COLEOPTERA SPECIES (INSECTA: COLEOPTERA) FOUND ON THE VILLAGE MEADOW IN AFUMAȚI, AFUMAȚI COMMUNE, DOLJ COUNTY, ROMANIA

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Abstract. This study was conducted on a natural meadow on the edge of the village of Afumați, where the locals take their cattle to pasture. In one month of collection (May, 2024) we collected 50 insects belonging to two families: Histeridae and Scarabaeidae, the largest share being held by individuals belonging to the Scarabaeidae family. The insects collected in the cattle dung are bioindicators for the environment and show us that the area is not polluted: *Hister quadrinotatus* L. G. Scriba, 1790 (Histeridae); *Acrossus luridus* (Fabricius, 1775), *Aphodius (Melinopterus) sphacelatus* (Panzer, 1798), *Onthophagus vaca* (Linnaeus, 1767), *Copris lunaris* (Linnaeus 1758) and *Onthophagus ovatus* (Linnaeus, 1767) (Scarabaeidae). From the point of view of the entomofauna, this is the first study of the area.

Keywords: *village meadow in Afumați, insects, coprophages, Coleoptera, bioindicators.*

Rezumat. Specii de coleoptere (Insecta: Coleoptera) găsite pe pajiștea sătească din Afumați, comuna Afumați, județul Dolj, România. Acest studiu a fost realizat pe o pajiște naturală de la marginea satului Afumați, unde localnicii își duc vitele la pășune. Într-o lună de colectare (mai 2024) am colectat 50 de insecte aparținând a două familii: Histeridae și Scarabaeidae, ponderea cea mai mare fiind deținută de indivizii aparținând familiei Scarabaeidae. Insectele colectate din bălegarul de vite sunt bioindicatori ai mediului și ne arată că zona nu este poluată: *Hister quadrinotatus* L. G. Scriba, 1790 (Histeridae); *Acrossus luridus* (Fabricius, 1775), *Aphodius (Melinopterus) sphacelatus* (Panzer, 1798), *Onthophagus vaca* (Linnaeus, 1767) *Copris lunaris* (Linnaeus 1758) și *Onthophagus ovatus* (Linnaeus, 1767) (Scarabaeidae). Din punct de vedere al entomofaunei, acesta este primul studiu al zonei.

Cuvinte cheie: *pajiștea sătească din Afumați, insecte, coprofage, Coleoptera, bioindicatori.*

INTRODUCTION

The present study was conducted on a meadow on the edge of Afumați village (Dolj county, Romania), where the locals used to graze their cattle. This area has never been investigated from the point of view of entomofauna. In one month of collection (May 2024) and another visit in June -September 2024, we found 50 insects belonging to two families: Histeridae and Scarabaeidae, the largest share being held by individuals belonging to the Scarabaeidae family.

The village of Afumați belongs to the commune with the same name. The commune of Afumati is located in the South of Romania near the Danube (20 km), in plain land. Looking at the map of the county, the commune of Afumați is located in the South of the county, 60 km away from the municipality of Craiova (Figure 1).

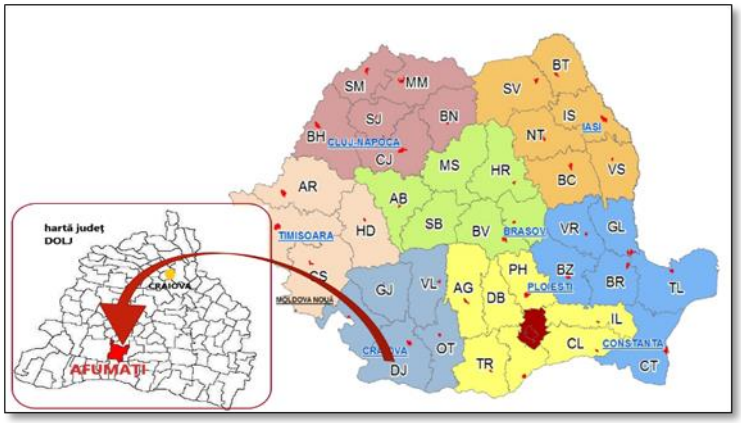


Figura 1. Map processed after: https://fr.wikipedia.org/wiki/Afuma%C8%9Bi_%28Dolj%29; https://www.cniptmoldovanoua.ro/harta-regiuni-romania/.

