

OBSERVATIONS OF THE *Lucanus cervus* Linnaeus, 1758 (COLEOPTERA: SCARABAEIDAE) SPECIES IN THE SIBIU AND HUNEDOARA COUNTIES IN THE CONDITIONS OF 2020

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Abstract. The purpose of this work is to bring up-to-date about the spreading of *Lucanus cervus*, by recording its presence in more habitats in the Sibiu and Hunedoara counties as of 2020. The presence of this species and its study also in this year may be an important contribution to its monitoring and may be a datum point for the researchers who will tackle in future subjects related to the specific spreading area for *Lucanus cervus* in Romania. This work includes information related to the place of collecting, GPS coordinates, data of collecting, examinations related to mating ritual, the number of the of recorded samples and the habitats where the species was recorded or captured, in the two counties Sibiu and Hunedoara.

Keywords: *Lucanus cervus*, Sibiu, Hunedoara, Transylvania, Romania.

Rezumat. Observații asupra speciei *Lucanus cervus* Linnaeus, 1758 (Coleoptera: Scarabaeidae) în județele Sibiu și Hunedoara, în condițiile anului 2020. Scopul acestei lucrări este de a prezenta date despre răspândirea speciei *Lucanus cervus*, prin semnalarea prezenței sale în mai multe habitate din județele Sibiu și Hunedoara, în condițiile anului 2020. Prezența acestei specii și studiul ei poate fi o contribuție importantă la monitorizarea acesteia și poate fi un punct de referință pentru cercetătorii care vor aborda în viitor subiecte legate de zona de răspândire a speciei *Lucanus cervus* în România. Lucrarea include informații legate de locul de colectare, coordonatele GPS, date de colectare, etologia legată de ritualul de împerechere, numărul de exemplare semnalate și habitatele în care specia a fost înregistrată sau capturată, în cele două județe, Sibiu și Hunedoara.

Cuvinte cheie: *Lucanus cervus*, Sibiu, Hunedoara, Transilvania, România.

INTRODUCTION

The *Lucanus cervus* Linnaeus, 1758 is a species belonging to Coleoptera, the most speciose and widespread order of the Animal Kingdom; it covers all heterotrophic categories in an ecosystem (NIȚU, 2007). Regarding the situation of this species in Europe, the degree of danger and legal protection were mentioned by different specialists (BARDIANI et al., 2017; BARTOLOZZI & SPRECHER-UEBERSAX, 2006; BARTOLOZZI et al., 2016; CAMPANARO & BARDIANI, 2012; FREMLIN & FREMLIN, 2010; HALIL et al., 2013; HARVEY et al., 2011; HAWES, 2008; MÉNDEZ et al., 2017).

The protection of this species in Romania became important in the moment of the accession to the European Union. After that, Romania had to align to the requirements of the EU concerning the measures for protection of this species and to take conservation measures because of the destruction of natural habitats, which constitutes one of the main threats of this species. Nowadays, *L. cervus* is a protected species in Romania, according to the Emergency Ordinance of the Government no.57/2007 encl. 3 and to the Habitat Directive 92/43/CEE encl.II.

L. cervus has been recorded in different habitats in Romania (IORGU, 2015). Several authors (CHIMIȘLIU, 2006, 2007, 2014; FLECK, 1906; IORGU, 2015; MONTANDON, 1906; NEGRU & ROȘCA, 1967; NICULESCU & MITREA, 2016) published details about its presence in our country and evidenced the distribution, mainly in the afforested zones, at forest margins, on trunks, stumps or on fallen trees, in gardens, parks and areas near forests (TOMAES et al., 2008).

Starting with the year 2000, the author collected and examined record of *L. cervus*, in various habitats in the Sibiu, Harghita, Vâlcea and Hunedoara counties (Romania). Some of these data will be published in the future article.

MATERIAL AND METHODS

In May-July 2020, 45 samples of *L. cervus* (22 females and 23 males), were recorded in various habitats in Biertan, Sibiu, Sibiul, Gusterița (Sibiu county) and Orăștie and Geoagiu (Hunedoara county), Romania (Fig. 1, Table 1).

Some samples were collected in the habitats with timber resources, in the forests of Dumbrava Sibiului and Supărațel or in their neighbourhood, in the ecotone of the foothills of Gusterița Hill or near the Orăștie forest; the samples were collected from old trees, at the border of forests or from grassy areas near forest ecosystems, where the predominant tree species was oak.

