на заброшенном выработанном торфянике в 2024 году было зарегистрирована 3181 особь 357 видов из 49 семейств. Данные были получены с использованием различных методов сбора и сопоставлены как между собой, так и с фаунистическими материалами, собранными в предыдущем году. Приведён аннотированный список видов. Значения шести экологических индексов: видовое богатство Маргалефа и Менхиника, доминирование Бергера–Паркера, концентрация доминантов Симпсона, биоразнообразие Шеннона–Уивера и выравненность Пиелоу, были рассчитаны для всей совокупности жуков, а также для совокупностей, собранных различными методами: почвенными ловушками, ручным сачком в водоёмах. Различные наземные биотопы торфяника, изученные с использованием пяти линий почвенных ловушек, были сравнены по обилию жуков, видовому богатству и значениям индексов разнообразия.

Introduction

Beetles are an important diversity component in different freshwater and terrestrial ecosystems, as well as in various wetland habitats, including peatlands as a wetland type characterized by accumulation of incompletely decomposed organic of plant origin (peat). The overall species composition and peculiarity of coleopteran populations in an ecosystem may indirectly reflect the intensity of accumulation or decomposition of organic matter and general complexity of community. Insects of the order Coleoptera play the important role of consumers of various levels, participating in the consumption of plants and subsequent stages of energy conversion in the ecosystem (being predators and parasites of other invertebrates, saprophages, necrophages, xylophages, etc.). The abundance and species richness of Coleoptera, the most species-rich insect order, as well as the role of beetles in biocenosis should not be underestimated and can be used for ecological assessment of an area and monitoring of a natural or anthropogenic succession. The general state of ecosystem or some characteristic environmental conditions within biotope can be characterized either through a set of selected ecologically specific organisms (an indicator approach) or through the most complete as possible assemblage of species (a generalized inventory approach). Studying the entire assemblage of species (even within a single taxonomic group) is a more labor-intensive task than research of a limited number of stenotopic species, but presumably no less promising in terms of interesting results and possible general conclusions dealing also with the overall characterization of the territory. The present research is an attempt to study the biodiversity of an area within the framework of the second type, i.e. generalized inventory approach.

Several issues related to the study of the beetle fauna of different bogs and peatland ecosystems in Europe and in Baltic region were previously mentioned and discussed [Alekseev et al., 2024], so they will be omitted from this paper.

The resulted in the current study data can be used for comparative analysis of the biodiversity in: (a) peatlands

How to cite this article: Alekseev V.I. 2026. Diversity of beetles (Insecta: Coleoptera) in a drained peatland in the south-eastern Baltic region: an attempt of quantitative assessment // Euroasian Entomological Journal. Vol.25. No.3. P.164–175. https://doi.org/10.15298/euroasentj.25.03.10 **Published:** 31.vii.2026.

of various types and at different stages of succession (our results relate to a highly transformed, degraded community, very different from the natural state of a raised bog), (b) peatlands situated in geographical distinct territories (our results correspond to the south-eastern Baltic region), and (c) for paleoclimatic interpretation of fossil or subfossil coleopteran remains of different ages, first at all of Quaternary, preserved in peat. It seems logical to draw conclusions about the time remote ecosystems and their corresponding paleoclimates by comparing paleofaunistic data [Schafstall et al., 2025] with the statistically processed studies of the diversity in similar (i.e. peatland) ecosystems of Recent.

Materials and methods

General characteristic of sampling place

Geographical location. The territory of performed study, the Wittgirren peatland (54.799N, 21.658E) with a total area of 122 ha, is situated in the Slavsk administrative district of Kaliningradskaya Oblast (Fig. 1) southwards from the extinct village of Wittgirren (=Weißenbruch), 18 km SE of Bol'shakovo (=Groß Skaisgirren/Kreuzingen), and 6 km NE of the Vysokoe (=Popelken/Markthausen). The Wittgirren peatland (sometimes latinized as 'Vittgirrensky') is a ditched, drained, and heavily human-transformed raised bog, which was intensively used for commercial peat extraction in the second half of the XX century and abandoned by the beginning of the XXI century. In 2021, the area was declared as a Carbon Supersite ('Rossyanka') to estimate and monitor greenhouse gas fluxes, study biodiversity and test rewetting technologies for fire prevention, climate change mitigate and habitat restoration. A more detailed historical, geographical, and botanical account concerning the area has been given earlier [Alekseev et al., 2024].

Climate. The study area belongs has the strongly influenced by the Baltic Sea, mild, transitional, shifting from maritime to humid continental temperate climate: precipitation is relatively evenly distributed throughout the year, an average annual precipitation consists of 755 mm, an average relative humidity is about 79 %; an average annual temperature is +7.8 °C, and annual temperature amplitude is about 20 °C (between July and January).

Sampling methodology

The samplings were targeted for evaluation of diversity of Coleoptera in the Wittgirren peatland. The material presented in this paper was collected between February and November 2024 and is represented by adult beetles sampled using the following methods and equipment:

Pitfall trapping in different plant associations (1) (the 250 cm³ plastic containers without bait and with 50 ml 9 % acetic acid as a fixation liquid, placed in lines of 10 traps with a distance between traps of about 1 m) in period between 18 February and 13 November 2024 in six habitats. The sampling effort is 2690 trap-days in each habitat and a total of 16140 trap-days in studied area. Several containers were effective in attracting beetles from necrophagous community after the accidental capture of shrews, voles and lizards in the originally non-baited trap. The sampled material was removed from the traps once a month and examined in laboratory conditions. The six trap lines were placed in: (1) the N edge of the peatland (site with *Calluna vulgaris*, *Eriophorum vaginatum*, and *Betula* regrowth), (2) the central part of the peatland (site with *Betula* regrowth and green mosses, *Polytrichum* and *Campylopus introflexus*), (3) the central part of the peatland (site with bare peat in the nearest vicinity of line 2), (4) the SE edge of the peatland (site with *Calluna*, *Phragmites australis*, and *Betula* regrowth), (5 and 6) the SW edge of the peatland (wet habitat, sites with *Sphagnum* spp. and *Betula* regrowth), the line 5 is placed in site with *Eriophorum* and the line 6 is placed in the most wet site with *Juncus effusus*). Location of pitfall trap lines and visualization of studied terrestrial habitats are presented in Fig. 2 and Figs 3–7.

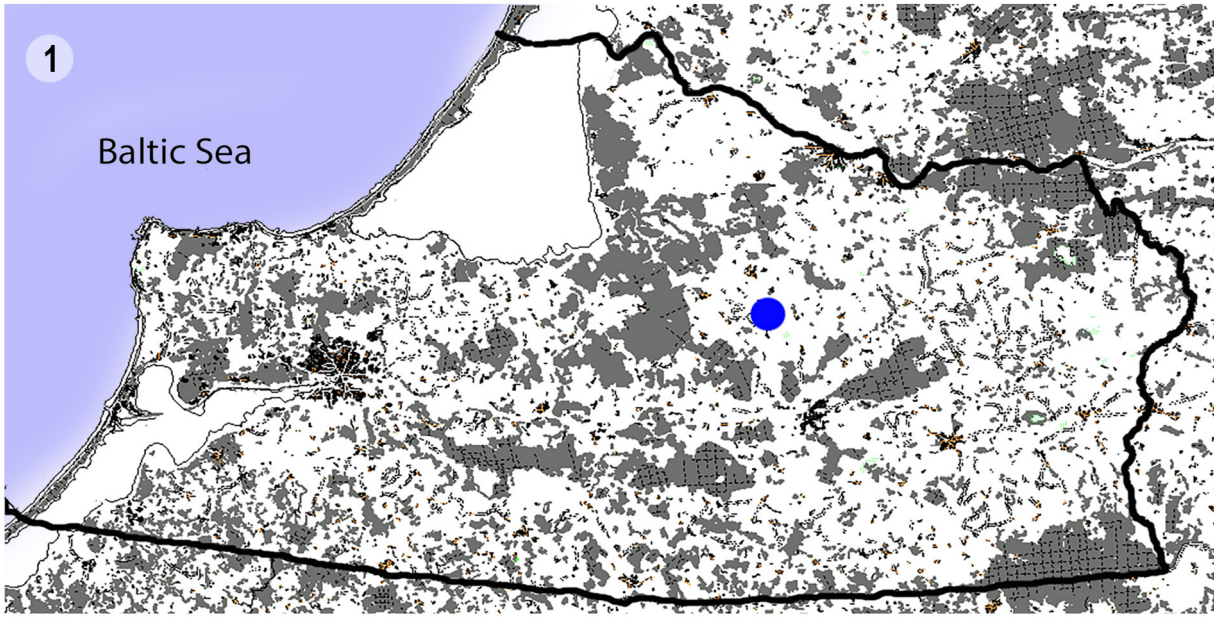
Sweeping with entomological net in different terrestrial or fresh water biotopes (2) during 9 field surveys (13–17.III, 10–14.IV, 15–19.V, 17–21.VI, 10–14.VII, 16–20.VIII, 18–22.IX, 16–20.X, 13–17.XI.2024), sweeping in a water body was standardized by the number of semicircular movements of the net submerged in water equal to 10, and sweeping on vegetation — equal to 50 semicircular movements. The photographs of several water body surveyed over two years are presented in Figs 9–14;

(3) visual search on vegetation, soil, fungi, as well as under pieces of wood and bark with hand collection during 10 field surveys (14–18.II, 13–17.III, 10–14.IV, 15–19.V, 17–21.VI, 10–14.VII, 16–20.VIII, 18–22.IX, 16–20.X, 13–17.XI.2024) with study time approximately 50 hours in total in different terrestrial biotopes of the studied area. The photograph of central road with rich ruderal vegetation, there the lot of findings has been made is shown in Fig. 8;

(4) sieving of the building material of a wood ant nest (*Formica rufa* complex) through sieve (16.III and 17.XI.2024), volume of each sample is equal to 3 liters.

Sampled material. In total, 3181 specimens of 357 beetle species were registered in 2024, absolute abundance of each species was documented and various ecological indices were calculated in order to determine the dominance structure and the general biodiversity of Coleoptera in the study area. Voucher specimens for all difficult to identification species are deposited in the private collection of the first author (Kaliningrad, Russia; abbreviation: CVIA). The specimens were identified by the author using the standard European identification key [Bieńkowski, 2004; Freude et al., 2004; Ryndevich, 2004]. The listed families and species within families are arranged alphabetically (by scientific name).

The results of a preliminary Coleoptera study of this area in 2023 with detailed description of slightly different collection methodology and the obtained data used



Figs 1–2. Location and typical habitats of the Wittgirren peatland. 1 — map of forest cover in Kaliningradskaya Oblast and location of the Wittgirren peatland (forests are grey, the peatland is showed with blue point); 2 — schema of the Wittgirren peatland and location of six pitfall trap lines (red dots, the numeration of the lines corresponds to the listed one in the paragraph 'Sampling methodology').

Рис. 1–2. Местоположение и типичные местообитания торфяника Виттгиррен. 1 — карта лесного покрова Калининградской области и местоположение Виттгирренского торфяника (леса отмечены серым, торфяник синей точкой); 2 — схема Виттгирренского торфяника и расположение шести линий почвенных ловушек (красные точки, нумерация линий соответствует таковой в параграфе «методология сбора»).

in the current paper as a comparison are given earlier [Alekseev et al., 2024]. Some significant details that may have caused the differences in the results of the two years of the study from the paper will be mentioned in the relevant sections when comparing the data.

4. Calculations from qualitative and quantitative data. The different ecological indices were calculated in accordance with following formulas.

(1) the Margalef's species richness index,

$$Dm = \frac{S-1}{\ln N};$$

(2) the Menhinick's species richness index,

$$Dmh = \frac{S}{\sqrt{N}};$$

(3) the Berger-Parker dominance index,

$$Dbp = \frac{Nmax}{N};$$

(4) the Simpson's index of dominant concentration,

$$Ds = \sum \frac{n^2}{N};$$

(5) the Shannon-Weaver biodiversity index,

$$Hs = -\sum \frac{n}{N} \times \ln \frac{n}{N};$$

(6) the Pielou's evenness index,

$$Hp = \frac{Hs}{\ln S},$$

where S is the number of revealed species, N is the total number of sampled individuals, Nmax is the number of maximally abundant species, and n_i is the number of individuals of a species;

(7) the Jaccard's index of community,

$$Kj = \frac{C}{A+B-C};$$

(8) the Sørensen's similarity index,

$$Ks = \frac{2 \times C}{A+B};$$

(9) the Ochiai' community index,

$$Ko = \frac{C}{\sqrt{A \times B}},$$

where A is the number of species in first sample (or in first year of sampling), B is the number species in second sample (or in second year of sampling), and C is the number of common species between first and second samples (or years).

