

# EARTHWORMS FROM SĂLAJ COUNTY, ROMANIA (OLIGOCHAETA, LUMBRICIDAE)

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**Abstract:** Results of the recent earthworm collecting in Sălaj, Romania are presented, including 9 new records for the region. With the new data the number of earthworm species and subspecies present in Sălaj is now 13. Short remarks on the taxonomically problematic species and biogeographical evaluation are also given.

**Keywords:** earthworms, Lumbricidae, faunistics, Sălaj county, Romania

## INTRODUCTION:

The earthworm fauna of Romania is quite well-known. The first records were published by Örley (1881, 1885) at the end of the 19th century. His work was followed by Victor Pop (1949) and his son, Victor V. Pop, whose intensive researches resulted in recording altogether 71 species and subspecies from the country (Pop *et al.*, 2012). However, since their researches focused on the inner Carpathians and the Apuseni Mts (Pop, 1972a, 1972b, 1989), huge areas remained unexplored. Recent collections in the Maramureș region revealed remarkable diversity and two new lumbricid species were described (Csuzdi *et al.*, 2011), while the investigation of the Southern Carpathians resulted in describing an other species new to science (Szederjesi *et al.*, 2014). Moreover, even the well-explored regions would still hide novelties (Csuzdi *et al.*, 2011).

The Sălaj region was a blank spot regarding its earthworm fauna. Up to now only four species were recorded from here (Pop, 1949), namely *Aporrectodea rosea* f. *typica* [= *Ap. rosea*], *Octodrilus lissaense* [= *Oc. compromissus*], *Lumbricus rubellus* and *Dendrobaena platyura* var. *montana* [= *Fitzingeria platyura montana*]. This present paper summarizes the results of the recent collecting trips to Sălaj County.

## MATERIALS AND METHODS:

Earthworms were collected by the diluted formaldehyde method (Raw, 1959), complemented with digging and searching under stones and fallen logs. The specimens were killed and fixed in 96% ethanol, then transferred into 75% ethanol and deposited in the earthworm collection of the Hungarian Natural History Museum (HNHM). Samples with taxonomic significance were placed into 96% ethanol for further DNA studies.

## RESULTS:

### *Aporrectodea caliginosa caliginosa* (Savigny, 1826)

*Enterion caliginosum* Savigny, 1826: 80.

*Allolobophora caliginosa*: Pop 1949: 435.

*Aporrectodea caliginosa*: Pop *et al.* 2012: 63.

*Aporrectodea* (*Aporrectodea*) *caliginosa caliginosa*: Mršić 1991: 321.

**Material examined:** **HNHM/16963** 1 ex., jud. Sălaj, Tusa (Tuszatelke), Ponor, Izvoarele Barcăului, N47°01.219', E22°44.925', 752 m, edge of beech forest and pasture with spring and stream, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 02.10.2014. **HNHM/16978** 1 ex., jud. Sălaj, between Băbiu (Bábony) and Almașu (Váralmás), shore of Băbiu Stream, N46°57.175', E23°05.757', 337m, stream bank with logs, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 01.10.2014.

**Remark:** *Ap. caliginosa* is a widely distributed peregrine species (Csuzdi and Zicsi, 2003).

### *Aporrectodea rosea* (Savigny, 1826)

*Enterion roseum* Savigny, 1826: 182.

*Allolobophora rosea* f. *typica*: Pop 1949: 451.

*Aporrectodea rosea*: Pop *et al.* 2012: 63.

**Material examined:** **HNHM/16961** 2 ex., jud. Sălaj, Aluniș (Szamosszéplak), N47.371°, E23.267°, 200 m, oak-beech forest and pasture, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 03.10.2014.

**Remark:** Widely introduced peregrine species (Csuzdi and Zicsi, 2003).

### *Dendrobaena attemsi* (Michaelsen, 1902)

*Helodrilus* (*Dendrobaena*) *attemsi* Michaelsen, 1902: 47.

