

**OBSERVATIONS ON THE COLEOPTERAN FAUNA IN THE FOREST
ECOSYSTEM LOCATED IN THE NECHIT AREA, NEAMŢ COUNTY**

Bardan Marius Vasile¹, Talmaciu Nela^{1*}, Manole Liliana³, Mitrea Ion²,
Prisecariu Liviu Adrian¹, Talmaciu Mihai¹ Ion Ionescu de la Brad¹ University of Life
Sciences, Mihail Sadoveanu, Iasi

¹Ion Ionescu de la Brad¹ University of Life Sciences, Mihail Sadoveanu, Iasi

²University of Craiova, "Al. Buia" Botanical Garden, Craiova

³Phytosanitary Office, Lanii, Brasov

* Correspondence author. E-mail: ntalmaciu@yahoo.com

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ABSTRACT

*In this study, the research material is represented by coleopteran species found in a mixed forest. In this study, the research material is represented by beetle species found in a mixed forest composed of deciduous and coniferous tree species, covering an area of 8 hectares. The forest is located in an area with rich biodiversity, characterized by a natural succession of tree species and a varied pitfall, which is conducive to the development of diverse fauna. This paper focuses on analyzing the structure, dynamics, abundance, and ecological role of beetles within this forest ecosystem, emphasizing their interactions with other species and the abiotic environment. The collection of fauna was carried out using pitfall traps type Barber, which are ecological traps, during the year 2024, from July to September, over a period of three months. A total of 6 traps were installed at various marked locations in the forest, depending on vegetation density, to adequately cover habitat diversity. The material from the traps was collected at regular intervals of 10-14 days to monitor the activity of beetle species. Throughout the study, 6 collections of entomological material were conducted on the following dates: July 10, July 22, July 31, August 14, August 28, and September 11. Among the most frequently collected species are *Poecilus cupreus*, *Necrophorus vespillo*, *Geotrupes vernalis*, *Aptinus bombardata*, and *Silpha carinata*. These species have a significant ecological impact on the ecosystem, playing key roles in organic matter decomposition and nutrient recycling, pollination processes, and controlling populations of harmful insects. Additionally, some of these species may be classified as harmful fauna in certain contexts, having the potential to affect the natural balance of other insect species or even the vegetation. However, overall, the majority of the beetle species collected in this study have a beneficial role and are essential for maintaining the health of the analyzed forest ecosystem.*

INTRODUCTION

When you want to realize a sustainable management of the forests it's absolutely necessary to resolve some important problems like assuring high quality wood saplings (Ene, 1971).

For this reason, it's mandatory that beside the technical works that must be done and that are foreseen by the existing instructions, to apply modern methods of

preventing and controlling the pests existing in the forest nurseries and forest cultures. (Grudnicki, 2006).

The present paper is the beginning of a research concerning the pests from the forest ecosystem from the North-East of Moldavia, Nechit area, Neamt county in 2024.

MATERIAL AND METHODS

To achieve sustainable forest management, it is absolutely necessary to address a significant issue, namely the provision of high-quality forest seedlings. For this reason, in addition to the technical work that must be carried out according to the current forestry instructions and standards, modern methods for preventing and controlling pests present in nurseries and forestry cultures, which often cause significant damage, must be applied (Tăut, 2002).

The research was conducted in 2024 using Barber pitfall traps, and observations were conducted in a stationary in Nechit area, chemical treatments were not applied.

The Barber pitfall traps were used in the research within the forestry ecosystem. For this method, were used the plastic boxes with a volume of 700 ml, a diameter of 10 cm, and a height of 8 cm, and the fixing liquid was a NaCl solution in concentrations of 20%.

In the studied stationary area, six traps were placed, each on a row of trees, positioned inward in a straight line at a distance of 20 m from the edge and 6 to 8 m between traps at a time. Harvesting was done at intervals of 10 to 20 days, totaling 6 harvests in 2024 (Brudea, 2007,2010, Grădinariu et al, 2012).