Afumați commune consists of the following villages: Afumați, Boureni and Covei.

Afumați borders: Urzicuta – to the east, Catane – to the south, Băilești – to the west, Siliștea Crucii – to the north. The locality is located in a plain area of Dolj county, being characterized by agricultural landscapes and fertile lands, typical of the south of the country.

The first documentary attestations regarding Afumați commune are from 1618, from 1941 to 1943 bearing the name Amzulești, after the name of the first shepherd who founded the first settlement here. The toponymic origin of Afumați commune is not known with certainty. The elders say that the name of the commune comes from one of the occupations of the villagers in the past - the people here made charcoal. Therefore, the name of the village would come



Fig. 2. Researched area (processing after Google maps).

from the smoke that covered the forests and the huts in which they lived. Another version would be that in 1864, when the people were privatized, because they were poor, they built houses in the ground called huts. When the lands were parceled out by the delegated engineer and the zapciul, they were impressed, calling the inhabitants afumati, hence the name of the Afumați commune.

The main economic activity of the inhabitants is agriculture, given the quality of the soil and the climate conducive to cereal, leguminous and vine crops as well as animal husbandry (https://www.primaria-afumati-dolj.ro/despre-noi/despre-comuna-afumati/).

The commune has a temperate-continental climate, specific to the plain area, with an average annual temperature of 11 degrees Celsius and an absolute temperature of 41-50 degrees Celsius. Afumați is characterized by fertile soil, chernozem, which favors the agricultural production of large crops, technical plants, vegetable crops, but also animal husbandry for human consumption (Figure 2).

The vegetation is specific to the plain area. This is marked by extensive areas, which highlight the image of a steppe. The spontaneous vegetation has undergone significant changes as a result of human intervention.

The local fauna is mainly composed of rodents, carnivores, reptiles and birds (field mice, ferrets, weasels, water snakes, lizards and toads, nightingales, etc.).

The village also includes water areas (Figure 3a, 2b). The Afumați commune is crossed by two streams: Baboia (alias Baboița) and Balasan, mostly dry this summer.



Figure 3. The Baboia (b) and Balasan (a) rivers (original foto).

There are no protected areas or species reported on the territory of the commune.

The industrial activities carried out in the commune do not constitute sources of environmental pollution, as evidenced by the species of beetles reported in this paper, biological indicators.

Among the species studied, species belonging to the Scarabaeidae family are the most widespread. They play an important role, which makes them useful as bioindicators for assessing habitat quality, so they can be used to monitor the impact of pollution and other environmental disturbances.

This study integrates previous research on the entomofauna of the Oltenia region, completing the existing knowledge about the biodiversity of this region. Our research also complements other studies in the context of climate change. As such, this article provides an important basis for future studies on the insect population, especially coprophagous beetles, in Dolj County, Oltenia Region, Romania.

MATERIALS AND METHODS

To collect the coprophagous insects, we used a jar (in which we added filter paper with 0.4% ethyl alcohol) and wooden sticks that helped us search for insects in the cattle feces. These were transported to the Natural Sciences Section of the Oltenia Craiova Museum, at the Restoration and Conservation Department, where my colleague, the conservator Bălă Lavinia, cleaned and prepared them for exhibition and research.

The study also aims to assess the degree of anthropogenic alteration of ecosystems and to monitor the impact of human activities (grazing, etc.) by analyzing the diversity and abundance of biological indicator beetle species. In order to protect and conserve them, insect populations should be monitored to detect possible decreases or oscillations.

The collections were made this year, in May, in the morning, around 7:30 - 9:30, but also in the afternoon, around 5:30 - 8:30 p.m. We tried to make collections in other months as well - June, July and August, September, but due to the extremely high temperatures (37-45/50^{0}C) the locals did not bring their cattle to graze, and this year there were very few.