The used methods were the signals or observations made in different habitats during the field trips. The duration of the routes coincides with the period of activity of the insects, respectively the months of May-July of 2020. The capture data and observation hours are presented in detail at each signaling location, along with the geographical coordinates and the number of collected specimens.

RESULTS AND DISCUSSIONS

The climate conditions of the sites of collectings and examinations were as follows: the average temperature of May-July was 16-18 °C in the Sibiu county and 18-20 °C in the Hunedora county; the average precipitations were 41-50 mm in the Sibiu county and 51-75 mm – in the Hunedoara county.

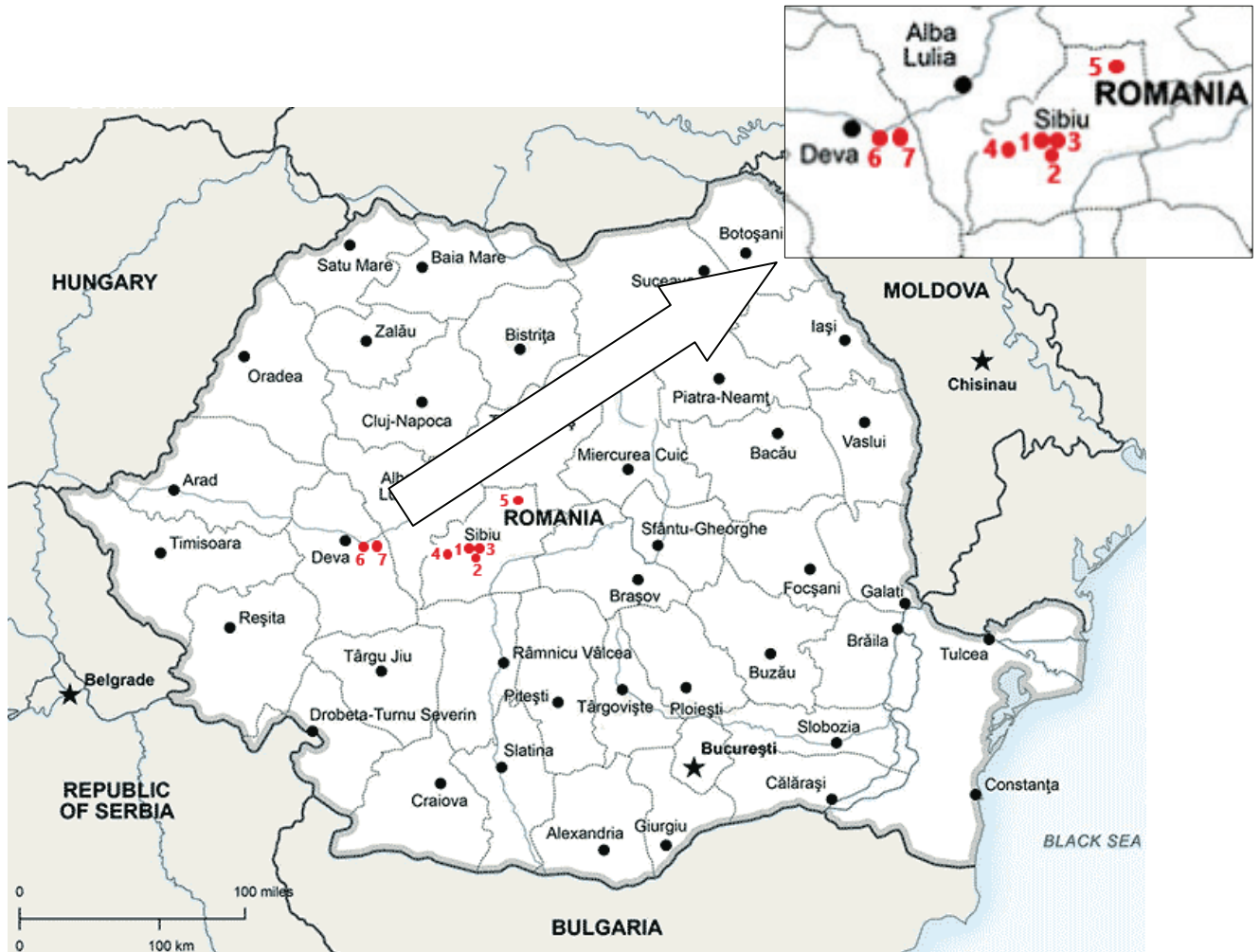


Figure 1. The studied area in Romania: 1 – Sibiu, 2 – Dumbrava Sibiului Forest, 3 – Gusterița, 4 – Sibieli, 5 – Biertan from the Sibiu county, 6 – Orăștie and 7 – Geoagiu from the Hunedoara county, Romania.

