COLEOPTERA SPECIES (INSECTA: COLEOPTERA) FOUND INTHE DESNĂȚUIULUI MEADOW, GIURGIȚA VILLAGE, GIURGITA COMMUNE, DOLJ COUNTY, ROMANIA

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Abstract: The study was conducted on a meadow on the outskirts of Giurgița, where the locals bring their cattle to graze. In two months of collection (April and May, 2023) we found 68 insects belonging to 3 families: Hydrophilidae, Histeridae, Scarabaeidae, the highest weight being held by individuals belonging to the Histeridae family. The insects that have been found in cattle are bioindicators for the environment and show us that the area is not polluted: *Sphaeridium lunatum* Fabricius, 1792 (Hydrophilidae), *Hister illigeri* Duftschmid, 1805, *Hister quadrinotatus* L.G.Scriba, 1790 (Histeridae), *Aphodius fimetarius* (Linnaeus 1758) (Scarabaeidae). From the point of view of entomofauna, this is the first study of the area.

Keywords: Giurgița, Desnățui, insects Coleoptera, coprophages, bioindicators.

Rezumat. Specii de coleoptere (Insecta: Coleoptera) întâlnite în Lunca Desnățuiului, sat Giurgița, comuna Giurgița, județul Dolj, România. Studiul a fost realizat pe o pajiște de la marginea satului Giurgița, unde localnicii își aduc vitele la păscut. În două luni de colectări (aprilie și mai, 2023) am găsit 68 de insecte ce aparțin la 3 familii: Hydrophilidae, Histeridae, Scarabaeidae, ponderea cea mai mare fiind reprezentată de indivizi ce aparțin familiei Histeridae. Insectele ce au fost găsite în fecale de vite sunt bioindicatori pentru mediul înconjurător și ne arată faptul că zona respectivă este nepoluată: *Sphaeridium lunatum* Fabricius , 1792 (Hydrophilidae), *Hister illigeri* Duftschmid, 1805, *Hister quadrinotatus* L.G.Scriba, 1790 (Histeridae), *Aphodius fimetarius* (Linnaeus 1758) (Scarabaeidae). Din punct de vedere al entomofaunei, zona respectivă este pentru prima data studiată.

Cuvinte cheie: Giurgița, Desnățui, coleoptere, coprofage, bioindicatori.

INTRODUCTION

The present study was conducted on a meadow on the outskirts of Giurgița, where the locals bring their cattle to graze. This area was not investigated from the point of view of entomofauna. In two months of collection (April and May, 2023) we found 68 insects belonging to 3 families: Hydrophilidae, Histeridae, Scarabaeidae, the highest weight being held by individuals belonging to the Histeridae family.

The Giurgița commune is located in the southern part of Dolj county, 43 km SW from Craiova, in the central plain of Oltenia, namely in the Băileşti Plain, more precisely in the Măceșului Plain, a subunit of the central plain of Oltenia. It neighbours with the communes of Cerăt, Lipov and the town of Segarcea; to the south, with Bârca; to the east, with Valea Stanciului and Segarcea; to the west, with Urzicuța.

The Giurgița toponym (meadow forest) is taken from the forest in the Desnățuiului meadow, to the west of the village, which that separates Giurgița from the village of Urzica Mare. The commune is attested as of August 29, 1577.

The territory of the Giurgița commune is included in the river basin of the Jiu River, in the area with underground water resources with high vulnerability and with specific resources higher than the average country resource. The hydrographic network that crosses the locality is represented by the Desnățui stream, the only permanent surface water, along which the three villages of the commune have developed. The territory of the commune is also crossed by the Buzatu stream, respectively Balta Giurgița/Buzatu, which limits to the south and west the meadow on which we did the research, and to the north we find the county road DJ 561A Segarcea - Băilești (Figs. 1; 2).