The annotated species list of Coleoptera sampled in the Wittgirren peatland in 2024 is presented in the Appendix (p. 4–12).

The present work is registered in ZooBank (www.zoobank.org) under urn:lsid:zoobank.org:pub:896F1734-CA80-48AC-AE26-15B9AF3BAA88

Results and discussion

1. General assessment

The total diversity of beetles registered in the Wittgirren peatland in 2024 consists of 3181 individuals representing 357 species from 49 families. The alphabetically arranged species list is compiled and presented in Appendix. Of the collected material, 175 species (49 %) were 'new for the area' i.e. not recorded in previous year of sampling in the same area, whereas 99 species found in 2023 were not re-sampled in 2024, and 182 species were recorded in both 2023 and 2024. Thus, the results of adult beetle sampling in the area by the same single collector varied considerably between two years. The Jaccard's index of community (K_J) between the 2023 and 2024 species lists is equal to 0.39, while the Sørensen' (K_S) and Ochiai' (K_O) indices are equal to 0.57. The Jaccard's index of community between the lists of families from 2023 and 2024 is equal to 0.8, while the Sørensen' index and Ochiai' index are 0.89. The possible reasons for such a low correspondence between the two lists of revealed beetles assemblages from the same area are not obvious from a simple comparison of generalized characteristics and can be (a) subjective methodological or (b) dependent on external factors, such as fluctuations in weather or beetle populations. The reasons for the differences in sampling results and their significance can be clarified by a more detailed analysis of the differences between the used beetle sampling methods and a more detailed comparison of the results obtained using each method. These will be presented and discussed below. The total species richness of the order Coleoptera in the surveyed area (122 hectares) registered over two years consists of 456 species from 50 families, i.e., approximately 15% of the species of total Coleoptera fauna, inhabiting the entire Kaliningradskaya Oblast [Alekseev, Bulgakov, 2011].

The Margalef's species richness index (D_M) calculated for the 2024 data is 44.27; the corresponding Menhinick's species richness index (D_{Mh}) consists 6.35; the Berger-Parker dominance index (D_{BP}) with *Lochmaea caprea* as the most abundant species in 2024 is 0.14; the Simpson's index of dominant concentration (D_S) is 0.033; the Shannon-Weaver biodiversity index (H_S) is 4.57 bit; and the Pielou's evenness index (H_P) is 0.78. These are the values for all materials sampled in Wittgirren peatland in 2024. Most of the coleopteran fauna of the Wittgirren peatland does not belong to the natural fauna of undisturbed raised bogs, the highest species diversity is concentrated along central road with ruderal and ecotone plant communities.

Of the sampled in 2024 beetles, six families combined constitute more than 60 % of the total species richness and more than 60 % of the all individuals captured. These six dominant families, based on the 2024 data, are: Staphylinidae, Curculionidae, Carabidae, Chrysomelidae, Dytiscidae, and Elateridae. The Margalef's species richness index (D_M) and the Menhinick's species richness index (D_{Mh}) for these dominant groups were separately calculated (Table 1).

The dominance of five families (terrestrial Staphylinidae, Curculionidae, Carabidae, and Chrysomelidae, and aquatic Dytiscidae) in the studied area is generally similar to the 2023 data and can be suggested to be a confirmed characteristic of beetle assemblage for such type of biotope, i.e., disturbed peatland. The rather significant decrease in the recorded species diversity in Cantharidae (terrestrial biotopes) and in Hydrophilidae

Table 1. The most species-rich families of Coleoptera from the Wittgirren peatland in sampling of 2024
Таблица 1. Наиболее богатые видами семейства отряда Coleoptera в сборах 2024 года на Виттгирренском торфянике

No	Family	Species, S	%	Specimens, N	%	D_M	D_{Mh}
1	**Staphylinidae**	65	18.2	559	17.6	10.1	2.7
2	**Curculionidae**	42	11.7	122	3.8	8.7	3.9
3	**Carabidae**	39	10.9	273	8.6	6.8	2.4
4	**Chrysomelidae**	32	8.9	600	18.9	4.8	1.3
5	**Dytiscidae**	27	7.5	198	6.2	4.9	1.9
6	**Elateridae**	17	4.7	266	8.4	2.9	1.0
	In total	222	62	2018	63.4	29.2	4.9

(aquatic biotopes) was noted in 2024 (compared to the 2023 data). These variations are presumably external, i.e. related to weather conditions and associated fluctuations in groundwater levels and the drying up time of temporary water bodies. The change in the recorded species richness in other families (including 8 additional families collected in 2024 and the absence of the family Megalopodidae known from 2023) is definitely less significant and is presumably methodologically determined, i.e. resulted from the lack of a collector in the right place at the right time.

The most abundant species of Coleoptera sampled in 2024 are following: *Lochmaea caprea* — 435 spp., *Rhagonycha fulva* — 221 spp., *Ampedus pomorum* — 188 spp., *Sciodrepoides watsoni* — 91 spp., and *Anthobium unicolor* — 73 spp. The first three species were collected using various methods, while *S. watsoni* and *A. unicolor* were sampled only in pitfall traps. No absolute numbers of individuals were calculated in 2023, all these species were recorded ether 'abundant' (4 species) or 'occasional' (*A. pomorum*) in previous year. *A. pomorum* was recorded in 2024 in large concentrations associated with fresh boards deposited in different places of the peatland: it may be interpreted as selective olfactory attraction for this common, but less effectively collected by other methods, species. *R. fulva* was extremely abundant in ruderal biotopes along central road of the peatland in June–July, whereas other four species were numerous in strictly speaking peatland area and their populations are considered the most abundant for the abandoned peatland.

The sampling of adult beetles in 2024 was carried out using various methods, which differed in efforts and in terms of the obtained results. In 2024, 140 species (1,372 individuals) were collected using pitfall traps (effort equal to 16140 trap-days), 41 species (410 individuals) were collected using entomological sweep net in water bodies, 137 species (353 individuals) were collected 'by hand', i.e. recorded during the inspection of vegetation, wood, and soil surface during the approximately 50 hours of searching within the season. 68 species (app. 50 %) from the 'by hand' sampling method were recorded as single individuals, and 32 species (22 %) were represented only by two individuals. Of the 137 species detected by visual search, 37 species (27.5 %) were phytophagous, collected during a targeted search directly from their food plants, 13 species (9.4 %) were found on or under the food substrate (excrement, mushrooms, wood), 35 species (25.4 %) were collected relatively randomly from vegetation along the central road during the migration activity of adult beetles.

In 2024, additional ('new for the studied area') 175 species are reported, representing by 689 recorded individuals (i.e. 21.7 % of all individuals registered in 2024). Of the new species, 84 species (48.2 %) were collected only 'by hand', 48 species (27.3 %) were collected using pitfall traps, 8 species were collected using entomological sweep net in fresh water biotopes, 5 species were collected only by sieving, and 30 species (17.1 %) were recorded using at least two methods simultaneously. Of the new species, 143 (79 %) were represented by small numbers of specimens in samples (by 1 individual — 82 species, by 2 individuals — 39 species, by 3 individuals — 14 species, by 4 individuals — 8 species).

The calculations suggest, visual search on substrates could be effective for many species and for a general understanding of the possible species composition of the territory, but in general it is rather random and subjective, with data that cannot be subjected to rigorous statistical processing. Manual collection by visual inspection of substrates at different times of the day greatly distorts the real picture of community evenness due to the rather random (even with seasonally balanced effort) number of individuals of short-lived species in the adult stage and due to migrant individuals of a number of species from neighboring communities. In light of the discussion above, it was decided to calculate separately the data obtained by other methods, which can be more easily standardized, namely the pitfall trapping and the sweeping with entomological sweep net in fresh water biotopes. Diversity indices obtained from a summation of the data obtained from the different methods may reflect the general picture of species richness slightly better, but apparently do not reveal the actual numerical ratios of species as accurately. Additionally, the methods of pitfall trapping and of sweeping by entomological hand net in aquatic habitat can display the part of diversity, closer associated with peatland biotopes. The visual search was made in all plant communities within the whole territory, including the roadside ruderal plant communities and ecotone zone of birch stand, there a lot of eurybiontic species occur.

Figs 3–8. The typical terrestrial habitats of the Wittgirren peatland in different seasons of 2024. 3 — birch coppice with *Calluna* and *Eriophorum* (site of the pitfall line 1); 4 — birch coppice with sparse green mosses (site of the pitfall line 2); 5 — habitat with bare peat (site of the pitfall line 3); 6 — birch coppice with *Phragmites* and *Calluna* (site of the pitfall line 4); 7 — birch coppice with *Sphagnum* and *Eriophorum* (site of the pitfall line 5); 8 — central road with diverse ruderal vegetation.

Рис. 3–8. Типичные наземные биотопы Виттгирренского торфяника в разные сезоны 2024 года. 3 — молодые берёзы с *Calluna* и *Eriophorum* (место расположения линии почвенных ловушек No.1); 4 — молодые берёзы с неплотным покровом зелёных мхов (линия почвенных ловушек No.2); 5 — биотоп с непокрытым растительностью торфом (линия почвенных ловушек No.3); 6 — молодые берёзы с *Phragmites* и *Calluna* (линия почвенных ловушек No.4); 7 — молодые берёзы со *Sphagnum* и *Eriophorum* (линия почвенных ловушек No.5); 8 — центральная дорога с разнообразной сорной растительностью.

Figs 9–14. The typical aquatic habitats of the Wittgirren peatland in different seasons of 2024. 9 — wet plant association with *Sphagnum* and *Juncus* in the nearest vicinity of site of the pitfall line 6; 10–12 — different small drainage ditches drying up in summer; 13 — non-drying part of drainage ditch along central road, the most species rich aquatic habitat in the studied area; 14 — beaver dam on large marginal drainage ditch, natural wetland restoration in process.

Рис. 9–14. Типичные водные биотопы Виттгирренского торфяника в разные сезоны 2024 года. 9 — влажное растительное сообщество со *Sphagnum* и *Juncus* в непосредственной близости с местом расположения линии почвенных ловушек No.6; 10–12 — различные малые дренажные канавы, пересыхающие летом; 13 — непересыхающая часть дренажной канавы вдоль центральной дороги, наиболее богатый видами водный биотоп на обследованной территории; 14 — бобровая плотина на крупной краевой дренажной канаве, процесс естественного заболачивания территории.

2. Particular assessment: pitfall traps in general

The most objective and independent of collector' efforts and experience method of collecting terrestrial entomofauna among those used in 2024 is the stationary pitfall trapping. A weakness of the methodology is its ecological selectivity (i.e., it only captures actively moving adults on the soil surface) and its relatively limited spatial coverage. Furthermore, due to the random but fairly regular capture and death of small vertebrates in soil traps, this method of collecting creates conditions for concentrating the numbers of necrobiont beetles from the families Staphylinidae, Silphidae, Leiodidae, Dermestidae, and Histeridae, attracted to the traps by the scent of carrion. In any case, a separate analysis of the biodiversity results from soil trapping should be conducted and discussed.

In 2023, 104 species were sampled using pitfall traps, whereas in 2024 — 140 species. In total, 51 species from pitfall traps were counted as new in 2024, 48 new species were collected only by pitfall trapping in 2024, 15 species from the materials of 2023 were not re-sampled in 2024, and 89 species were recorded in both 2023 and 2024. The Jaccard index of similarity between the species lists obtained from pitfall traps in 2023 and 2024 is 0.57, the Sørensen index is 0.73, and the Otiai index is 0.74. The similarity of the assemblages in pitfall traps between years is significantly higher than the similarity of the total assemblages collected by all methods. Significant differences in the species composition caught by traps in 2023 and 2024 are explained by the fact that in 2024 the number of trap lines and surveyed sites was doubled (from 3 to 6 lines), sampling was carried out from February to November in 2024 compared to the sampling period of April to November in 2023, and, thus, the trapping effort increased from 6450 trap-days in 2023 to 16140 trap-days in 2024. It should be noted that in 2024, only two trap lines were left in the same biotopes, one trap line from 2023 was not re-used, and 4 lines were established anew to cover greater biotopic diversity.

Representatives of 140 species (39 % of the species list) from 24 families (49 %) were caught in pitfall traps in 2024. A total of 1372 individuals were caught (43 % of the total number of 2024). Of these, 51 species were not sampled in 2023. Six families accounted for a total of 78 % of the species diversity sampled using pitfall traps and about 92 % of the number of individuals of all beetles sampled in pitfall traps during 2024 (Table 2). Only two families, predatory Staphylinidae and Carabidae, remained dominant in terms of species and abundance, while two strictly soil-dwelling families with high abundance due to their attraction to pitfall traps (Silphidae and Leiodidae) appeared. The proportion of phytophagous beetles of the families Curculionidae and Chrysomelidae decreased in relation to the recorded species (Chrysomelidae) and individuals (Curculionidae). In addition, the family Byrrhidae (represented by 2 species with epigaeic adult and moos-feeding larvae) accounts for about 3% of all recorded individuals from pitfall traps.