Locality: Dumbrava Sibiului forest, Sibiu county.

Collected material : 1 ♀, May 17; 1 ♂, May 18; 1 ♀, 1 ♂, June 22.

Coordinates: 37°57'N and 34°38'E

The Dumbrava Sibiului forest has an area of 109 ha and is characterized by several species of deciduous trees (*Cerasus avium*, *Acer campestre*, *Fraxinus excelsior*, *Populus tremula*, *Ulmus minor*, *Tilia platyphyllos*). The dominant species is *Quercus robur*, many of the oak trees are more than 25 m high and over 800 years old. The grasslands of the forest edge include many herbaceous plants: *Carex brizoides*, *Betonica officinalis*, *Orchis maculata*, *Potentilla erecta*; there are also bushes of *Crataegus monogyna*, *Prunus spinosa*, *Cornus sanguinea*, *Ligustrum vulgare* (STANCĂ-MOISE, 2012).

A part of the captured specimens was recorded on May 17 (female) and May 18 (male) in the grassy area at the skirt of the Dumbrava Sibiului forest, in the western part of the forest, towards the Cisnădioara village. A mating couple was also recorded at the skirt of the forest on June 22, on an oak-tree stump (Fig. 2).



Figure 2. *Lucanus cervus* in Dumbrava Sibiului forest, Sibiu county (original photo).

Locality: City of Sibiu, Sibiu County.

Collected material : 1 ♀, 1 ♂, May 18; 2 ♂♂, 3 ♀♀, June 29.

Coordinates: 45°N and 8°E

The specimens were recorded also on May 18, 2020, when a couple was noticed in a garden in Sibiu, in the grass. The male was trying to locate the female. At the end of June, 2020, five specimens were recorded on a plum-tree stump (Fig. 3).



Figure 3. *Lucanus cervus* in the garden of Sibiu city (original photo).

The collectings and the survey made by various researchers (CUZEPAN & TĂUȘAN, 2013; STAN, 2013) show that in June and then in the second half of July more frequent flies of the species were registered. Aspects are also presented regarding the mating ethology of the species, aspects which were noticed in the period between 23 and 25 of May, earlier as they were known before. Some authors have made records of the mating activity, which took place mainly at the end of May (BĂRBUCEANU et al., 2015; PROCHEȘ, 1997).

After analysing the data of the specialized literature the recording of the species *L. cervus* in Romania made of various entomologists, based on their own collections, or after analysing the data taken over from the entomologic collections which exist in the Romanian Museums of Natural Sciences (BĂRBUCEANU et al., 2015; FUSU et al., 2015; ISTRATE, 2016; STANCĂ-MOISE, 2015, 2016, 2018; STANCĂ-MOISE & TĂNASE, 2016; ȘERBAN, 2013; TATOLE et al., 2009), the period May 17-18, 2020 could be considered rather early for the mating ritual. Out of the specific surveys performed during 2020, we can remark an intense mating activity at the middle of May, as more couples were recorded, in different ecosystems, in different places; this intense activity is due to the specific climatic conditions of 2020 mentioned before.

Locality: Gusterița Hill, Sibiu county.

Collected material: 1 ♂, June 14.

Coordinates: 41°56' N and 47°83' E

The Gusterița Hill site is represented by a tree vegetation consisting of various tree species: *Quercus robur*, *Q. petraea*, *Tilia cordata*, *Cerasus avium*, *Sorbus torminalis* and *Carpinus betulus*.

The grass vegetation consists of the following species: *Galium kitaibelianum*, *G. valantioides*, *Genista ovata*, *Primula columnae*, *Tamus communis*, which confer a southern character on this forest of Gusterița Hill (SCHNEIDER-BINDER, 1971).

The sample collected in June, the 1-st, 18.00 hours was situated on an oak stump, near the access road, at the base of the Gusterița Hill.

Locality: Supărățel Forest, Sibiel village, Sibiu county.

Collected material: 2 ♀♀, 3 ♂♂, June 2.

Coordinates: 58' N and 29' E.

The forest of Supărățel is a forest of deciduous trees, in the western part of the village of Sibiel with the following tree species: *Quercus petraea*, *Carpinus betulus*, *Fagus sylvatica*, *Acer pseudoplatanus*, *Sorbus aucuparia* and *Betula verrucosa* (STANCĂ-MOISE, 2016).