The cattle excrement, during that period, from the first grazing until the afternoon, around 5:00 p.m., was already a little dry (Figures 3, 4). Therefore, the solution was to be present in the field in the morning or around 5:00 p.m., in the afternoon, and even then the efficiency was not very high.

The research and sample collection was done on an area of 50000 m^2 of pastures, where the locals bring their cattle to graze. This means approximately 8-12 cow dung, every field day. This was the first time we used this place for research, as it had not been exploited from the point of view of entomofauna. We decided to do more persistent research in this area in the following years, as it is not polluted, and the detected bioindicators are relevant evidence in this regard.

The photographs of the species were taken with an OLYMPUS electronic microscope, Plan N 2x/0.06/∞-/FN22 objective, from the Natural Sciences Section of the Oltenia Museum Craiova.

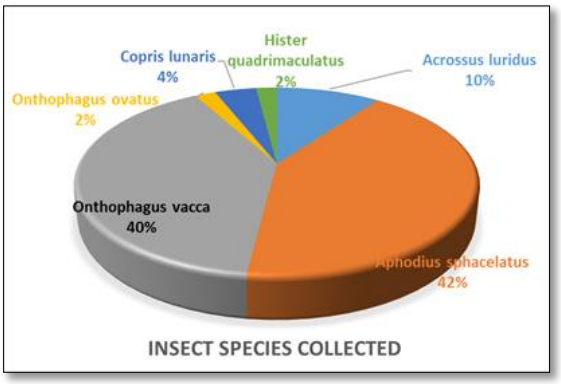
RESULTS AND DISCUSSION

Two families of coprophagous coleopterans were identified, namely: Histeridae and Scarabaeidae, with the largest share being held by the Scarabaeidae family (histograma 1 and 2).

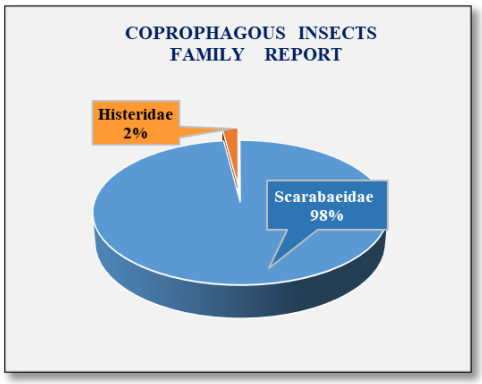
We found six species of the Scarabaeidae family and one species belonging to the Histeridae family, throughout May 2024 (Table 1). In the other months, June - September, no insects were found, for natural reasons, as explained in the text below.

Table 1. Systematic classification, species and number of individuals collected.

No.	Species	Family	Individuals
1	*Acrossus luridus* (Fabricius, 1775)	Scarabaeidae	5
2	*Aphodius (Melinopterus) sphacelatus* (Panzer, 1798)	Scarabaeidae	21
3	*Onthophagus vacca* (Linnaeus, 1767)	Scarabaeidae	20
4	*Onthophagus ovatus* (Linnaeus, 1767)	Scarabaeidae	1
5	*Copris lunaris* (Linnaeus 1758)	Scarabaeidae	2
6	*Hister quadrimaculatus* Linnaeus, 1758	Histeridae	1
	Total	**2**	**50**



Histograma 1. Couprophagous insects found at Afumați, 2025.



Histograma 2. Family insects found at Afumați, 2025.

Below are mentioned and described the insect species found on the Afumați meadow:

1. ***Acrossus luridus* (Fabricius, 1775)**

Insecte Coleoptere Scarabaeiformia Scarabaeoidea Scarabaeidae Aphodiinae Aphodiini *Acrossus*

Acrossus is a genus of beetles in the family Scarabaeidae. There are over 40 described species, found in Asia, Europe, Africa, and the Americas.

The nocturnal dung beetle, *Acrossus luridus* (Figure 4), found in one of the dung heaps (5 specimens), undergoes amazing transformations throughout its life cycle. As larvae, they are voracious detritivores, consuming decaying plant matter, which in turn plays a crucial role in nutrient recycling. Upon reaching adulthood, their diet shifts to fresh vegetation.