The Giurgița commune has a temperate-continental climate regime, specific to the plain area, with an average annual temperature of 11 degrees Celsius and an absolute temperature of 41 degrees Celsius. Giurgița is characterized by a fertile soil, chernozem, which favours the agricultural production of large crops, technical plants, vegetable crops, but also the growth of animals for human consumption.

Giurgița vegetation is specific to the plain area. It is marked by large surfaces, which highlights the image of a steppe. Also, the village includes a forest area - Giurgița Forest (a future research place because we found defoliator species - Geometidae, *Euproctis* sp., *Lymantria dispar* etc.) (STANCĂ-MOISE, 2014), as well as water areas (Figs. 1; 2). The spontaneous vegetation has undergone significant changes in the last two, as a result of human intervention.

The local fauna is mainly made up of rodents, carnivores, reptiles and birds (squirrels, field mice, ferrets, weasels, water snakes, lizards and toads, quails, partridges, jays, nightingales, etc.).

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

The industrial activities that are carried out in the commune do not constitute sources of pollution of the environment, the proof being the species of coleopter, biological indicators. (https://www.anpm.ro/documents/19431/3612277/Memoriu+general_PUG+Comuna+Giurgita_2016.pdf/2b8fd6a1-cf61-49c7-8bc2-e0cb241fdadf).

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

This study integrates previous research on entomofauna in the Oltenia region, completing the existing knowledge about the biodiversity of this region. Our research also complements other studies in the context of climatic changes. As such, this article tries to register and provide an important basis for future studies on the insect population, especially coprophage Coleoptera in Dolj, Oltenia region.

Also, the study aims to evaluate the degree of anthropic alteration of ecosystems and monitor the impact of human activities (grazing, forestry, etc.) by analysing the diversity and abundance of cockroaches. In order to protect and preserve them, insect populations should be monitored to detect possible decreases.

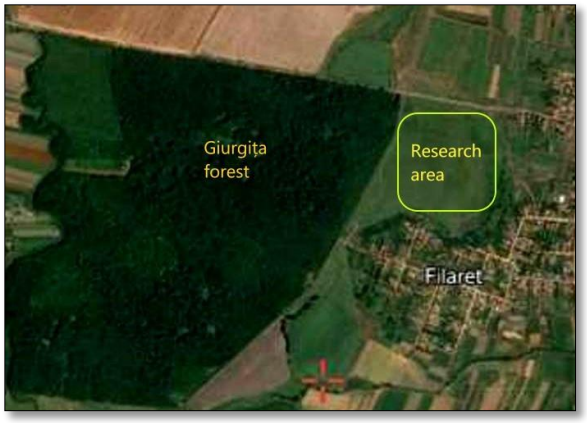


Figure 1. Desnățuiului meadow (Photo processed Internet).

Figure 2. DJ County Road 561A Segarcea - Băilești to whose left we find the meadow and the forest on which scientific research has been performed (original photo 2023).

MATERIALS AND METHODS

In order to collect the coprophage insects, we used a jar in which we added 0.4 % ethyl alcohol filter paper and sticks on the spot that helped us look for insects in cattle feces. These were transported to the section of nature sciences of the Oltenia Craiova Museum, to the Department of Restoration and Conservation where my colleague, preserver Bălă Lavinia, cleaned and prepared them for display (Figs. 3; 4).

Figure 3. The cow grazed on the meadow (original photo L. Gima).

Figure 4. Cow feces (original photo L. Gima).

The collections were made this year, in April and May, in the morning, around the hours 7.30 - 9.30 but also in the afternoon, around 3 pm - 6.30 pm. We also tried to do it at another time (approx. 5 pm) in July and August, but due to the very high temperatures, the insects were already beginning to withdraw to the ground, although they were very active at this time in other years.