The materials from the traps were identified to species level (S = 140), and all captured individuals were counted (N = 1372). The Margalef's species richness index (D_M) calculated for the total pitfall data of 2024 (S = 140, N = 1372) is 19.24; the corresponding Menhinick's species richness index (D_{Mh}) consists 3.78. The Berger-Parker dominance index (D_{BP}) with *Lochmaea caprea* as the most abundant species in 2024 (N_{max} = 357) is 0.26. The index is clearly higher for pitfall traps than the for total sampling methods in 2024 combined, which is due to the obviously higher abundance of birch trees, the fodder plant of the phytophagous *Lochmaea caprea* and the only tree species at all pitfall trap locations. The Simpson's index of dominant concentration (D_S) is 0.086. This index is evidently higher for pitfall traps than for the all materials of 2024 combined.

The Shannon – Weaver biodiversity index for pitfall traps in 2024 is 3.52 bits, the value is significantly lower than the result obtained for all sampling methods counted together, and the Pielou evenness index is 0.71, the value is approximately equal to that for all collections in 2024.

During the season, 9–16 families are caught in each trap line within a biotope, with 48–65 species and 161–395 individuals sampled in each biotope. New species are recorded in varying numbers for new and old sampling points without any patterns within the range of 4–12. The obligate families of pitfall traps (present in all biotopes) include Carabidae, Chrysomelidae, Curculionidae, Leiodidae, Silphidae, and Staphylinidae. Analysis of the dominance structure of the beetle community recorded by all pitfall traps in 2024 in six biotopes (140 species, 1372 individuals) showed the following results. Three species (*Lochmaea caprea* — 26 %, *Sciodrepoides watsoni* — 6.6 %, *Anthobium unicolor* — 5.3 %) were classified as dominant species (more than 5 % of the total number of individuals) in pitfall trap sampling methodic. Eighteen species were classified as subdominant species (1–4.9 %): *Curimopsis nigrita*, *Amara aenea*, *A. eurynota*, *Bradycellus caucasicus*, *Leistus terminatus*, *Nebria brevicollis*, *Poecilus cupreus*, *Pterostichus strenuus*, *Apocatops nigrita*, *Nicrophorus vespillo*, *N. vespilloides*, *Ischnosoma*

Table 2. The most diverse families of Coleoptera in pitfall traps on the Wittgirren peatland during year 2024

Таблица 2. Наиболее разнообразные семейства отряда Coleoptera в уловах почвенными ловушками на Виттгирренском торфянике в 2024 году

No	Family	Species	%	Individuals	%
1	**Staphylinidae**	46	32.9	384	28,0
2	**Carabidae**	34	24.3	232	16,9
3	**Curculionidae**	10	7.1	33	2,4
4	**Silphidae**	8	5.7	109	7,9
5	**Chrysomelidae**	6	4.3	368	26,8
6	**Leiodidae**	5	3.6	135	9,8
In total		109	77.9	1261	91.9

splendidum, *Olophrum piceum*, *Tachyporus dispar*, *T. hypnorum*, *Xantholinus linearis*, *X. longiventris*, and *Zyras lugens*. The category of recedent species (0.5–0.9 %) include 10 beetles: *Pterostichus nigrita*, *Otiorhynchus ovatus*, *Ampedus balteatus*, *Oiceoptoma thoracica*, *Thanatophilus rugosus*, *T. sinuatus*, *Drusilla canaliculata*, *Mycetoporus lepidus*, *Oxypoda opaca*, and *Sepedophilus testaceus*. The remaining 109 species are considered subrecedent species (i.e. represented by the less than 0.5% of the total number of trapped specimens). The majority of the most abundant species (dominant, subdominant, and recedent), except of two species, can be classified as inhabitants of open environments or sparsely forested landscape, where the beetles inhabit the soil (most part of recorded beetles) or herbaceous plants. Only one species, *Lochmaea caprea*, is associated with foliage of birches and willows, and another species, *Ampedus balteatus*, is connected with rotten wood of trees in larval stage.

3. Particular assessment: pitfall trapping in different biotopes and comparison of results

In total, six trap lines were set up in six selected peat bog habitats in 2024 (sampling period: February 18 to November 13). A comparison of the materials collected in different biotopes is given in Table 3. The most diverse biotopes according to the Margalef's index are: birch regrowth with *Calluna*, birch regrowth with *Phragmites* and *Calluna*, and wet birch regrowth with *Sphagnum* and *Juncus*. The most diverse biotopes according to the Menhinick's index are: wet birch regrowth with *Sphagnum* and *Juncus*, birch regrowth with *Calluna*, and open bare peat. The latter biotope (bare pit area) made it to the top due to the small number of trapped individuals and the relatively large number of species, which perhaps indicates high migration activity of beetles here and comparatively small number of permanent inhabitants. The Menhinick's index, as an adequate index for assessing the biotope, is apparently less appropriate in the case. In terms of the species number, the '*Betula* + *Calluna*' biotopes are the most abundant. In terms of the number of individuals, the 'birch regrowth with *Phragmites* and *Calluna*' biotope leads, that can be explained by complexity of its structure and presence of vertical layers.

Individual indices of Simpson's dominant concentration for different pitfall lines vary from 0.04 to 0.19, with the maximum on the biotope of birch regrowth with *Phragmites* and *Calluna* and the minimum on wet patches with bog vegetation (*Sphagnum*, *Juncus*, *Eriophorum*) and bare peat.

Four ecological indices (the Berger-Parker's dominance, the Simpson's dominant concentration, the Shannon-Weaver's biodiversity, and the Pielou's evenness) were calculated separately for each of the biotopes with placed in 2024 pitfall traps. The obtained results confirm the conclusions from recent study [Zoch et al., 2024], that vegetation structure in degraded peatland influences the beetles species occurrence and abundance. Beetle biodiversity in pitfall traps is sufficiently higher in three locations with moss cover presence. The Simpson's dominance index and Berger-Parker's dominance index are higher (and the Pielou's evenness index is lower) in the *Calluna* biotopes. This situation can presumably be explained by the fact that moss cover (*Sphagnum* or green mosses) creates more favorable conditions for species associated with the soil at different stages of their life cycle, stabilizing the fluctuations of humidity and temperature in the surface soil layer, the most important environmental factors for epigaeic fauna. The presence of the *Sphagnum* cover is important for several bog specialists of the family Carabidae [Kędzior et al., 2022], while the green moss coverage seems to be favorable for the rich non-specialized fauna. The shrub layer (represented in our area by *Calluna*) and sparse tree layer (*Betula*) create additional niches for predators and phytophages, reflecting in a greater number of species and individuals in pitfall traps in favorable environmental conditions and in a more pronounced dominance of several species.

Only four species (out of 140 recorded species in the 2024 list) were collected in pitfall traps in all studied six biotopes: the birch phytophage *Lochmaea caprea*, the scavengers *Sciodrepoides watsoni* and *Nicrophorus vespilloides*, and the ground predator of autumn-spring season *Olophrum piceum*. Other 11 beetles species were collected in five of the six biotopes (*Amara eurynota*,

Table 3. Diversity of adult Coleoptera sampled in pitfall traps in six biotopes of the Wittgirren peatland
Таблица 3. Разнообразие имаго отряда Coleoptera, собранных почвенными ловушками в шести биотопах Виттгирренского торфяника

No	Biotope and location	Fam.	S	N	D_M	D_{Mh}	D_{BP}	D_S	H_S	H_P
1	*Betula*, *Calluna*, NWP	13	65	295	11.3	4.0	0.35	0.14	2.93	0.70
2	*Betula*, sparse green mosses, CP	14	54	268	9.7	3.4	0.15	0.06	3.28	0.82
3	*Betula*, open bare peat, CP	9	28	56	6.7	3.7	0.21	0.08	2.92	0.88
4	*Betula*, *Phragmites*, *Calluna*, SEP	16	62	395	10.2	3.1	0.43	0.19	2.66	0.65
5	*Betula*, *Sphagnum*, *Eriophorum*, SWP	13	48	197	8.9	3.4	0.20	0.08	3.09	0.79
6	*Betula*, *Sphagnum*, *Juncus*, SWP	14	51	161	9.8	4.0	0.09	0.04	3.47	0.88
	Average	13	52	229	9.4	3.6	0.24	0.10	3.06	0.79

Note. CP — central area, NWP — north-western part, SEP — south-eastern part, SWP — south-western part.
Примечание. CP — центральная часть, NWP — северо-западная часть, SEP — юго-восточная часть, SWP — юго-западная часть.

Bradycellus caucasicus, *Poecilus cupreus*, *Pterostichus nigrita*, *Ampedus balteatus*, *Apocatops nigrita*, *Oxypoda opaca*, *Tachyporus dispar*, *Tachyporus hypnorum*, *Xantholinus linearis*, and *X. longiventris*). These 17 species can be considered as ecological generalists, widespread species throughout the area of disturbed peatland, and typical for the pitfall trap samplings.

It is interesting to analyze the similarities between the species lists sampled by pitfall trap lines in six different biotopes, especially given that two pairs of trap lines were installed in different plant communities in close proximity to each other. The particular similarity of the species lists in such locations would be expected. The Jaccard's index of community for trap lines in different biotopes in 2024 is low (K_j ranging from 0.03 to 0.08). The highest index of community recorded (0.08, i.e. 8 %) is between remotely close biotopes 'birch regrowth with *Sphagnum*'. The average value of Jaccard's index (0.06, i.e. 6 %) is between remotely close biotopes 'open bare peat' and 'birch regrowth with sparse green moss'. Apparently, there is no reason to evaluate and discuss such small similarities. The result of comparing species lists obtained in identical biotopes and trap lines in 2023 and 2024 is interesting too. Such a comparison for the 'birch regrowth with sparse green moss' biotope showed a low correspondence of the lists, i.e., the Jaccard's index of community is 0.29 (with an identical number of registered species, 54 in both years, only 24 species were common for two years). A similar result was obtained when comparing the data for 2023 and 2024 for the 'birch regrowth with *Calluna'* biotope — the similarity is relatively low, the Jaccard's index of community is 0.31 (71 species in 2023 and 65 species in 2024, with 32 species in common). The calculated index of community between pitfall trap data from two years in the same biotope (Kj = 29–31 %) is slightly lower, but roughly corresponds to the index of community for the general species lists of beetles collected by all methods between 2023 and 2024 years (Kj = 39 %), but significantly lower than the similarity shown by pitfall trapping in sum (Kj = 57 %). The community value of interannual data in a single biotope (29–31 %) is significantly higher than the community value in different points in the same year (3–8 %), indicating that despite the short distance between lines in some cases, there is a real biotopic difference and some kind of ecological isolation. This ecosystem and faunal difference exists for a long times and is more significant for the composition of the local coleopteran communities trapped than fluctuations in abundance and migration activity of the beetles.

4. Particular: hand net sweeping in fresh water biotopes

Experiences in the peatland in 2024 have shown that sweeping by entomological net in terrestrial ecosystems (method effectively applied in grassy and shrubby layers) provides the highly variable in species composition samples due to the vertical and horizontal migratory activity of adult beetles, which varies depending on daytime, light conditions, weather conditions, and other factors. Compared to sweeping by entomological hand net on land vegetation, sweeping by entomological hand net in water bodies is more effective and objective due to the greater coverage of all possible habitats of adult beetles (the entire water column, including the upper layer of the bottom and all layers of aquatic vegetation), the lesser dependence of aquatic organisms on weather conditions, and, possibly, the longer existence of the imago stage of certain species of aquatic beetles. It is obvious that the aquatic ecosystems of the surveyed area have a much smaller total spatial volume, as well as a smaller diversity of conditions, ecological niches, and species than all terrestrial ecosystems. Their fauna can apparently be identified more quickly and completely using a net.