RESULTS AND DISCUSSIONS

During the first sample collection, conducted on July 10, a total of 38 arthropod specimens belonging to 10 species were collected. The species with the highest number of specimens was *Necrophorus vespillo* from the Silphidae family, with 14 specimens, followed by *Aptinus bombarda* from the Carabidae family, which had 8 specimens.

The other species had between 1 and 5 specimens collected.

Table 1

Collection summary of beetle species from July 10, 2024

No	Species	C1	C2	C3	C4	C5	C6	Total
1	<i>Aptinus bombarda</i>	1	1	-	3	-	3	8
2	<i>Carabus hungaricus</i>	-	-	-	1	-	1	2
3	<i>Ceruchus chrysomelinus</i>	-	-	-	1	-	-	1
4	<i>Cychrus caraboides</i>	1	-	-	-	-	-	1
5	<i>Ectobius lapponicus</i>	-	-	-	-	-	2	2
6	<i>Geotrupes vernalis</i>	2	-	2	-	-	1	5
7	<i>Hister sinuatus</i>	-	-	-	1	-	-	1
8	<i>mecoptere(Panorpa)</i>	-	1	-	1	2	-	4
9	<i>Necrophorus vespillo</i>	-	1	-	13	-	-	14
10	<i>Poecilus cupreus</i>	-	-	-	1	-	-	1
11	<i>Staphilinus olens</i>	-	-	1	1	-	1	3
Total / trap		4	3	3	22	2	8	42

During the second sample collection conducted on July 22, a total of 65 arthropod specimens belonging to 15 species were collected. The species with the highest number of specimens were *Geotrupes vernalis* with 16 specimens and *Atomaria turgida* with 9 specimens. The majority of the species belonged to the Carabidae family, with the most frequently collected being *Poecilus cupreus*, *Aptinus bombarda*, *Pterostichus cylindricus*, and *Carabus coriaceus*.

Table 2

Collection summary of beetle species from July 22, 2024

No	Species	C1	C2	C3	C4	C5	C6	Total
1	<i>Aptinus bombarda</i>	2	-	-	-	-	-	2
2	<i>Archaeognatha (ordin)</i>	-	2	-	-	-	-	2
3	<i>Atomaria turgida</i>	-	-	-	-	-	9	9
4	<i>Brachynus crepitans</i>	-	-	-	-	-	1	1
5	<i>Carabus coriaceus</i>	-	-	-	1	-	1	2
6	<i>Carabus glabratus</i>	1	-	-	-	-	-	1
7	<i>Cychrus semigranosus</i>	-	-	1	-	-	-	1
8	<i>Dadobia immersa</i>	-	-	-	-	-	5	5
9	<i>Geotrupes vernalis</i>	4	-	2	-	2	8	16
10	<i>Mecoptere(Panorpa)</i>	2	1	1	-	-	7	11
11	<i>Necrophorus vespillo</i>	1	-	1	-	-	5	7
12	<i>Oiceoptoma thoracica</i>	-	-	-	-	-	2	2
13	<i>Poecilus cupreus</i>	-	-	-	-	-	1	1
14	<i>Pterostichus cylindricus</i>	1	-	-	-	-	-	1
15	<i>Silpha carinata</i>	-	-	-	-	-	1	1
16	<i>Staphylinus caesareus</i>	-	-	-	-	-	1	1
17	<i>Staphylinus olens</i>	3	-	-	-	-	1	4
Total / trap		14	3	5	1	2	42	67

During the third collection (Table 3), a total of 4 species were collected, amounting to 7 specimens. The species were: *Geotrupes vernalis*, *Necrophorus vespillo*, *Poecilus cupreus*, and *Silpha carinata*.