The feces of cattle, during the respective period, at the temperatures of that time, from the first grazing (6.30-7.00) until afternoon, around 3-4 pm, were already dry (Fig. 4). So the solution was the presence on the field in the morning or around 3 pm, in the afternoon. The research and collection of the samples was done on an area of 193600 m2 of pastures, where the locals bring their cattle to graze. This means about 10-18 cow dungs, on each field day, in which research has been done within 2 months (April and May, 2023). This was the first time we used this place for research, since it had not been exploited from the point of view of entomofauna. We decided to do more persistent research in this area in the future years, because it is not polluted, and the detected bioindicators are a relevant proof thereof.

Species determination was done using the Biolab Platform.

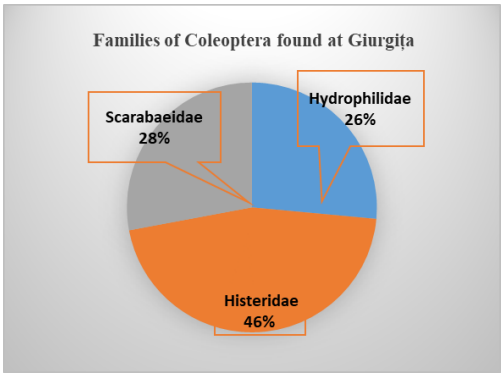
The photos of the found species were taken with Olympus Szx 7 steromicroscope, by Mrs. Boicea Marinela, a chemist investigator at the Restoration-Conservation Laboratory, of the Oltenia Museum.

RESULTS AND DISCUSSIONS

3 families were identified of 68 exemplars insects find, respectively: Hydrophilidae, Histeridae, Scarabaeidae the highest weight being held by the Histeridae family (Table 1; Histogram 1).

Table 1. Systematic classification and number of individuals collected.

No.	Name	Family	Individuals
1	*Sphaeridium lunatum* Fabricius, 1792	Hydrophilidae	18
2	*Hister illigeri* Duftschmid, 1805	Histeridae	16
3	*Hister quadrinotatus* L.G.Scriba, 1790	Subf. Histerinae	15
4	*Aphodius fimetarius* (Linnaeus 1758)	Scarabaeidae	19
	Total	**3**	**68**



Histogram 1. Families of Coleoptera found at Giurgița.

***Sphaeridium lunatum* Fabricius, 1792** (Coleoptera; Hydrophilidae)

Sphaeridium is a genus of beetles in the family Hydrophilidae, the water scavenger beetles. They occur in Europe, and some species have been introduced to North America. The adults are 4 to 7.5 millimeters long. They have short antennae with hairy clubs at the tips.

These beetles live in cow dung. The adults feed on the dung and other organic matter, but the beetle larvae are predators of the maggots of the flies that breed in the dung, such as the face fly (*Musca autumnalis*) (Fig. 5). Two or more *Sphaeridium* beetle species may coexist in one part, and the larvae may feed on each other. The female beetle deposits several eggs encased in a cocoon. (https://en.wikipedia.org/wiki/Sphaeridium).

Sphaeridium lunatum (Fig. 6) is a species of beetles in the family water scavenger beetles (https://eol.org/pages /1173969). The insect specimens we found have length 5.5 to 7.5 mm. A very smooth, blackish dome-shaped beetle with pale yellow elytra tips and faint reddish spots on its sides.

Figure 5. *Musca autumnalis* (foto original L. Gima).

Figure 6. *Sphaeridium lunatum* Fabricius, 1792 (original front / verso photo by Boicea Marinela).

Sphaeridium lunatum (Fabricius 1792) as a species was also reported by Firu Ion in Rânca in 1963, August 22, 24, 2 specs. August 25 as well as in the town of Gura Văii (BOBÎRNAC et al., 1999; MARCU, 1928 in MOGOȘEANU, 2010).