In 2023, 50 species (8 families) were reported from water bodies, whereas in 2024 — 41 species (410 individuals representing the same 8 families). Nine aquatic species were recorded as locally new in 2024, 18 species from the samples of 2023 were not re-collected in 2024, and 32 species were common to both years. The Jaccard's index of community between the species lists of aquatic beetles in 2023 and 2024 is equal to 0.54, the Sørensen index is 0.70, and the Ochiai' community index is 0.71. The similarity of the species lists of aquatic organisms in the Wittgirren peatland between years is significantly higher than the similarity of the general fauna collected by various methods and comparable with the values of similarity indices calculated for pitfall trapping. Thus, catches of aquatic Coleoptera using this method give the most similar overall results and, apparently, more fully reveal the general aquatic fauna of the territory and can more clearly show its changes. The decline in the total species diversity of aquatic beetles in 2024 (notable in Hydrophilidae and Haliplidae) was probably the result of a dry summer and the complete drying up of most small peatland water bodies. The decrease in the relative weight of aquatic beetles in catches is a consequence of a significantly larger species list of beetles collected by various methods in terrestrial catches in 2024 (231 species in 2023 and 317 in 2024). The results obtained with a net in water bodies are summarized in Table 4.

An analysis of the dominance structure of the beetle community, recorded by the entomological hand net sweeping in water bodies of the peatland in 2024 (41 species), revealed the following results. Eight species were classified as dominant (more than 5% of the total number of all aquatic beetles): *Hydroporus neglectus* — 11 %, *Enochrus affinis* — 10 %, *Noterus clavicornis* — 10 %, *Anacaena lutescens*, *Helophorus granularis*, and *Haliplus ruficollis* — 8 % each, *Hydroporus palustris* — 6 %, and *Hydroporus angustatus* — 5 %. Eleven species (*Acilius sulcatus*, *Agabus affinis*, *Clemnius decoratus*, *Hydroporus dorsalis*, *H. erythrocephalus*, *Hygrotus inaequalis*, *Hyphydrus ovatus*, *Porhydrus lineatus*, *Helophorus aquaticus*, *Limnebius parvulus*, and *Helochares obscurus*) are classified as subdominant species of aquatic habitats (1–4.9 %). Nine species, namely *Acilius canaliculatus*, *Graptodytes granularis*, *Hydaticus trans-*

Table 4. Generalized data on sampled aquatic Coleoptera in the Wittgirren peatland in 2023–2024
Таблица 4. Обобщённые данные по собранным в 2023–2024 гг водным Coleoptera Виттгирренского торфяника

No	Family	2023		2024			
		species	%	species	%	specimens	%
1	**Dytiscidae**	28	10.0	25	7.0	191	6.0
2	**Gyrinidae**	1	0.4	1	0.3	2	0.1
3	**Haliplidae**	5	1.8	2	0.6	32	1.0
4	**Helophoridae**	3	1.1	2	0.6	43	1.4
5	**Hydraenidae**	2	0.7	3	0.8	10	0.3
6	**Hydrochidae**	1	0.4	2	0.6	3	0.1
7	**Hydrophilidae**	9	3.2	5	1.4	90	2.8
8	**Noteridae**	1	0.4	1	0.3	39	1.2
	In total	50	17.8	41	11.5	410	12.9

versalis, *Ilybius ater*, *Laccophilus minutus*, *Gyrinus substriatus*, *Limnebius crinifer*, *Hydrochus elongatus*, and *Enochrus testaceus*, are recedent species (0.5–0.9 %) and the remaining 13 species are subrecedent species (less than 0.5 % of individuals of total number).

The sampling using entomological hand net in water bodies reflects the biodiversity of aquatic beetles of the Wittgirren peatland. Therefore, it makes sense to perform all possible calculations for beetles in aquatic ecosystems as a whole, but separately from terrestrial beetles. The comparison of obtained ecological indices is presented in Table 5. The Margalef's species richness index D_M for the water bodies of the Wittgirren peatland (S = 41, N = 410) for collections with entomological hand net in 2024 is equal to 6.65. It is significantly lower than the corresponding index for terrestrial ecosystems (D_M = 39.86) or results obtained by pitfall trapping (D_M = 19.24). The Menhinick's species richness index D_{Mh} for aquatic beetles in 2024 is 2.03. This index is also clearly lower than that analogous values for all materials (D_{Mh} = 6.35) and for pitfall trapping (D_{Mh} = 3.78). I suggest, the result reflects the natural pattern of a lower species number of aquatic beetles on a drained peatland than beetles in terrestrial ecosystems.

The Berger–Parker dominance index (D_{BP}) for the aquatic samples in 2024 is 0.11 for the most abundant aquatic species, *Hydroporus neglectus*. The Simpson's index of dominant concentration (D_S) for aquatic habitats is 0.063. Similar to the previous index, it is sensitive to a few of the most abundant species and also reflects the degree of dominance in the community, which is lower in aquatic habitats than in those resulted from pitfall trapping.

The Shannon-Weaver biodiversity index (H_S) for aquatic ecosystems in 2024 is 3.05 bits, and the Pielou's evenness index (H_P) is 0.82. The higher is the value of the H_S and H_P indices, the higher is the diversity and evenness of the community and the higher is the biological diversity. The coleopteran diversity sampled by sweeping in water, as it is showed by our results, is lower than the soil trapped one, but the evenness of community in water bodies is more pronounced. The species diversity positively depends of spatial heterogeneity; the general heterogeneity of terrestrial biotopes in a drained peatland is obviously higher than in aquatic ecosystems, represented in conditions of the water regime disturbance by small stagnant water bodies with comparatively small number of permanent water bodies in the area.

Conclusions

In 2024, 357 beetle species were recorded in the Wittgirren peatland. The total list of beetle of this area based on samplings in 2023–2024 includes 456 species from 50 families. In terms of the number of species and the number of individuals collected, representatives of the terrestrial families Staphylinidae, Curculionidae, Carabidae, Chrysomelidae and aquatic Dytiscidae dominate among beetles of antropogenically transformed peatland. The most numerous species in terrestrial ecosystems in 2024 were the phytophagous *Lochmaea caprea*, the associated with rotten wood *Ampedus pomorum*, the scavenger *Sciodrepoides watsoni*, and the predaceous *Anthobium unicolor*, while the most numerous aquatic species were the predaceous *Hydroporus neglectus* and the detritophagous *Enochrus affinis*, *Anacaena lutescens*, and *Helophorus granularis*. Beetle species diversity of drained peatland is significantly higher in terrestrial than in aquatic ecosystems.

Different collection methods yield different results regarding the sampled species and their abundance. Calculating data from selected collection methods provides

Table 5. Beetles diversity sampled in 2024 by several methods with corresponding diversity indices
Таблица 5. Разнообразие жуков, собранных в 2024 году разными методами с соответствующими индексами разнообразия.

No	Method	Fam.	S	N	D_M	D_{Mh}	D_{BP}	D_S	H_S	H_P
1	Hand sampling	35	137	353	23.35	7.3	0.07	0.02	4.5	0.91
2	Pitfall trapping	24	140	1372	19.2	3.8	0.26	0.09	3.52	0.71
3	Sweeping in water	8	41	410	6.65	2.0	0.11	0.06	3.05	0.82
4	All methods	49	357	3181	44.3	6.4	0.14	0.03	4.57	0.78

significantly different numerical estimates of the group's biodiversity. The methods used for capturing adult beetles are not universal: visual search and hand collection shows the most diverse species set from ecologically specific ecosystems, but apparently not reliable picture of species abundance due to species congregations in feeding substrates; the terrestrial sweeping method provides a variable results, dependent on weather and time of day, and poorly reflecting the abundance of individual species; the sweeping in aquatic ecosystems most fully reflects the population and abundance only for aquatic beetles; the pitfall trapping can only be applied to terrestrial fauna and yields significantly variable results in different years, even with identical trap placement. Various collection methods can complement each other in terms of the general species list, but many of them are questionable regarding the reliability of the data on the abundance of species recorded by each method. The validity of comparison of the numerical data obtained from different methods with each other is highly questionable.

Surveys of the beetle fauna of a disturbed peatland over a period of two years indicate a rather inconstant nature of the population and species composition from year to year, both for the entire territory and for sepaarte locations. The inconstant nature of the beetle populations can be explained by: (1) low isolation of the peatland from surrounding ecosystems, (2) biotopic heterogeneity and mosaic nature of the territory in terms of vegetation cover, (3) the presence of a central road with ruderal and shrub vegetation, which serves as a migration route for diverse fauna penetrating from adjacent field and meadow biotopes, (4) significant variability in the depth and number of freshwater bodies and the groundwater level, (5) significant differences between existing ecosystems and the natural original biotopes, and the long period of human exploitation of the territory. Apparently, the population sizes of many beetles species fluctuate greatly from year to year, which is reflected in the 'disappearance' of some inhabitants and the 'appearance' of new ones during collections by identical methods in identical locations. This non-constant state of the coleopteran assemblage in a drained and heavily human-transformed peatland is assumed to be a natural phenomenon.

Acknowledgements

I am very thankful also to two anonymous reviewers for their critical and helpful comments on an earlier version of the manuscript.

References

Alekseev V.I. 2025. Rare and regionally new beetles (Coleoptera) from Kaliningradskaya Oblast // Euroasian Entomological Journal. Vol.24. No4. P.201–204. https://doi.org/10.15298/euroasentj.24.04.05

Alekseev V., Bulgakov D.B. 2011. [Assessment of the research degree of entomofauna of the Kaliningrad region] // [Bulletin of I. Kant Baltic Federal University. Series: Natural Sciences]. Vol.7. P.119–126. [In Russian].

Alekseev V., Napreenko M., Napreenko-Dorokhova T. 2024. Ecological groups of Coleoptera (Insecta) as indicators of habitat transformation on drained and rewetted peatlands: a baseline study from a carbon supersite, Kaliningrad, Russia // Insects. Vol.15. No.5. Art.356. P. 1–27. https://doi.org/10.3390/insects15050356

Bieńkowski A.O. 2004. Leaf-beetles (Coleoptera: Chrysomelidae) of the Eastern Europe. New key to subfamilies, genera and species. Moscow: Mikron-Print. 278 p.

Freude H., Harde K.W., Lohse G.A., Klausnitzer B. 2004. Die Käfer Mitteleuropas. Bd.2. Carabidae. München: Elsevier GmbH-Spectrum. 521 S.

Kędzior R., Zarzycki J., Zając E. 2022. Raised bog biodiversity loss: a case-study of ground beetles (Coleoptera, Carabidae) as indicators of ecosystem degradation after peat mining // Land degradation and development. Vol.33. No.17. P.351–3522. https://doi.org/10.1002/ldr.4404

Ryndevich S.K. 2004. [Fauna and ecology of water beetles of Belarus]. Minsk: Technoprint, 272 p. [In Russian].

Schafstall N., Stančikaitė M., Ferenca R., Šeirienė V. 2025. First records of beetle fauna (Insecta: Coleoptera) from Late Glacial sediments of Lithuania: novel environmental reconstructions // Diversity. Vol.17. No.12. Art.820. P.1–19. https://doi.org/10.3390/d17120820

Zoch L., Budig S., Reich M. 2024. *Sphagnum* cultivation sites as habitat for beetles (Coleoptera) and the effect of vegetation structure on species occurrence and abundance // Journal of Insect Conservation. Vol.28. No.1. P.75–88. https://doi.org/10.1007/s10841-023-00524-5

Поступила в редакцию 17.12.2025

Appendix to the article: Alekseev V.I. 2026. Diversity of beetles (Insecta: Coleoptera) in a drained peatland in the south-eastern Baltic region: an attempt at quantitative assessment // Euroasian Entomological Journal. Vol.25. No.1. P.164–175.

Приложение к статье: Алексеев В.И. 2025. Разнообразие жесткокрылых насекомых (Insecta: Coleoptera) на осушенном торфянике в юго-восточной Прибалтике: попытка количественной оценки // Евразиатский энтомологический журнал. Т.25. Вып.1. С.164–175.

The annotated species list of Coleoptera sampled in the Wittgirren peatland in 2024

Аннотированный список видов жуков, собранных на торфянике Виттгиррен в 2024 году

The annotation schema for each species include species name, sampling date or period, sampling method, and total number of registered specimens. The following conventions for sampling methods are used: hand — visual search on vegetation, soil, fungi, as well as under pieces of wood and bark with hand collection in different terrestrial biotopes; t-net and w-net — sweeping with entomological sweep nets in different terrestrial (t-net) or fresh water (w-net) biotopes; pitfall — pitfall trapping in six different plant associations; sieve — sieving building material of an wood ant nest. The species sampled in 2024 and not recorded in 2023 are marked with an asterisk.

Anthicidae Latreille, 1819

1. **Omonadus floralis* (Linnaeus, 1758)
Material. 17.VIII.2024, hand, 1.

Attelabidae Billberg, 1820

2. **Apoderus coryli* (Linnaeus, 1758)
Material. 18.VI, 10.VII, 17.VIII.2024, hand, 3.

3. *Byctiscus betulae* (Linnaeus, 1758)
Material. 15.V, 17.VI, 19.VI.2024, hand, 5.

4. *Byctiscus populi* (Linnaeus, 1758)
Material. 19.V.2024, hand, 1.