This dietary transition signifies not only a change in their ecological role, but also in the habitat in which they live, as they emerge from the ground to participate in the larger terrestrial ecosystem. As adults, the focus shifts to mating and dispersal, as well as feeding. Predators of nocturnal dung beetle larvae include birds, frogs, dung beetles, and rodents, while adults include birds, mammals, and reptiles. Adult nocturnal dung beetles communicate by stridulation, producing sounds by rubbing parts of their bodies together to attract mates or deter predators.

Habitat preferences of nocturnal dung beetles at different life stages: nocturnal dung beetle larvae typically inhabit decaying organic matter such as manure or leaf litter, benefiting from the warm, moist environment to grow, and adults are often found near larval feeding sites, but are also attracted to fresh plant matter. (https://pictureinsect.com/wiki/Acrossus_luridus.html).



Figure 4. *Acrossus luridus* (Fabricius, 1775) (foto original).

2. ***Aphodius (Melinopterus) sphacelatus* (Panzer, 1798)**

Scarabaeoidea: Scarabaeidae: *Aphodius: Melinopterus*: *Aphodius sphacelatus*

In the field we found 21 individuals of *Aphodius (Melinopterus) sphacelatus* (Figure 5). *Aphodius* species typically dominate dung beetle communities in ecosystems. Most species are functionally classified as endocoprids, also known as denizens, because the larvae live and feed inside dung piles.

Recorded: Comarova forest, 27.IV. (Negru. 1957: Negru & Roșea, 1967). Biotope: in fresh dung and in human excrements. Distribution: Europe, including Crimea and Scandinavian countries, the Caucasus, Siberia, Central Asia, Syria, North America (in SERAFIM & MAICAN, 2004).



Figure 5. *Melinopterus (Aphodius) sphacelatus* (foto original).

Until 2013, in Oltenia fauna, there were identified 40 species of the family Aphodiinae of the 88 listed in the Romanian fauna (CHIMIȘLIU, 2004a). Apart from the species mentioned by BALTHASAR (1963) as host species for various parasitic species, in Dolj County, there were identified another 37 species of *Aphodius*, including *A. (M.) sphacelatus* (CHIMIȘLIU, 2001a).

3. ***Onthophagus vacca* (Linnaeus, 1767)**

(Coleoptera: Polyphaga: Scarabaeiformia: Scarabaeidae: *Onthophagus*)

The genus *Onthophagus* is represented in the fauna of Oltenia by 16 species, out of the 24 reported for the fauna of Romania (CHIMIȘLIU, 2004a). All 16 species were identified in the entomofauna of Dolj County, including *O. vacca*.

Previous reports –Novaci (BOBÎRNAC et al., 1999b, CHIMIȘLIU, 2000a, 2000b, 2004b) (in CHIMIȘLIU, 2006).

In the field, we found 20 individuals of *O. vacca* in different dunghills (Figure 6). *O. vacca* is a species of dung beetle, and the specimens found are 7-11 millimeters long. The first pair of legs is strong, with three teeth on the outside and suitable for digging. The head, legs and pronotum are black or dark green, while the elytra are yellowish with small green dots. This species is present in most of Southern Europe, Western Asia and North Africa. It was introduced to Australia in 2014 to improve the processing of cattle manure (https://en.wikipedia.org/wiki/Ontho phagus_vacca).



Figure 6. *Onthophagus vacca* (foto original).