***Hister illigeri* Duftschmid, 1805 (Coleoptera; Histeridae; Histerinae)** (Fig. 7)

Hysterids (Histeridae), also referred to as blunt cockroaches, are a large family of coleoptera (about 3,900 species) with a short, wide, somewhat dorsoventral, strong, glossy tedded body; with knee and masked antennas. The surface of the individuals presents characteristic features: a humeral layering often followed by a sub-humeral ion, followed by 3-4 discs. They are black, some species having red dots on the bodies. They usually feed on vegetable and decomposing animal matter.

Several species are necrophagous being spread on the bodies, others can be coprophages encountered in birds and mammals. There are also species that feed on trees. An important number of hysterids are predatory (species of *Saprinus, Hister*), their larvae attacking adults or larvae of other insects. The species of the *Hololepta* genre live under the bark of the trees and are ipidiophage, being found in the *Ipide* galleries. Some species of Histeride are myrmecophile and are spread in the feces of ants.

The species of the *Hister* genus are encountered in animal dejections, on corpses, rotten fungi and other decaying plant and animal matter (https://ro.wikipedia.org/wiki/Histeride).

Figure 7. *Hister illigeri* Duftschmid, 1805 (original photo Boicea Marinela).

It was also reported in May (11.V.2015) in Surduc (Sălaj county), also on a pasture, besides cow feces. It is mentioned that it was also found in horse feces (OTTO MERKL et al., 2016).

The species is quite widespread in Europe: Austria, Azerbaijan, Albania, Belgium, Bosnia Herzegovina, Bulgaria, Belarus, Hungary, Croatia, Italy, Kazakhstan, Czech Republic, Germany, France, Great Britain, Greece, Macedonia, Poland, Romania, Serbia Slovakia, Slovenia, Spain, Russia: South European Territory, Switzerland, Ukraine. Asia: Afghanistan, Iran, Kyrgyzstan, Kazakhstan, Tajikistan, Turkmenistan, Turkey, Uzbekistan (OTTO MERKL et al., 2016).

***Hister quadrinotatus* L. G. Scriba, 1790 (Coleoptera; Histeridae; Histerinae)**

H. quadrinotatus, in Dolj county, was reported in Tismana (MARCU, 1928 in MOGOȘEANU, 2010). 18 specimens were found in the same cow, in Giurgița, Desnățuiului meadow, whale on April 16, 2023. A theory for the name "Hister" comes

from Juvenal's work, a Romanian poet. Juvenal used the word "Hister" to mean a dirty and humble being. Another theory for the origin of the name of this cockroach comes from the fact that in Latin "Hister" means an actor (Fig. 8).

Figure 8. *Hister quadrinotatus* L. G. Scriba, 1790 (original photo Boicea Marinela).

***Aphodius fimetarius* (Linnaeus 1758)** (Coleoptera: Scarabaeoidae: Aphodiidae: Aphodiinae: *Aphodius*).

Aphodius is a genus of beetles in the Scarabaeidae family. In most species both the adults and larvae are coprophagous (dung feeding) although some species have herbivorous or saprophagous larvae. *Aphodius* species typically dominate dung beetle communities in north temperate ecosystems. Most species are functionally classified as endocoprids, also known as dwellers, because the larvae live and feed within the dung pat itself. Their systematics is uncertain, the subfamily it comprises over 11 tribs with 280 genera and 3200 species. *A. fimetarius* is a common species with coprophagous trophic regime, found in all climatic conditions of Romania. It is frequent in cow and horse manure (CHIMIŞLIU, 2001b; c in LILA, 2017).

A. fimetarius (Linnaeus 1758) alert in fauna Dolj County: BOBÎRNAC et al. (1968) – Tâmbureşti; CHIMIŞLIU (2001a) - Almăj, Bistreţ, Bratovoeşti, Craiova, Poiana Mare, Preajba, Răcari, Segarcea; ILIE & CHIMIŞLIU (2000) – Vârvoru de Jos; LILA (2014) - Bucovăţ, May 22, 2012; May 26, 2012; Făcăi, May 12, 2012 (LILA, 2014); Cernăteşti, May 2, 2016 (LILA, 2017).