5. **Deporaus betulae* (Linnaeus, 1758)
Material. 11.IV.2024, hand, 1.

6. *Temnocerus coeruleus* (Fabricius, 1798)
Material. 17.V, 18.VI.2024, hand, 3.

Brentidae Billberg, 1820

7. *Betulapion simile* (Kirby, 1811)
Material. 10.IV, 13.III–10.IV.2024, hand, pitfall, 2.

8. *Ceratapion onopordi* (Kirby, 1808)
Material. 13.IV, 21.IX.2024, hand, 5.

9. *Eutrichapion viciae* (Paykull, 1800)
Material. 18.IX.2024, hand, 1.

10. *Nanophyes marmoratus* (Goeze, 1777)
Material. 18.VI, 18.IX, 19.IX.2024, hand, t-net.

11. *Protapion fulvipes* (Geoffroy, 1785)
Material. 13.III–10.IV, 16.V–19.VI.2024, pitfall, 2.

Buprestidae Leach, 181

12. **Agrilus viridis* (Linnaeus, 1758)
Material. 18.VI.2024, hand, 2.

13. **Dicerca furcata* (Thunberg, 1787)
Material. 19.V.2024, hand, 1 [Alekseev, 2025].

14. *Trachys minutus* (Linnaeus, 1758)
Material. 14.VII.2024, hand, 2.

Byrrhidae Latreille, 1804

15. *Curimopsis nigrita* (Palm, 1934)
Material. 10.IV, 13.III–10.IV, 10.IV–16.V.2024, hand, pitfall, 40.

16. **Lamprobyrrhulus nitidus* (Schaller, 1783)
Material. 10.IV.2024, hand, 1.

17. **Simplocaria semistriata* (Fabricius, 1794)
Material. 13.III–10.IV.2024, pitfall, 2.

Byturidae Jacquelin du Val, 1858

18. **Byturus tomentosus* (De Geer, 1774)
Material. 17.V.2024, hand, 1.

Cantharidae Imhoff, 1856 (1815)

19. *Cantharis pellucida* Fabricius, 1792
Material. 15.V, 17.V, 19.V.2024, t-net, hand, 4.

20. *Cantharis rufa* Linnaeus, 1758
Material. 15.V, 17.V, 19.V, 19.VI.2024, t-net, hand, 5.

21. *Malthodes marginatus* (Latreille, 1806)
Material. 16.V–19.VI.2024, pitfall, 1.

22. *Rhagonycha fulva* (Scopoli, 1763)
Material. 18.VI, 20.VI, 10.VII. 2024, t-net, hand, 221.

23. *Rhagonycha lignosa* (Müller, 1764)
Material. 15.V, 17.V, 19.V.2024, t-net, hand, 5.

24. *Rhagonycha testacea* (Linnaeus, 1758)
Material. 15.V, 17.V, 19.V.2024, t-net, hand, 6.

Carabidae Latreille, 1802

25. **Acupalpus flavicollis* (Sturm, 1825)
Material. 16.V–19.VI.2024, pitfall, 1

26. **Amara aenea* (DeGeer, 1774)
Material. 14.IV, 13.III–10.IV, 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII.2024, hand, pitfall, 24.

27. * *Amara eurynota* (Panzer, 1797)
Material. 13.III–10.IV, 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII, 17.VIII–19.IX, 19.IX–18.X.2024, pitfall, 18.

28. *Amara famelica* Zimmermann, 1832
Material. 10.IV–16.V, 12.VII–16.VIII.2024, pitfall, 2.

29. * *Amara tibialis* (Paykull, 1798)
Material. 19.VI–11.VII.2024, pitfall, 1.

30. **Anchomenus dorsalis* (Pontoppidan, 1763)
Material. 13.III–10.IV, 17.VIII–19.IX.2024, pitfall, 2.

31. **Bembidion articulatum* (Panzer, 1796)
Material. 20.VI, 21.IX.2024, hand, 13.

32. ** Bembidion biguttatum* (Fabricius, 1779)
Material. 18.X–13.XI.2024, pitfall, 1.

33. *Bembidion lampros* (Herbst, 1784)
Material. 16.V–19.VI, 17.VIII–19.IX, 19.IX–18.X.2024, pitfall, 5.

34. *Bembidion quadrimaculatum* (Linnaeus, 1761)
Material. 17.III, 21.IX, 17.VIII–19.IX.2024, hand, pitfall, 11.

35. **Blethisa multipunctata* (Linnaeus, 1758)
Material. 12.VII–16.VIII.2024, pitfall, 1.

36. *Bradycellus caucasicus* (Chaudoir, 1846)
Material. 18.II–13.III,13.III–10.IV, 12.VII–16.VIII, 19.IX–18.X, 18.X–13.XI.2024, pitfall, 19.

37. ** Bradycellus csikii* Laczo, 1912
Material. 18.IX.2024, hand, 1.

38. *Bradycellus rufcollis* (Stephens, 1828)
Material. 18.X–13.XI.2024, pitfall, 4.

39. **Calathus melanocephalus* (Linnaeus, 1758)
Material. 19.VI–11.VII.2024, pitfall, 1.

40. *Cicindela campestris* Linnaeus, 1758
Material. 13.III–10.IV, 15.V,10.IV–16.V.2024, hand, pitfall, 6.

41. **Cychrus caraboides* (Linnaeus, 1758)
Material. 19.IX–18.X.2024, pitfall, 1.

42. *Cymindis vaporariorum* (Linnaeus, 1758)
Material. 10.IV–16.V, 19.V, 16.VIII, 12.VII–16.VIII.2024, hand, pitfall, 5.

43. **Dyschirius thoracicus* (Rossi, 1790)
Material. 20.VI, 21.IX.2024, hand, 4.

44. **Elaphrus cupreus* Duftschmidt, 1812
Material. 14.II.2024, hand, 1.

45. *Leistus ferrugineus* (Linnaeus, 1758)
Material. 17.VIII–19.IX.2024, pitfall, 1.

46. *Leistus rufomarginatus* (Duftschmid, 1812)
Material. 18.X–13.XI.2024, pitfall, 1.

47. *Leistus terminatus* (Hellwig, 1793)
Material. 10.IV–16.V, 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII, 17.VIII–19.IX.2024, pitfall, 17.

48. *Loricera pilicornis* (Fabricius, 1775)
Material. 10.IV–16.V, 12.VII–16.VIII.2024, pitfall, 2.

49. *Microlestes minutulus* (Goeze, 1777)
Material. 16.V–19.VI, 19.IX–18.X.2024, pitfall, 2.

50. *Nebria brevicollis* (Fabricius, 1792)
Material. 13.III–10.IV, 10.IV–16.V, 17.VIII–19.IX, 19.IX–18.X.2024, pitfall, 15.

51. **Notiophilus germinyi* Fauvel, 1863
Material. 17.VIII–19.IX.2024, pitfall, 2.

52. **Ophonus laticollis* Mannerheim, 1825
Material. 20.VI.2024, hand, 6.

53. **Oxypselaphus obscurus* (Herbst, 1784)
Material. 14.II, 19.VI–11.VII.2024, hand, pitfall, 2.

54. *Poecilus cupreus* (Linnaeus, 1758)
Material. 13.III–10.IV, 10.IV–16.V, 16.V–19.VI, 12.VII–16.VIII, 17.VIII–19.IX, 19.IX–18.X.2024, pitfall, 52.

55. *Pseudoophonus rufpes* (DeGeer, 1774)
Material. 16.V–19.VI,12.VII–16.VIII.2024, pitfall, 2.

56. *Pterostichus anthracinus* (Illiger, 1798)
Material. 10.IV–16.V.2024, pitfall, 2.

57. ** Pterostichus minor* (Gyllenhal, 1827)
Material. 16.V–19.VI, 19.IX–18.X.2024, pitfall, 4.

58. *Pterostichus niger* (Schaller, 1783)
Material. 19.VI–11.VII, 12.VII–16.VIII, 17.VIII–19.IX.2024, pitfall, 5.

59. ** Pterostichus nigrita* (Paykull, 1790)
Material. 16.III, 13.III–10.IV, 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII, 19.IX–18.X, 18.X–13.XI.2024, hand, pitfall, 13.

60. ** Pterostichus strenuus* (Panzer, 1796)
Material. 12.IV, 13.III–10.IV, 10.IV–16.V, 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII, 17.VIII–19.IX.2024, hand, pitfall, 22.

61. **Stenolophus mixtus* (Herbst, 1784)
Material. 13.III–10.IV.2024, pitfall, 1.

62. **Stomis pumicatus* (Panzer, 1796)
Material. 16.V–19.VI, 12.VII–16.VIII.2024, pitfall, 2.

63.**Synuchus vivalis* (Illiger, 1798)
Material. 12.VII–16.VIII.2024, pitfall, 1.

Cerambycidae Latreille, 1802

64. *Agapanthia villosoviridescens* (DeGeer, 1775)
Material. 18.V, 18.VI.2024, hand, 2.

65. **Aromia moschata* (Linnaeus, 1758)
Material. 18.VI, 10.VII.2024, hand, 2.

66. *Lamia textor* (Linnaeus, 1758)
Material. 17.V, 18.V, 19.VI.2024, hand, 4.

67. *Leptura quadrifasciata* Linnaeus, 1758
Material. 10.VII.2024, hand, 1.

68. *Paracorymbia maculicornis* (De Geer, 1775)
Material. 20.VI.2024, hand, 1.

69. **Pseudovadonia livida* (Fabricius, 1776)
Material. 18.VI, 11.VII.2024, hand, 2.

70. **Rhagium mordax* (De Geer, 1775)
Material. 11.IV.2024, hand, 1.

71. **Saperda scalaris* (Linnaeus, 1758)
Material. 18.VI.2024, hand, 1.

72. *Stenurella melanura* (Linnaeus, 1758)
Material. 18.VI, 11.VII.2024, hand, 4.

73. *Stictoleptura rubra* (Linnaeus, 1758)
Material. 10.VII, 11.VII, 17.VIII, 12.VII–16.VIII.2024, hand, pitfall, 5.

74. *Strangalia attenuata* (Linnaeus, 1758)
Material. 10.VII, 11.VII.2024, hand, t-net, 7.

75. **Tetrops praeustus* (Linnaeus, 1758)
Material. 15.V.2024, hand, 1.

Chrysomelidae Latreille, 1802

76. *Agelastica alni* (Linnaeus, 1758)
Material. 15.V, 17.V,19.V.2024, hand, 7.

77. *Altica aenescens* Weise, 1888
Material. 11.IV, 15.V, 19.V, 10.IV–16.V, 19.VI, 16.V–19.VI, 17.VIII, 21.IX, 18.X.2024, hand, pitfall, t-net, 20.

78. *Altica chamaenerii* (Lindberg, 1926)
Material. 13.III–10.IV, 15.V, 19.VIII.2024, hand, pitfall, t-net, 8.

79. *Batophila rubi* (Paykull, 1799)
Material. 13.IV, 13.III–10.IV.2024, hand, pitfall, 6.

80. *Bromius obscurus* (Linnaeus, 1758)
Material. 15.V, 17.V.2024, hand, 2.

81. *Cassida denticollis* Suffrian, 1844
Material. 18.V.2024, hand, 2.

82. *Cassida rubiginosa* Mueller, 1776
Material. 10.IV, 17.V.2024, hand, t-net, 5.

83. * *Cassida stigmatica* Suffrian, 1844
Material. 18.VI, 19.VI.2024, hand, t-net, 2.

84. **Chaetocnema concinna* (Marsham, 1802)
Material. 10.VII, 17.VIII.2024, t-net, 4.

85. * *Chaetocnema hortensis* (Geoffroy, 1785)
Material. 17.VIII–19.IX, 18.X–13.XI.2024, pitfall, 3.

86. *Chrysomela populi* Linnaeus, 1758
Material. 15.V, 20.VI.2024, hand, 2.

87. *Crepidodera aurata* (Marsham, 1802)
Material. 13.IV, 17.V, 19.V, 20.VI.2024, hand, 15.

88. * *Crepidodera aurea* (Geoffroy, 1785)
Material. 13.IV, 17.V.2024, hand, 10.

89. *Cryptocephalus decemmaculatus* (Linnaeus, 1758)
Material. 19.VI.2024, hand, 2.

90. * *Cryptocephalus moraei* (Linnaeus, 1758)
Material. 18.VI.2024, t-net, 1.

91. *Cryptocephalus ocellatus* Drapiez, 1819
Material. 20.VI.2024, hand, 1.

92. **Epitrix pubescens* (Koch, 1803)
Material. 17.V.2024, hand, 1.

93. **Fasta fastuosa* (Scopoli, 1763)
Material. 14.IV, 17.V.2024, hand, 2.