Table 3

Collection summary of beetle species from July 31, 2024

No	Species	C1	C2	C3	C4	C5	C6	Total
1	<i>Geotrupes vernalis</i>	-	-	-	1	-	1	2
2	<i>Necrophorus vespillo</i>	-	-	-	-	1	-	1
3	<i>Poecilus cupreus</i>	3	-	-	-	-	-	3
4	<i>Silpha carinata</i>	-	-	-	1	-	-	1
Total / trap		3	-	-	2	1	1	7

During the fourth collection, a total of 35 specimens belonging to the following species were collected: *Aptinus bombarda*, *Geotrupes vernalis*, *Necrophorus vespillo*, and *Pterostichus niger*. The species with the highest number of specimens was *Geotrupes vernalis*, with 22 specimens.

During the fifth collection conducted on August 28, a total of 8 specimens belonging to the following species were collected: *Geotrupes vernalis*, with 6 specimens; *Necrophorus vespillo* and *Pterostichus niger*, each with one specimen.

Table 4

Collection summary of beetle species from August 14, 2024

No	Species	C1	C2	C3	C4	C5	C6	Total
1	<i>Aptinus bombardata</i>	-	1	1	-	-	1	3
2	<i>Geotrupes vernalis</i>	1	2	8	-	6	5	22
3	<i>Necrophorus vespillo</i>	-	-	5	-	1	1	7
4	<i>Pterostichus niger</i>	-	1	1	-	-	1	3
Total / trap		1	4	15	-	7	8	35

Table 5

Collection summary of beetle species from August 28, 2024

No	Species	C1	C2	C3	C4	C5	C6	Total
1	<i>Geotrupes vernalis</i>	3	-	1	1	1	-	6
2	<i>Necrophorus vespillo</i>	-	-	1	-	-	-	1
3	<i>Pterostichus niger</i>	-	-	-	-	1	-	1
Total / trap		3	-	2	1	2	-	8

During the sixth collection, arthropods belonging to the following 4 species were collected: *Carabus coriaceus*, *Geotrupes vernalis*, *Otiorhynchus laevigatus*, and *Thalycra fervida*.

Table 6

Collection summary of beetle species from September 11, 2024

Nr.	Specia	C1	C2	C3	C4	C5	C6	Total
1	<i>Carabus coriaceus</i>	-	1	-	-	-	-	1
2	<i>Geotrupes vernalis</i>	-	1	-	-	2	-	3
3	<i>Otiorhynchus laevigatus</i>	-	-	1	-	-	-	1
4	<i>Thalycra fervida</i>	-	-	-	1	-	-	1
Total / trap		-	2	1	1	2	-	6

The highest number of arthropods (54) was collected during the second collection on July 22, 2024. In total, across the 6 collections, 148 specimens belonging to 24 species were collected.

The species with the highest number of specimens were: *Geotrupes vernalis* (54 specimens), representing 36,49% of the total specimens; *Necrophorus vespilo* (30 specimens), representing 20,27% of the total; and *Aptinus bombardata* with 13 specimens, representing 8% of the total collected specimens. The other species had between 1 and 9 specimens collected.

Table 7

Centralized summary of beetle species collection from pitfall trap in 2024

No	Species	C1	C2	C3	C4	C5	C6	Total
1	<i>Aptinus bombardata</i>	3	2	1	3	-	4	13
2	<i>Atomaria turgida</i>	-	-	-	-	-	9	9
3	<i>Brachynus crepitans</i>	-	-	-	-	-	1	1
4	<i>Carabus coriaceus</i>	-	1	-	1	-	1	3
5	<i>Carabus glabratus</i>	1	-	-	-	-	-	1
6	<i>Carabus hungaricus</i>	-	-	-	1	-	1	2
7	<i>Ceruchus chrysomelinus</i>	-	-	-	1	-	-	1
8	<i>Cychrus caraboides</i>	1	-	-	-	-	-	1
9	<i>Cychrus semigranosus</i>	-	-	1	-	-	-	1