Figure 4. *Lucanus cervus* in Supărățel forest, Sibiel village, Sibiu county (original photo).

The grass of the outskirts of the forest consists of the following species of herbaceous plants: *Festuca rubra*, *Dactylis glomerata*, *Plantago lanceolata*, *Lotus corniculatus*, *Centaurea pannonica* and *Ranunculus acer*. At the border of the forest there are bushes composed of species like *Alnus* sp., *Rosa canina*, *Sambucus* spp., *Salix caprea*, *Salix purpurea*, and *Populus tremula* [29]. The specimens were collected at the beginning of June, at the middle of the forest, from the bark of the trees or from the tree-chumps or under the tree foliage, where couples in a mating ritual were identified (Fig. 4).

Locality: Biertan commune, Sibiu county.

Collected material: 1 ♀, June 12.

Coordinate: 10' N and 15' E

The female specimen was collected at the middle of June, from the inner part of the Biertan fortified church, from a tree chump, at around 12.00 o'clock, when the female lied out in the sun.

Locality: Geoagiu town, Hunedoara county.

Collected material: 13 ♀♀, 11 ♂♂, May 18, 1 ♂, June 20.

Coordinates: 12' N and 00' E

The survey was performed on May 18, in the town of Geoagiu, where the mating ritual of 5 couples of the species *L. cervus* took place around 11.00 o'clock a.m. On that day I monitored 24 specimens of this species. I watched the ethology of the males before copulation and I witnessed a combat between the males for the females, when the males hit each other with

their mandibles. The strongest and most vigorous specimens pushed the weaker males with their legs and wings, throwing them down from the tree stump; after the combat, the winners initiated the mating ritual (Fig. 5).

Locality: Orăștie town, Hunedoara county.

Collected material: 1 ♀, 2 ♂♂, July 2.

Coordinates: 00" N and 00"E

The recorded specimens were collected from a garden in the town of Orăștie. The survey took place at 19.00 hours, when the 3 specimens were sitting on a plum-tree trunk. The two males courted the female with a view to mating.



Figure 5. *Lucanus cervus* in the garden of the Geoagiu town, Hunedoara county (original photo).

Table 1. The total data about specimens of *Lucanus cervus* collected in our researchers.

No.	Locality	Date of report / specimens	Number of Specimens
1	Dumbrava Sibiului forest, Sibiu county	1 ♀, May 17; 1 ♂, May 18; 1 ♀, 1 ♂, June 22	4
2	Sibiu county	1 ♀, 1 ♂, May 18; 2 ♂♂, 3 ♀♀, June 29	7
3	Gusterita Hill, Sibiu county	1 ♂, June 14	1
4	Suparățel Forest, Sibiel village, Sibiu county	2 ♀♀, 3 ♂♂, June 2	5
5	Biertan commune, Sibiu county	1 ♀, June 12	1
6	Geoagiu town, Hunedoara county	13 ♀♀, 11 ♂♂, May 18, 1 ♂, June 20	25
7	Orastie town, Hunedoara county	1 ♀, 2 ♂♂, July 2	3
TOTAL			45

CONCLUSIONS

Recording the species *L. cervus* in the six above-mentioned places, where it was studied and collected under the specific conditions of the year 2020, in the period May-July 2020, we can conclude that this species is a common one for those places. Out of our field studies, we noticed that the preferred habitats are oak-tree forests and the specific life conditions for this species are ensured; that is why this species is present in the habitats where it was identified.

Data about the presence of species in Sibiu county are mentioned by (CUZEPAN G. & TĂUȘAN, 2013) from the Natural History Museum Collections of Sibiu. Some points of collection like the Gușterița Hill were also confirmed by our studies in the years 2018, 2020. The first data about the presence of species in the Gușterița Hill date back to 1889 by Albrecht and Deubel, 1891. The other data are by Hannenheim 1955-1957 and Schneider 1970. The species was collected in Sibiu and its surroundings by many researchers: Albrecht 1917; Müller, 1923, 1929; Worell, 1931, Weyrauch, 1954, 1955, 1958, 1959, 1963, Schneider, 1970, 1976 and Pascu, 1974 (CUZEPAN G. & TĂUȘAN, 2013).

This paper mentions for the first time new data regarding the collection of species in the Sibiu county: Biertan, Dumbrava Sibiului Forest and Sibiel (Supărățel Forest) and also in the Hunedoara county: Geoagiu and Orăștie. These data are important for the knowledge of the areal of the species in comparison with the historical data.

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