94. *Galeruca tanaceti* (Linnaeus, 1758)
Material. 10.VII.2024, hand, 1.

95. **Gonioctena decemnotata* (Marsham, 1802)
Material. 15.V.2024, hand, 1.

96. *Lochmaea caprea* (Linnaeus, 1758)
Material. 18.II–13.III, 13.III–10.IV, 17.V, 19.V, 10.IV–16.V, 18.VI, 19.VI, 16.V–19.VI, 13.VII, 19.VI–11.VII, 17.VIII, 12.VII–16.VIII, 18.IX, 17.VIII–19.IX, 17.X, 19.IX–18.X.2024, pitfall, hand, t-net, 435.

97. **Longitarsus brunneus* (Duftschmid, 1825)
Material. 17.VIII–19.IX.2024, pitfall, 1.

98. *Longitarsus jacobaeae* (Waterhouse, 1858)
Material. 18.VI.2024, t-net, 4.

99. * *Longitarsus pratensis* (Panzer, 1794)
Material. 10.VII, 19.VIII.2024, t-net, 4.

100. *Neocrepidodera transversa* (Marsham, 1802)
Material. 18.VI, 10.VII, 13.VII, 17.VIII.2024, hand, t-net, 7.

101. *Oulema melanopus* (Linnaeus, 1758)
Material. 10.VII.2024, hand, t-net, 5.

102. *Oulema obscura* (Stephens, 1831)
Material. 10.V.2024, hand, 1.

103. *Pachybrachis hieroglyphicus* (Laicharting, 1781)
Material. 17.VIII.2024, hand, 1.

104. **Phyllotreta vittula* (Redtenbacher, 1849)
Material. 10.VII, 18.IX.2024, t-net, 6.

105. **Plagiodera versicolora* (Laicharting, 1781)
Material. 11.IV.2024, hand, 3.

106. *Psylliodes chalcomerus* (Illiger, 1807)
Material. 13.IV, 15.V, 17.V, 17.VI.2024, hand, t-net, 37.

107. * *Psylliodes dulcamarae* (Koch, 1803)
Material. 15.V.2024, hand, 1.

Ciidae Leach, 1819

108. **Sulcacis affinis* (Gyllenhal, 1827)
Material. 17.III, 20.IX.2024, hand, 5.

Coccinellidae Latreille, 1807

109. **Adalia bipunctata* (Linnaeus, 1758)
Material. 12.VII, 16.XI.2024, hand, 2.

110. *Chilocorus renipustulatus* (Scriba, 1791)
Material. 18.V.2024, hand, 1.

111. *Coccinella hieroglyphica* Linnaeus, 1758
Material. 11.IV, 10.VII, 19.VI–11.VII, 17.VIII, 12.VII–16.VIII, 19.X.2024, hand, t-net, pitfall, 27.

112. *Coccinella septempunctata* Linnaeus, 1758
Material. 18.VI, 11.VII, 16.X, 19.IX–18.X.2024, hand, pitfall, 4.

113. * *Coccinella quinquepunctata* Linnaeus, 1758
Material. 11.VII.2024, hand, 1.

114. **Coccinula quatuordecimpustulata* (Linnaeus, 1758)
Material. 17.VIII.2024, hand, 1.

115. *Harmonia axyridis* (Pallas, 1773)
Material. 17.X, 16.XI.2024, hand, 5.

116. **Hippodamia notata* (Laicharting, 1781)
Material. 10.VII.2024, t-net, 2.

117. **Nephus redtenbacheri* (Mulsant, 1846)
Material. 13.IV, 17.VIII.2024, hand, t-net, 3.

118. *Propylea quatuordecimpunctata* (Linnaeus, 1758)
Material. 17.VIII.2024, hand, 2.

119. *Psyllobora vigintiduopunctata* (Linnaeus, 1758)
Material. 19.VIII, 18.IX.2024, hand, t-net, 3.

Corylophidae LeConte, 1852

120. **Orthoperus brunnipes* (Gyllenhal, 1808)
Material. 18.VI, 17.VIII–19.IX.2024, hand, pitfall, 2.

121. **Sericoderus lateralis* (Gyllenhal, 1827)
Material. 18.VI.2024, hand, 1.

Cryptophagidae Kirby, 1837

122. **Atomaria diluta* Erichson, 1846
Material. 17.V.2024, hand, 1.

123. * *Atomaria fuscata* (Schoenherr, 1808)
Material. 13.III–10.IV.2024, pitfall, 1.

Cucujidae Latreille, 1802

124. **Pediacus depressus* (Herbst, 1797)
Material. 17.VI.2024, hand, 2.

Curculionidae Latreille, 1802

125. *Anthonomus rubi* (Herbst, 1795)
Material. 17.V, 10.VII.2024, t-net, 4.

126. *Archarius salicivorus* (Paykull, 1792)
Material. 13.IV, 19.VI.2024, hand, 2.

127. **Baris artemisiae* (Panzer, 1794)
Material. 20.VI.2024, hand, 2.

128. *Brachysomus echinatus* (Bonsdorff, 1785)
Material. 13.III–10.IV.2024, pitfall, 1.

129. *Calosirus terminatus* (Herbst, 1795)
Material. 19.IX.2024, hand, 2.

130. **Charagmus gressorius* (Fabricius, 1792)
Material. 13.III–10.IV, 18.V, 17.VIII, 17.VIII–19.IX, 18.X–13.XI.2024, hand, pitfall, 6.

131. * *Charagmus griseus* (Fabricius, 1775)
Material. 17.VIII, 18.IX.2024, hand, 2.

132. **Coeliodes rubicundus* Herbst, 1795
Material. 10.IV.2024, hand, 1.

133. **Ceutorhynchus obstrictus* (Marsham, 1802)
Material. 13.VII.2024, hand, 1.

134. * *Ceutorhynchus pallidactylus* (Marsham, 1802)
Material. 18.V.2024, hand, 1.

135. **Cryptorhynchus lapathi* (Linnaeus, 1758)
Material. 16.V.2024, hand, 1.

136. **Glocianus punctiger* (Sahlberg, 1835)
Material. 17.V.2024, hand, 1.

137. **Hylobius abietis* (Linnaeus, 1758)
Material. 16.V.2024, hand, 1.

138. **Hylurgops palliatus* (Gyllenhal, 1813)
Material. 13.IV.2024, hand, 1.

139. *Hypera nigrirostris* (Fabricius, 1775)
Material. 13.III–10.IV, 10.IV–16.V, 19.VI–11.VII.2024, pitfall, 6.

140. *Hypera postica* (Gyllenhal, 1813)
Material. 16.V–19.VI, 19.VI–11.VII, 17.VIII–19.IX.2024, pitfall, 3.

141. *Larinus turbinatus* Gyllenhal, 1835
Material. 15.V, 17.V.2024, hand, t-net, 6.

142. **Lixus pulverulentus* (Scopoli, 1763)
Material. 18.V.2024, hand, 1.

143. **Magdalis carbonaria* (Linnaeus, 1758)
Material. 16.V.2024, hand, 1.

144. **Mecinus pascuorum* (Gyllenhal, 1813)
Material. 11.IV.2024, hand, 1.

145. *Micrelus ericae* (Gyllenhal, 1813)
Material. 17.VIII, 12.VII–16.VIII.2024, pitfall, t-net, 6.

146. **Mogulones euphorbiae* (Brisout de Barneville, 1866)
Material. 10.IV.2024, hand, 1 [Alekseev, 2025].

147. *Orchestes jota* (Fabricius, 1787)
Material. 17.VIII.2024, hand, 3.

148. *Otiorhynchus ovatus* (Linnaeus, 1758)
Material. 16.V–19.VI, 10.VII, 12.VII–16.VIII, 17.VIII–19.IX, 18.X–13.XI.2024, pitfall, hand, 11.

149. *Otiorhynchus tristis* (Scopoli, 1763).
Material. 18.V, 20.VI.2024, hand, 2.

150. *Phyllobius pyri* (Linnaeus, 1758)
Material. 14.IV.2024, hand, 1.

151. **Pissodes castaneus* (DeGeer, 1775)
Material. 18.VI.2024, hand, 1.

152. **Polydrusus mollis* (Stroem, 1768)
Material. 10.IV, 14.IV, 18.V, 19.V.2024, hand, 11.

153. *Polydrusus cervinus* (Linnaeus, 1758)
Material. 15.V, 20.VI.2024, hand, 5.

154. *Polydrusus picus* (Fabricius, 1792)
Material. 17.V, 19.V, 21.VI.2024, hand, 4.

155. * *Polydrusus pilosus* Gredler, 1866
Material. 10.IV, 13.IV.2024, hand, 6.

156. *Rhamphus pulicarius* (Herbst, 1795)
Material. 13.VII.2024, hand, 1.

157. *Sciaphilus asperatus* (Bonsdorff, 1785)
Material. 19.V, 10.IV–16.V.2024, pitfall, hand, 2.

158. **Scolytus ratzeburgi* Janson, 1856
Material. 18.VI.2024, hand, 1.

159. *Sitona hispidulus* (Fabricius, 1777)
Material. 13.III–10.IV, 10.VII, 17.VIII, 12.VII–16.VIII, 17.VIII–19.IX, 19.IX–18.X.2024, pitfall, hand, t-net, 7.

160. * *Sitona humeralis* Stephens 1831
Material. 10.IV–16.V, 18.IX, 16.XI.2024, pitfall, hand, 4.

161. * *Sitona lineellus* (Bonsdorff, 1785)
Material. 14.IV.2024, hand, 1.

162. **Tachyerges salicis* (Linnaeus, 1758)
Material. 18.V, 19.V.2024, hand, 2.

163. * *Tachyerges stigma* (Germar, 1821)
Material. 18.V, 13.VII.2024, hand, 2.

164. *Tanymecus palliatus* (Fabricius, 1787)
Material. 16.V–19.VI, 10.VII.2024, pitfall, t-net, 3.

165. **Tanysphyrus lemnae* (Paykull, 1792)
Material. 15.V.2024, hand, 1.

166. **Trypodendron domesticum* (Linnaeus, 1758)
Material. 14.III.2024, hand, 2.

Dermestidae Latreille, 1804

167. *Dermestes murinus* Linnaeus, 1758
Material. 10.IV, 16.V–19.VI, 19.VI–11.VII.2024, hand, pitfall, 6.

168. **Trogoderma versicolor* (Creutzer, 1799)
Material. 19.V.2024, hand, 1.

Elateridae Leach, 1815

169. **Actenicerus sjaelandicus* (Müller, 1764)
Material. 16.V, 19.V.2024, hand, 2.

170. *Adrastus pallens* (Fabricius, 1792)
Material. 18.VI, 10.VII.2024, hand, t-net, 6.

171. **Agriotes lineatus* (Linnaeus, 1767)
Material. 13.III–10.IV, 15.V.2024, hand, pitfall, 2.

172. * *Agriotes obscurus* (Linnaeus, 1758)
Material. 17.V, 18.VI.2024, hand, t-net, 3.

173. *Ampedus balteatus* (Linnaeus, 1758)
Material. 14.IV, 15.V, 17.V, 10.IV–16.V, 16.V–19.VI.2024, hand, pitfall, t-net, 36.

174. *Ampedus pomorum* (Herbst. 1784)
Material. 14.III, 13.III–10.IV, 15.V, 10.IV–16.V, 16.V–19.VI, 21.IX, 18.X, 16.XI.2024, hand, pitfall, 188.

175. *Ampedus sanguineus* (Linnaeus, 1758)
Material. 18.V.2024, hand, 1.

176. **Cardiophorus ruficollis* (Linnaeus, 1758)
Material. 12.IV, 16.V–19.VI.2024, hand, pitfall, 2.

177. *Cidnopus aeruginosus* (Olivier, 1790)
Material. 15.V, 19.V.2024, hand, 4.

178. *Dalopius marginatus* (Linnaeus, 1758)
Material. 19.V.2024, hand, 1.

179. *Hemicrepidius niger* (Linnaeus, 1758)
Material. 20.VI.2024, hand, 1.

180. **Lacon murinus* (Linnaeus, 1758)
Material. 15.V.2024, hand, 2.

181. **Oedostethus quadripustulatus* (Fabricius, 1792)
Material. 18.VI.2024, hand, 1.

182. **Paraphotistus nigricornis* (Panzer, 1799)
Material. 18.V, 19.V.2024, hand, 2.

183. **Prosternon tessellatum* (Linnaeus, 1758)
Material. 15.V.2024, hand, 1.

184. *Sericus brunneus* (Linnaeus, 1758)
Material. 15.V, 17.V.2024, hand, t-net, 13.

185. **Synaptus filiformis* (Fabricius, 1781)
Material. 19.V.2024, hand, 1.