Previous reports: all of Romania (PANIN, 1957); Novaci (BOBÎRNAC et al., 1999b; CHIMIŞLIU, 2000a, 2000e, 2004a); Radomir (LILA, 2017); Botoșani, Suceava County; Ceahlău, Neamț County; Bijighir 1971, Rahova 1995, Iteşti 1997, Filipeşti 1998, Valea Uzului 1993, 2000, Holt 2004-2006 Bacău County (ARINTON, 2017); Piteşti (AG); Gurahonț (AR); Herăstrău (B); Comăneşti (BC); Predeal (BV); Balaurul Hill, Frasinu forest, Izvorul Dulce, Slănic river valley (BZ); Klausbg, Sibenburgen, Cluj Hermannstadt [Transilvania, Sibiu], Valea Fânațelor; (CT) Băltăgeşti, Crucea, Grădina, Gura Dobrogei, Limanu, Vadu, Dobruja [Agigea]; Băneasa - Canaraua Fetei, Esechioi(CJ); Preajba, Rodovan (DJ); Cheile Galbenului, Comana forest (GJ); Hanul Conachi (GL); Comana forest (GR); Hațeg (HD); Büdösfürdő, [Sântimbru, Băile Pucioasa] (HR); Chitila, Pasărea forest (IF); Podu Roș, Poieni, Oțeleni (IS); Turnu Severin, Orșova, Valea Vodiței, Ocol Breșnița, Gura Văii, Strehaia (MH); Nagvnyires [Mireșul Mare], Repedea (MM); Gadinți, Ion Creangă, Roman, Horia, Piatra Neamț, Vulpășești (NT); Colonești (Ot); Azuga, Bușteneri, Sinaia (PH); Valea Lupului: Valea lui David (IS); Cibin Mountains, Turnul Roșu, Sibiu, Viile Sibiului (SB); Satu Mare, Tarna Mare (SM); Zalău (SJ); Maliuc, Partizani, Enisala, Corugea (TL); Nanov forest (TR) (DRĂGHICI et al., 2019).

It is interesting to mention that after the collection I kept the insects in the collection jar for about 2 days and a night because I was in the country for the weekend, and at the beginning of the following week I took them to the Restoration and Conservation Department of the Natural Sciences Section of the Oltenia Museum in Craiova, for preparation. During these 2 days after the collection (the jar, a regular one, was stored in a hallway that was rarely used and I did not check them again), the insects were still alive. This time I prepared the entomological jar with toilet paper and alcohol (sanitary alcohol) because the field trip was spontaneous, not planned and I managed with what I had at hand (Figure 6).

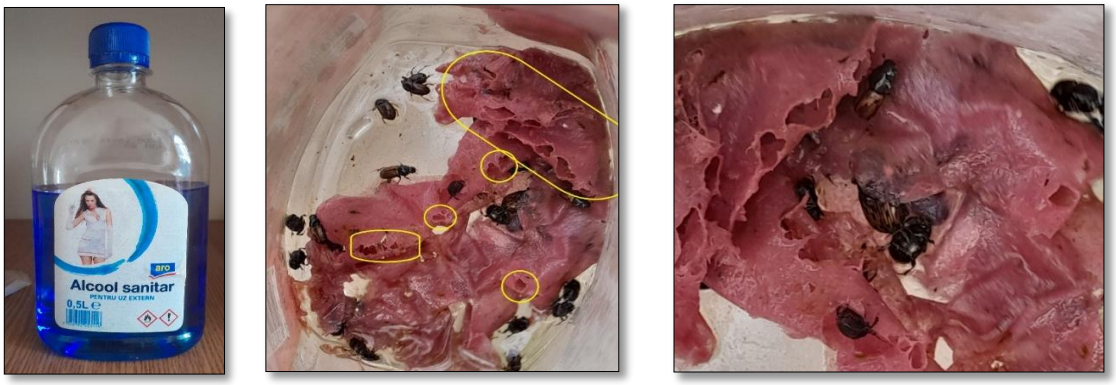


Figure 7. The entomological jar with the collected coprophagous insects and the used alcohol (original photo).

Initially I thought about cannibalism, but their lively behavior caught my attention and I followed them and noticed that there were holes in the toilet paper and they were moving towards it and gnawing at it. I filmed these moments, in the work putting only a freeze frame from the video (Figure 7). My personal conclusion was that, out of the survival instinct, they fed on cellulose, the toilet paper being cruder, not from those prepared with various odorizing substances. Personally, I made an association with cellulose from the plants that cattle feed on and the vegetable remains they eliminate through feces and it is very clearly observed in the dung, especially after 24 hours after defecation, when they are already starting to dry out and insects appear and develop in them. For now, it is a first conclusion, intending to repeat the experience, that is, to use the same paper and alcohol, and also to deepen the information and research on the chemical composition of toilet paper, dung and chemical substances in the diet of insects. So those who have information in this regard are invited to join me.