The species was also reported in cow whales in the meadow area of Siret (Bacău County, Romania) (ARINTON, 2010) and zimbru dejections (*Bison bonasus* Linnaeus 1758) from Vânatori Neamț Natural Park (Neamț County, Romania) (ARINTON et al., 2012). Also reported was reported from the "Codrii" Scientific Reserve of the Republic of Moldova (BABAN, 2012).

18 copies were collected, one of which had mites on the surface of its body (Arachnida; Mesostigmata; Laelapidae) (Fig. 9). So far, we have not identified the species, and this will be the subject of a separate work.

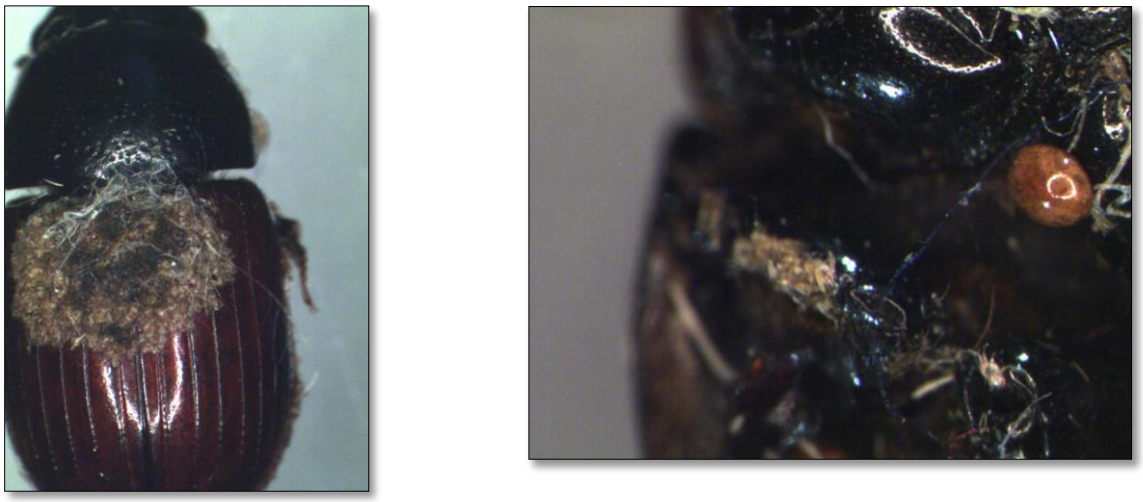


Figure 9. *Aphodius fimetarius* (Linnaeus 1758) with mites (photo by Boicea Marinela).

The total number of species of Aphodine subfamilia known so far in the Oltenia area is 38 species of the 91 mentioned in the fauna of Romania. Following the research undertaken in recent years on this group of insects, we have identified most of the species mentioned above by other authors in the specialized literature (CHIMIŞLIU, 2001a) but also new species (CHIMIŞLIU, 2001b).

CONCLUSIONS

The species, are coprophagic species, with very few exceptions (some species are saprophage or necrophagous). Due to their trophic regime there are useful species, contributing on the one hand to cleaning the environment, on the other hand ensures the circuit of matter in nature.

Through their habit of burying pieces of bell, as a supply of food for progeny or for adults, they also contribute to soil improvement. Although they are often abundant in nature, their living environment, the unpleasant odor released by in cow and horse manure, repulsion to it, is probably the cause for the species of this group of insects has been less studied and known in Oltenia.

This can be one of the reasons why the Lunca Desnățui area, the village of Giurgița, Dolj County was studied for the first time and will be subjected, as well invasive species *Corythucha arctuata* Say, 1832 (Heteroptera: Tingidae), otherwise quite present in recent years and we considered it an opportunity to mention its presence, both for us and for the specialists who research it (STANCĂ MOISE, 2024).

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

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