Endomychidae Leach, 1815

186. **Mycetina cruciata* (Schaller, 1783)
Material. 18.VI.2024, hand, 1.

Eucinetidae Lacordaire 1857

187. **Eucinetus haemorrhoidalis* (Germar, 1818)
Material. 17.VIII–19.IX, 19.IX–18.X.2024, poitfall, 3.

Histeridae Gyllenhal, 1808

188. **Dendrophilus pygmaeus* (Linnaeus, 1758)
Material. 17.XI.2024, sieve, 2.

189. **Margarinotus brunneus* (Fabricius, 1775)
Material. 17.VI.2024, hand, 3.

190. **Saprinus semistriatus* (Scriba, 1790)
Material. 19.V, 19.VI–11.VII, 12.VII–16.VIII.2024, hand, pitfall, 9.

Dytiscidae Leach, 1815

191. *Acilius canaliculatus* (Nicolai, 1822)
Material. 20.IX, 16.XI.2024, w-net, 3.

192. *Acilius sulcatus* (Linnaeus, 1758)
Material. 14.III, 15.III, 11.IV, 17.V, 20.VI, 13.VII, 17.VIII, 20.IX, 16.XI.2024, w-net, 14.

193. **Agabus affinis* (Paykull, 1798)
Material. 11.IV, 16.V–19.VI, 16.XI.2024, pitfall, w-net, 6.

194. *Agabus bipustulatus* (Linnaeus, 1767)
Material. 16.V–19.VI.2024, pitfall, 3.

195. * *Agabus melanarius* Aubé, 1837
Material. 20.VI, 13.VII.2024, w-net, 2.

196. *Agabus undulatus* (Schrank, 1776)
Material. 14.III, 13.VII.2024, w-net, 2.

197. *Clemnius decoratus* (Gyllenhal, 1810)
Material. 17.V, 13.VII.2024, w-net, 5.

198. **Colymbetes fuscus* (Linnaeus, 1758)
Material. 20.IX.2024, w-net, 1.

199. *Graptodytes granularis* (Linnaeus, 1767)
Material. 14.III, 20.IX.2024, w-net, 2.

200. *Hydaticus seminiger* (DeGeer, 1774)
Material. 16.V–19.VI, 17.VIII–19.IX.2024, pitfall, 3.

201. *Hydaticus transversalis* (Pontoppidan, 1763)
Material. 20.VI.2024, w-net, 2.

202. **Hydroglyphus geminus* (Fabricius, 1792)
Material. 17.V.2024, w-net, 1.

203. *Hydroporus angustatus* Sturm, 1835
Material. 14.III, 20.VI, 13.VII, 20.IX.2024, w-net, 21.

204. *Hydroporus dorsalis* (Fabricius, 1787)
Material. 15.III, 11.IV, 17.V, 13.VII, 16.XI.2024, w-net, 9.

205. *Hydroporus erythrocephalus* (Linnaeus, 1758)
Material. 14.III, 17.V, 13.VII, 19.X, 16.XI.2024, w-net, 12.

206. * *Hydroporus morio* Aube, 1838
Material. 17.V.2024, w-net, 2.

207. *Hydroporus neglectus* Schaum, 1845
Material. 13.III, 14.III, 11.IV, 13.VII, 17.VIII, 19.X, 16.XI.2024, w-net, 46.

208. *Hydroporus palustris* (Linnaeus, 1761)
Material. 14.III, 15.III, 11.IV, 20.VI, 17.VIII, 20.IX, 19.X, 16.XI.2024, w-net, 25.

209. *Hygrotus impressopunctatus* (Schaller, 1783)
Material. 20.VI.2024, w-net, 1.

210. *Hygrotus inaequalis* (Fabricius, 1777)
Material. 11.IV, 20.VI, 13.VII, 17.VIII, 19.VIII, 20.IX, 21.IX.2024, w-net, 10.

211. *Hyphydrus ovatus* (Linnaeus, 1761)
Material. 14.III, 17.V, 20.VI, 13.VII, 17.VIII, 20.IX.2024, w-net, 14.

212. *Ilybius ater* (DeGeer, 1774)
Material. 13.VII.2024, w-net, 2.

213. * *Ilybius quadriguttatus* (Lacordaire, 1835)
Material. 17.V.2024, w-net, 1.

214. *Laccophilus minutus* (Linnaeus, 1758)
Material. 11.IV, 13.VII.2024, w-net, 2.

215. *Porhydrus lineatus* (Fabricius, 1775)
Material. 20.VI, 20.IX, 21.IX.2024, w-net, 5.

216. *Rhantus suturalis* (MacLeay, 1825)
Material. 20.X, 16.XI.2024, w-net, 3.

217. *Scarodytes halensis* (Fabricius, 1787)
Material. 14.III.2024, w-net, 1.

Gyrinidae Latreille, 1810

218. *Gyrinus substriatus* Stephens, 1828
Material. 20.VI.2024, w-net, 2.

Haliplidae Brullé, 1835

219. *Haliplus fulvus* (Fabricius, 1801)
Material. 14.III.2024, w-net, 1.

220. *Haliplus ruficollis* (DeGeer, 1774)
Material. 14.III, 15.III, 20.VI, 13.VII, 20.IX, 16.XI.2024, w-net, 31.

Helophoridae Leach, 1815

221. *Helophorus aquaticus* (Linnaeus, 1758)
Material. 20.VI, 13.VII.2024, w-net, 10.

222. *Helophorus granularis* (Linnaeus, 1761)
Material. 20.VI, 13.VII, 20.IX.2024, w-net, 33.

Hydraenidae Mulsant, 1844

223. **Limnebius aluta* (Bedel, 1881)
Material. 20.X.2024, w-net, 1.

224. *Limnebius crinifer* Rey, 1885
Material. 15.III.2024, w-net, 2.

225. * *Limnebius parvulus* (Herbst, 1797)
Material. 13.VII, 20.X.2024, w-net, 7.

Hydrochidae Thomson, 1859

226. **Hydrochus crenatus* (Fabricius, 1792)
Material. 13.VII.2024, w-net, 1.

227. *Hydrochus elongatus* (Schaller, 1783)
Material. 20.VI.2024, w-net, 2.

Hydrophilidae Latreille, 1802
228. *Anacaena lutescens* (Stephens, 1829)
Material. 13.III, 15.III, 11.IV, 17.V, 20.VI, 13.VII.2024, w-net, 34.

229. *Enochrus affinis* (Thunberg, 1794)
Material. 11.IV, 17.V, 20.VI, 13.VII.2024, w-net, 39.

230. *Enochrus testaceus* (Fabricius, 1801)
Material. 13.VII.2024, w-net, 2.

231. *Helochares obscurus* (Müller, 1776)
Material. 13.III, 17.V, 20.VI, 13.VII.2024, hand, w-net, 15.

232. *Hydrobius fuscipes* (Linnaeus, 1758)
Material. 15.III.2024, w-net, 1.

Noteridae Thomson, 1860
233. *Noterus clavicornis* (DeGeer, 1774)
Material. 14.III, 11.IV, 17.V, 20.VI, 13.VII, 17.VIII, 20.IX.2024, w-net, 39.

Kateretidae Erichson, 1846
234. **Brachypterolus linariae* (Stephens, 1830):18. IX.2024, hand, 1.

Latridiidae Erichson, 1842
235. **Cortinicara gibbosa* (Herbst, 1793)
Material. 11.IV, 10.VII, 17.VIII, 18.IX, 21.IX, 17.VIII–19.IX.2024, hand, t-net, pitfall, 45.

236. **Enicmus rugosus* (Herbst, 1793)
Material. 16.V–19.VI.2024, pitfall, 1.

237. **Latridius minutus* (Linnaeus, 1767)
Material. 16.XI.2024, hand, 4.

238. *Melanophthalma transversalis* (Gyllenhal, 1827)
Material. 17.VIII.2024, hand, 1.

Leiodidae Fleming, 1821
239. **Agathidium atrum* (Paykull, 1798)
Material. 18.X–13.XI.2024, pitfall, 1.

240. *Apocatops nigrita* (Erichson, 1837)
Material. 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII, 17.VIII–19. IX, 18.X–13.XI.2024, pitfall, 41.

241. **Catops fuliginosus* Erichson, 1837
Material. 18.II–13.III.2024, pitfall, 1.

242. **Choleva agilis* (Illiger, 1798)
Material. 10.IV–16.V.2024, pitfall, 1.

243. *Sciodrepoides watsoni* (Spence, 1813)
Material. 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII, 17.VIII–19. IX.2024, pitfall, 91.

Lucanidae Latreille, 1804
244. *Dorcus parallelepipedus* (Linnaeus, 1758)
Material. 13.VII.2024, hand, 1.

245. **Sinodendron cylindricum* (Linnaeus, 1758)
Material. 11.VII.2024, hand, 1.

Malachiidae Fleming, 1821
246. *Cordylepherus viridis* (Fabricius, 1787)
Material. 17.V, 18.VI.2024, t-net, 10.

Dasytidae Laporte de Castelnau, 1840
247. *Dasytes niger* (Linnaeus, 1761)
Material. 18.VI, 16.V–19.VI, 19.VI–11.VII.2024, hand, pitfall, 6.

Mordellidae Latreille, 1802
248. **Mordella brachyura* Mulsant, 1856
Material. 18.VI, 10.VII, 16.V–19.VI.2024, hand, pitfall, 25.

249. **Mordellistena brevicauda* (Boheman, 1849)
Material. 18.VI. 19.VI–11.VII, 12.VII–16.VIII.2024, t-net, pitfall, 4.

250. *Variimorda villosa* (Schrank, 1781)
Material. 18.VI, 11.VII.2024, hand, 3.

Nitidulidae Latreille, 1802
251. *Brassicogethes aeneus* (Fabricius, 1775)
Material. 11.IV, 10.IV–16.V, 16.V–19.VI.2024, hand, pitfall, 3.

252. *Brassicogethes viridescens* (Fabricius, 1787)
Material. 10.VII, 17.VIII.2024, t-net, 8.

253. **Epuraea neglecta* (Heer, 1841)
Material. 16.V–19.VI.2024, pitfall, 1.

254. **Fabogethes nigrescens* (Stephens, 1830)
Material. 10.IV–16.V, 16.V–19.VI, 19.VI–11.VII.2024, pitfall, 6.

255. **Glischrochilus grandis* (Tournier, 1872)
Material. 12.VII–16.VIII.2024, pitfall, 1.

256. **Sagittogethes distinctus* (Sturm, 1845)
Material. 17.V.2024, t-net, 2.

Oedemeridae Latreille, 1810
257. **Chrysanthia geniculata* Heyden, 1877
Material. 10.VII.2024, t-net, 2.

258. *Oedemera croceicollis* (Gyllenhal, 1827)
Material. 17.V.2024, hand, 1.

259. * *Oedemera femorata* (Scopoli, 1763)
Material. 18.VI.2024, t-net, 1.

260. *Oedemera lurida* (Marsham, 1802)
Material. 18.VI, 10.VII, 17.VIII.2024, hand, t-net, 7.

261. *Oedemera virescens* (Linnaeus, 1767)
Material. 15.V, 17.V.2024, hand, t-net, 11.

Phalacridae Leach, 1815
262. **Olibrus aeneus* (Fabricius, 1792)
Material. 17.VIII.2024, hand, 1.

263. * *Olibrus millefolii* (Paykull, 1800)
Material. 18.VI.2024, t-net, 1.

264. *Phalacrus championi* Guillebeau, 1892
Material. 17.V.2024, hand, 1.

Ptinidae Latreille, 1802
265. **Ptilinus fuscus* Geoffroy, 1785
Material. 18.VI.2024, hand, 1.

Pyrochroidae Latreille, 1807
266. *Schizotus pectinicornis* (Linnaeus, 1758)
Material. 14.II.2024, hand, 2.

Scarabaeidae Latreille, 1802
267. **Cetonia aurata* (Linnaeus, 1758)
Material. 16.V, 19.VI, 11.VII, 18.IX, hand, 10.

268. *Melolontha melolontha* (Linnaeus, 1758)
Material. 15.V, 17.V, 18.V, 18.VI.2024, hand, 24.

269. *Oxythyrea funesta* (Poda, 1761)
Material. 18.VI, 10.VII, 19.IX.2024, hand, 4.

270.**Protaetia metallica* (Herbst, 1782)
Material. 17.VIII.2024, hand, 1.

271. *Trichius fasciatus* (Linnaeus, 1758)
Material. 18.VI, 19.VI, 10.VII, 11.VII, 17.VIII, 20.IX.2024, hand, 11.