I mention that the sanitized alcohol was for external use, manufactured on 11/20/2020, older, and the insects did not die as usual, but only got a little dizzy. As a result, in this environment they survived between 52 and 60 hours, about 2 and a half days, because already on Monday morning (May 12, 2025), the 3rd day after collection (they were collected on Friday, May 09, 2025), most of them were no longer alive.

***Onthophagus ovatus* (Linnaeus, 1767)**

Coleoptera; Scarabaeoidea; Scarabaeidae; Scarabaeinae; Onthophagini; *Onthophagus*

It is a type of dung beetle, meaning it primarily feeds and nests using the dung of mammals, typically herbivores and omnivores (Figure 8). Dung beetles are vital for nutrient cycling and fly control. *O. ovatus* has a high synecological affinity with *Onthophagus nuchicornis*, suggesting similar habitat or resource preferences.

As a dung beetle, it inhabits various environments where fresh manure is available, including grasslands, forests, and farmlands.

The species has a wide distribution, recorded across Europe and potentially parts of Asia and North Africa.

Dung beetles are sensitive to environmental conditions, avoiding extremely cold or dry weather. The availability of moist dung is crucial for their life cycle and reproduction.

Previous reports– everywhere (MARCU, 1928, BOBÎRNAC et al., 1999a), the whole Romania (PANIN, 1955), Novaci (BOBÎRNAC et al., 1999b), Tismana, Cloşani, Novaci (Gorj), 1963; Bugiulești (Vâlcea) 1964; Plenița (Dolj), 1972; Craiova - Parc (Dolj), 1973, 1974, 1975; Melineşti (Dolj), 1975; Craiova - Parc (Dolj), 1975, 1978; (CHIMIŞLIU, 2000a, 2000b, 2004b); the floodplain of the Siret River (Holt Village, Letea Veche Commune*)* 2004-2006 (ARINTON, 2009).

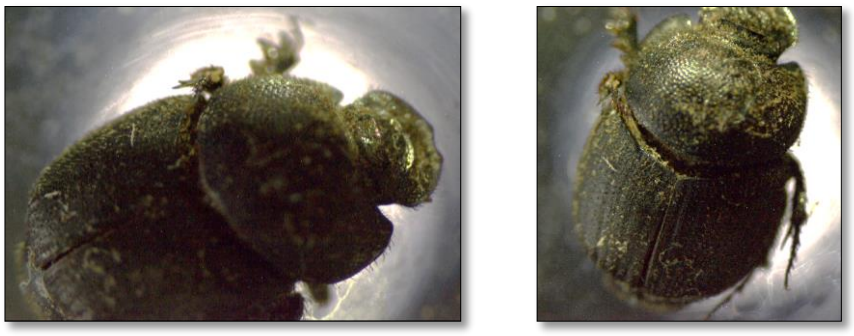


Figure 8. *Onthophagus ovatus* (Linnaeus, 1767) (foto original).

***Copris lunaris* (Linnaeus, 1758)**

Coleoptera: Polyphaga: Scarabaeiformia: Scarabaeoidea: Scarabaeidae: Scarabaeinae: Coprini: *Copris: C. lunaris*

Previous reports– everywhere (MARCU, 1928), Cloşani (MARCU, 1929, BOBÎRNAC et al., 1999a), Novaci (BOBÎRNAC et al., 1999b), Ch. Sohodol (CHIMIŞLIU, 2000b, 2004b) (in CHIMIŞLIU, 2006).

Coprophagous species, found especially in the area of high dicotyledonous steppes, antesteppes and oak. It has been observed up to an altitude of 800 m (PANIN, 1957).

Adults dig 25-30 cm deep galleries under fresh cattle and horse droppings, at the base of which they deposit pieces of droppings for the offspring, which they shape into a pear. The two sexes collaborate in digging the gallery and gathering food supplies. The female remains in the gallery until the new individuals hatch (CHIMIŞLIU, 2014).