No	Species	C1	C2	C3	C4	C5	C6	Total
10	<i>Dadobia immersa</i>	-	-	-	-	-	5	5
11	<i>Ectobius lapponicus</i>	-	-	-	-	-	2	2
12	<i>Geotrupes vernalis</i>	10	3	13	2	11	15	54
13	<i>Hister sinuatus</i>	-	-	-	1	-	-	1
14	<i>Necrophorus vespillo</i>	1	1	7	13	2	6	30
15	<i>Oiceoptoma thoracica</i>	-	-	-	-	-	2	2
16	<i>Otiorhynchus laevigatus</i>	-	-	1	-	-	-	1
17	<i>Poecilus cupreus</i>	3	-	-	1	-	1	5
18	<i>Pterostichus cylindricus</i>	1	-	-	-	-	-	1
19	<i>Pterostichus niger</i>	-	1	1	-	1	1	4
20	<i>Silpha carinata</i>	-	-	-	1	-	1	2
21	<i>Staphilinus olens</i>	-	-	1	1	-	1	3
22	<i>Staphylinus caesareus</i>	-	-	-	-	-	1	1
23	<i>Staphylinus olens</i>	3	-	-	-	-	1	4
24	<i>Thalycra fervida</i>	-	-	-	1	-	-	1
Total / trap		23	8	25	26	14	52	148

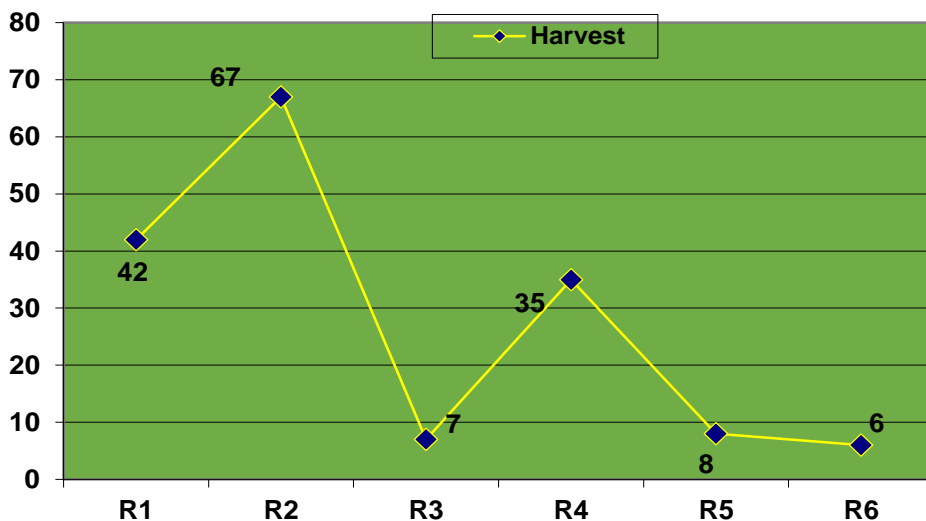


Figure. 1. Graphical representation the number of beetle samples collected after 6th harvests in 2024

It is observed that the highest number of specimens collected in 2024 was recorded during the second collection, while the lowest number of specimens was recorded during the sixth collection (Fig. 1). The recorded collection values ranged widely, from 67 specimens to 6 specimens.

CONCLUSIONS

Observations were made throughout the year 2024, from July to September, in a forest located in the Nechit area of Neamț County.

The collection of material was carried out using 6 Barber-type traps, which were placed at distances of 6-8 meters apart.

A total of 148 specimens of arthropods belonging to 24 species were collected during the entire observation period. Three species—*Geotrupes vernalis*, *Necrophorus vespillo*, and *Aptinus bombardae*—had the highest number of specimens collected.

The other species contributed to a smaller proportion of the total collections, suggesting a lower density or seasonal variation in their activity.

Throughout the observation period, environmental factors such as temperature and humidity were monitored to assess their influence on the activity and distribution of arthropods.

Data analysis revealed that peak activity for the most abundant species occurred at the end of July, correlating with higher temperatures and reduced rainfall.

These findings provide valuable insights into the structure of the arthropod community and the ecological roles of the dominant species in the Nechit forest area. Further studies are recommended to assess long-term trends and the potential impact of environmental changes on arthropod populations.

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