Scirtidae Fleming, 1821
272. **Contacyphon coarctatus* Paykull, 1799
Material. 17.V, 18.VI, 17.VIII.2024. hand, t-net, 7.

273. *Contacyphon ochraceus* Stephens, 1830
Material. 17.VIII–19.IX.2024, pitfall, 1.

274. *Contacyphon padi* (Linnaeus, 1758)
Material. 13.IV, 17.V, 17.VIII, 19.VIII.2024, hand, t-net, 20.

275. *Contacyphon variabilis* (Thunberg, 1785)
Material. 17.V, 19.V, 21.IX.2024, hand, 4.

276. *Microcara testacea* (Linnaeus, 1767)
Material. 18.VI, 12.VII.2024, hand, 2.

277. *Scirtes hemisphaericus* (Linnaeus, 1758)
Material. 18.VI, 10.VII, 17.VIII.2024. hand, t-net, 6.

Scraptiidae Mulsant, 1856
278. *Anaspis frontalis* (Linnaeus, 1758)
Material. 17.V, 19.V.2024, hand, t-net, 3.

Silphidae Latreille, 1807
279. **Necrodes littoralis* (Linnaeus, 1758)
Material. 16.V, 17.VI, 12.VII, 18.IX.2024, hand, 8.

280. *Nicrophorus humator* (Gleditsch, 1767)
Material. 19.VI–11.VII.2024, pitfall, 2.

281. * *Nicrophorus investigator* (Zetterstedt, 1824)
Material. 19.VI–11.VII.2024, pitfall, 3.

282. *Nicrophorus vespillo* (Linnaeus, 1758)
Material. 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII, 17.VIII–19.IX.2024, pitfall, 32.

283. *Nicrophorus vespilloides* Herbst, 1783
Material. 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII, 17.VIII–19.IX.2024, pitfall, 50.

284. *Oiceoptoma thoracica* (Linnaeus, 1758)
Material. 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII.2024, pitfall, 7.

285. *Phosphuga atrata* (Linnaeus, 1758)
Material. 14.II.2024, hand, 1.

286. **Silpha tristis* Illiger, 1798
Material. 14.IV, 10.IV–16.V.2024, hand, pitfall, 2.

287. **Thanatophilus rugosus* (Linnaeus, 1758)
Material. 19.VI–11.VII.2024, pitfall, 7.

288. * *Thanatophilus sinuatus* (Fabricius, 1775)
Material. 19.VI–11.VII, 17.VIII–19.IX.2024, pitfall, 7.

Sphindidae Jacquelin du Val, 1858
289. **Aspidiphorus orbiculatus* (Gyllenhal, 1808)
Material. 17.VIII.2024, hand, 1.

Staphylinidae Latreille, 1802
290. **Acrotona aterrima* (Gravenhorst, 1802)
Material. 13.III–10.IV, 19.IX–18.X, 18.X–13.XI.2024, pitfall, 3.
291. *Acidota crenata* (Fabricius, 1793)

Material. 19.IX–18.X, 18.X–13.XI.2024, pitfall, 6.

292. *Aleochara curtula* (Goeze, 1777)
Material. 19.VI–11.VII.2024, pitfall, 5.

293. * *Aleochara moerens* Gyllenhal, 1827
Material. 17.VIII–19.IX, 19.IX–18.X.2024, pitfall, 3.

294. **Anthobium atrocephalum* (Gyllenhal, 1827)
Material. 14.II, 18.X–13.XI.2024, hand, pitfall, 5.

295. *Anthobium unicolor* (Marsham, 1802)
Material. 13.III–10.IV, 10.IV–16.V, 16.V–19.VI, 19.IX–18.X, 18.X–13.XI.2024, pitfall, 73.

296. **Autalia longicornis* Scheerpeltz, 1947
Material. 21.IX.2024, hand, 2.

297. **Bolitochara obliqua* Erichson, 1837
Material. 19.IX–18.X.2024, pitfall, 1.

298. *Brachygluta fossulata* (Reichenbach, 1816)
Material. 10.IV–16.V.2024, pitfall, 3.

299. **Bryophacis crassicornis* (Maeklin, 1847)
Material. 21.IX.2024, hand, 3.

300. **Creophilus maxillosus* (Linnaeus, 1758)
Material. 11.IV, 17.V.2024, hand, 2.

301. **Dinarda maerkelii* Kiesenwetter, 1843
Material. 16.III.2024, sieve, 15.

302. *Drusilla canaliculata* (Fabricius, 1787)
Material. 16.III, 14.IV, 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII, 17.VIII–19.IX.2024, sieve, hand, pitfall, 10.

303. *Eusphalerum minutum* (Fabricius, 1792)
Material. 17.V.2024, hand, 2.

304. **Gyrophaena nana* (Paykull, 1800)
Material. 13.VII.2024, hand, 5.

305. **Ischnopoda leucopus* (Marsham, 1802)
Material. 20.VI.2024, hand, 3.

306. **Ischnosoma splendidum* (Gravenhorst, 1806)
Material. 13.III–10.IV, 16.V–19.VI, 12.VII–16.VIII, 17.VIII–19.IX, 19.IX–18.X, 18.X–13.XI.2024, pitfall, 15.

307. **Lathrobium brunnipes* (Fabricius, 1792)
Material. 19.VI–11.VII, 12.VII–16.VIII.2024, pitfall, 3.

308. * *Lathrobium fulvipenne* (Gravenhorst, 1806)
Material. 14.III.2024, hand, 1.

309. * *Lathrobium longulum* Gravenhorst, 1806
Material. 13.III–10.IV.2024, pitfall, 2.

310. *Lesteva longoelytrata* (Goeze, 1777)
Material. 16.V–19.VI.2024, pitfall, 1.

311. *Lordithon thoracicus* (Fabricius, 1777)
Material. 13.VII, 17.VIII–19.IX, 18.X–13.XI.2024, hand, pitfall, 8.

312. **Mycetoporus clavicornis* (Stephens, 1832)
Material. 18.II–13.III.2024, pitfall, 2.

313. *Mycetoporus lepidus* (Gravenhorst, 1806)
Material. 18.II–13.III, 17.VIII–19.IX, 18.X–13.XI.2024, pitfall, 7.

314. **Myllaena minuta* (Gravenhorst, 1806)
Material. 13.III–10.IV, 10.IV–16.V.2024, pitfall, 2.

315. **Nototheca flavipes* (Gravenhorst, 1806)
Material. 16.III, 17.XI.2024, sieve, 41.

316. *Ocypus brunnipes* (Fabricius, 1781)
Material. 14.II, 19.VI–11.VII, 12.VII–16.VIII.2024, hand, pitfall, 3.

317. *Olophrum piceum* (Gyllenhal, 1810)
Material. 18.II–13.III, 13.III–10.IV, 10.IV–16.V, 17.VIII–19.IX, 19.IX–18.X, 18.X–13.XI.2024, pitfall, 39.

318. *Omalium rivulare* (Paykull, 1789)
Material. 14.II.2024, hand, 1.

319. **Oxypoda opaca* (Gravenhorst, 1802)
Material. 13.III–10.IV, 10.IV–16.V, 16.V–19.VI, 19.VI–11.VII.2024, pitfall, 12.

320. **Oxytelus rugosus* (Fabricius, 1775)
Material. 20.VI.2024, hand, 1.

321. **Paederus riparius* (Linnaeus, 1758)
Material. 20.VI.2024, hand, 1.

322. *Parabolitobius formosus* (Gravenhorst, 1806)
Material. 13.III–10.IV.2024, pitfall, 1.

323. *Philonthus decorus* (Gravenhorst, 1802)
Material. 13.III–10.IV.2024, pitfall, 3.

324. * *Philonthus longicornis* Stephens, 1832
Material. 16.V–19.VI.2024, pitfall, 1.

325. * *Philonthus nigrita* (Gravenhorst, 1806)
Material. 10.IV–16.V.2024, pitfall, 1.

326. * *Philonthus rubripennis* Stephens, 1832
Material. 20.VI.2024, hand, 1.

327. * *Philonthus ventralis* (Gravenhorst, 1802)
Material. 13.III–10.IV.2024, pitfall, 1.

328. *Platydracus latebricola* (Gravenhorst, 1806)
Material. 16.V–19.VI.2024, pitfall, 1.

329. * *Platydracus stercorarius* (Olivier, 1795)
Material. 19.VI–11.VII, 13.VII.2024, hand, 2.

330. *Proteinus brachypterus* (Fabricius, 1792)
Material. 13.III.2024, hand, 1.

331. *Pselaphus heisei* Herbst, 1792
Material. 13.III–10.IV, 10.IV–16.V.2024, pitfall, 2.

332. **Quedius cruentus* (Olivier, 1795)
Material. 16.V–19.VI.2024, pitfall, 1.

333. * *Quedius molochinus* (Gravenhorst, 1806)
Material. 17.VIII–19.IX.2024, pitfall, 4.

334. **Scopaeus laevigatus* (Gyllenhal, 1827)
Material. 18.X–13.XI.2024, pitfall, 1.

335. *Sepedophilus testaceus* (Fabricius, 1793)
Material. 10.IV–16.V, 16.V–19.VI, 12.VII–16.VIII, 19.IX–18.X, 17.XI.2024, pitfall, sieve, 15.

336. **Staphylinus dimidiaticornis* Gemminger, 1851
Material. 10.IV–16.V.2024, pitfall, 1.

337. *Stenichnus scutellaris* (Müller & Kunze, 1822)
Material. 13.III–10.IV.2024, pitfall, 2.

338. * *Stenichnus godarti* (Latreille, 1806)
Material. 17.XI.2024, sieve, 12.

339. **Stenus juno* (Paykull, 1789)
Material. 13.III–10.IV.2024, pitfall, 1.

340. *Stenus solutus* Erichson, 1840
Material. 13.III–10.IV, 10.IV–16.V, 16.V–19.VI, 18.VI, 18.IX.2024, pitfall, hand, 10.

341. **Sunius melanocephalus* (Fabricius, 1792)
Material. 16.III.2024, sieve, 1.

342. **Tachinus laticollis* Gravenhorst, 1802
Material. 20.VI.2024, hand, 2.

343. *Tachyporus dispar* (Paykull, 1789)
Material. 18.II–13.III, 13.III–10.IV, 16.V–19.VI, 12.VII–16.VIII, 17.VIII–19.IX, 19.IX–18.X, 18.X–13.XI.2024, pitfall, 25.

344. *Tachyporus hypnorum* (Fabricius, 1775)
Material. 18.II–13.III, 13.III–10.IV, 10.IV–16.V, 19.VI–11.VII, 12.VII–16.VIII, 19.IX–18.X, 18.X–13.XI, 18.X–13.XI.2024, pitfall, 57.

345. *Tachyporus nitidulus* (Fabricius, 1781)
Material. 18.II–13.III, 13.III–10.IV, 16.V–19.VI, pitfall, 6.

346. *Tachyporus obtusus* (Linnaeus, 1767)
Material. 19.IX.2024, hand, 3.

347. * *Tachyporus solutus* Erichson, 1839
Material. 18.IX.2024, hand, 1.

348. **Thiasophila angulata* (Erichson, 1837)
Material. 16.III, 10.IV–16.V, 17.XI.2024, sieve, pitfall, 59.

349. **Xantholinus linearis* (Olivier, 1795)
Material. 18.II–13.III, 13.III–10.IV, 16.V–19.VI.2024, pitfall, 14.

350. *Xantholinus longiventris* Heer, 1839
Material. 13.III–10.IV, 10.IV–16.V, 16.V–19.VI, 19.VI–11.VII, 12.VII–16.VIII, 19.IX–18.X, 18.X–13.XI.2024, pitfall, 26.

351. * *Xantholinus tricolor* (Fabricius, 1787)
Material. 12.VII–16.VIII, 17.VIII–19.IX.2024, pitfall, 2.

352. *Zyras collaris* (Paykull, 1800)
Material. 16.V–19.VI.2024, pitfall, 1.

353. * *Zyras humeralis* (Gravenhorst, 1802)
Material. 16.V–19.VI.2024, pitfall, 3.

354. *Zyras lugens* (Gravenhorst, 1802)
Material. 16.III, 13.III–10.IV, 16.V–19.VI.2024, hand, pitfall, 18.

Tenebrionidae Latreille, 1802
355. *Lagria hirta* (Linnaeus, 1758)
Material. 18.VI, 19.VI, 12.VII–16.VIII.2024, hand, pitfall, 5.

Tetratomidae Billberg, 1820
356. **Hallomenus axillaris* (Illiger, 1807)
Material. 19.V.2024, hand, 1.

Throscidae Laporte de Castelnau, 1840
357. *Trixagus dermestoides* (Linnaeus, 1767)
Material. 18.V.2024, hand, 1.