Signals in the fauna of Dolj County: BOBÎRNAC & SANDA (1964) – Tâmbureşti; CHIMIŞLIU (2000a) – Craiova; CHIMIŞLIU (2000b) - Almaj, Bucovăţ, Craiova, Leamna, Negoi, Pleniţa, Şimnic, CHIMIŞLIU et al. (2002) - Banu Măracine, Bucovăţ, Calafat, Craiova, Podari; CHIMIŞLIU (2004) - Bechet, Bistreţ, Bratovoeşti, Bucovăţ, Dunăreni, Leamna, Negoi, Pisculeţ, Poiana Mare, Şimnic; FIRU (1982) - Craiova; Craiova - Craioviţa Nouă Pond (in LILA, 2015). To these are added 2 specimens reported this year on the village meadow at Afumați.

***Hister quadrimaculatus* Linnaeus, 1758**

(Coleoptera: Polyphaga: Staphyliniformia: Histeroidea: Histeridae: Histerinae: Histerini: *Hister*)

Histeridae are small beetles, recognized by their short elytra that do not cover the last two segments of the abdomen and by their small antennae that end in a club shape. *Hister quadrimaculatus* is carnivorous and feeds on decaying material and dipteran larvae. However, it also feeds on other beetles that live in the same habitat. The beetle lives in the excrement of various mammals of the Bovidae (cattle) or Ecidae (horses) families. It can also be found in decaying plant matter. When disturbed, it retracts its head, hides its legs, and remains motionless as if it were dead.

H. quadrimaculatus is shiny black, its elytra have 4 red spots. *H. quadrimaculatus*, found in cattle dung, measures approximately 7 mm long and 4 mm wide.

Reports: H. quadrimaculatus – one specimen, Tinca, May 5 (Bihor contry, Crișana, Romania). Common species in Romania, european species (ILIE & MARINESCU, 2024). It has also been reported among the species of coleoptera found under piles of decaying algae in the coastal area (https://www.eib.org/attachments/registers/149581931.pdf).



Figure 9. *Hister quadrimaculatus* (foto original).

The analysis of samples in the Sadaclia steppe area, a village in Basarabeasca district, Republic of Moldova, elucidated for the first time the trophic spectrum of the Danube hedgehog in various types of ecosystems, which consists of representatives of 10 insect families, most of which are harmful, and among these the authors also identified H. quadrimaculatus (NISTREANU, 2024). It has also been reported in the Republic of Moldova (NECULISEANU, 2020). In addition to these, 14 specimens were reported last year (2024) on the meadow at Sălcuța (LILA, 2024) and the 2 specimens found this year on the meadow of the village of Afumați (Figure 9).

Although the trip to the same area was repeated, in September 2025, unlike May 2025 (Figs. 10, 11), we faced a special situation: we found dry and crumbled dung all over the meadow. Only 2-3 were whole. The latter, although they

did not have coprophagous insects, helped us notice that they contained wheat (given as food to the cattle at home, by the locals). The "culprits" were the crows nearby, which fed on the grains in these dung (Figure 12). We could not get closer to them to take photos, because there were dogs in the area guarding the cattle. But we were able to explain why they are not coprophagous insects at this time.



Figure 10. The Afumați meadow in May 2024.



Figure 11. The Afumați meadow in the months of August –September 2024.

In conclusion, all six species are biological indicators, which demonstrate that the area in question is an unaltered ecosystem. Because the presence (availability and volume) of fresh manure is often unpredictable, manure as a resource for insect feeding and reproduction can also be limited, especially in natural areas such as grasslands. However, even in areas where manure is apparently quite common (natural grasslands where people bring their livestock to graze), manure as a resource for supporting insect populations may be rare, or present and scattered, due to natural factors – as is the case here, food for crows (Corvidae, *Corvus frugilegus* Linnaeus, 1758).



Figure 12. Cow dung with grains, crumbled dung and flock of crows (original photo).

This work joins the efforts of specialists who have contributed to the knowledge of the diversity of entomofauna, taking into account the fact that, although insects play an important role in terms of the number of species and individuals in the animal kingdom and contribute to maintaining the biological balance of ecosystems, they are often underestimated, with many groups of insects and large areas being unstudied and unknown to experts.

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