*Dendrobaena attemsi*: Pop *et al.* 2012: 63.

**Material examined:** **HNHM/16975** 1 ex., jud. Sălaj, Iaz (Krasznajáz), valley of the Iaz Stream, N47°05.219', E22°39.066', 380 m, beech forest with stream, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 30.09.2014.

**Remark:** *D. attemsi* is a morphologically highly variable Balkanic-Alpine species with a wide distribution stretching from France (Mršić, 1991) to Greece (Zicsi and Michalis, 1981). It was also introduced to Northern regions and found in greenhouses, e.g. in Hungary (Csuzdi *et al.*, 2008) and Sweden (Rota and Erséus, 1997).

### *Dendrobaena byblica* (Rosa, 1893)

*Allolobophora byblica* Rosa, 1893: 4.

*Dendrobaena byblica*: Pop 1949: 483; Pop *et al.* 2012: 63.

**Material examined:** **HNHM/16974** 5 ex., jud. Sălaj, Iaz (Krasznajáz), valley of the Iaz Stream, N47°05.219', E22°39.066', 380 m, beech forest with stream, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 30.09.2014. **HNHM/16977** 1 ex., jud. Sălaj, Meseş Mts, Huta (Csákyújfalú), N46°59.650', E22°55.688', 560 m, beech forest with stream, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 01.10.2014. **HNHM/16982** 1 ex., jud. Sălaj, Tusa (Tuszatelke), Ponor, Izvoarele Barcăului, N47°01.219', E22°44.925', 752 m, edge of beech forest and pasture with spring and stream, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 02.10.2014.

**Remarks:** *D. byblica* is a taxonomically unclassified species. It was described from the Middle East (Rosa, 1893) and then found all around in the whole Mediterranean. The Romanian *D. byblica* specimens show notable differences from the original description. The clitellum is shorter, stretching on 25–29 instead of 25–30. They possess dark red-violet pigmentation, while the specimens from the Mediterranean have only a slight pigmentation on the head. Thirdly, they have well-developed calciferous diverticula in segment 11.

#### ***Dendrobaena clujensis* Pop, 1938**

*Dendrobaena clujensis* Pop, 1938: 137, 1949: 485; Pop *et al.* 2012: 63.

**Material examined:** **HNHM/16965** 1 ex., jud. Sălaj, Tusa (Tuszatelke), Ponor, N47°00.717', E22°44.526', 830 m, pasture and fern (*Pteridium aquilinum*), leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 02.10.2014. **HNHM/16966** 3 ex., jud. Sălaj, Iaz (Krasznajáz), peat bog and ruins of the bath, N47.111°, E22.659°, 320 m, peat bog and ruins of the bath in an oak forest, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 30.09.2014. **HNHM/16979** 1 ex., jud. Sălaj, Meseş Mts, Pria (Perje), SW slope of Vf. Măgura Priei (Perjei csúcs), N47°00.240', E22°53.796', 838m, Juncus bog at the edge of beech forest and pasture, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 01.10.2014.

**Remark:** *D. clujensis* is a Dacian endemism living solely in the Carpathian Basin (Szederjesi *et al.*, 2014).

#### ***Dendrobaena octaedra* (Savigny, 1826)**

*Enterion octaedrum* Savigny, 1826: 183.

*Dendrobaena octaedra* f. *typica*: Pop 1949: 486.

*Dendrobaena octaedra* var. *quadrivesiculata*: Pop 1949: 487.

*Dendrobaena octaedra*: Pop *et al.* 2012: 63.

**Material examined:** **HNHM/16964** 1 ex., jud. Sălaj, Tusa (Tuszatelke), Ponor, Izvoarele Barcăului, N47°01.219', E22°44.925', 752 m, edge of beech forest and pasture with spring and stream, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 02.10.2014. **HNHM/16968** 1 ex., jud. Sălaj, Iaz (Krasznajáz), peat bog and ruins of the bath, N47.111°, E22.659°, 320

m, peat bog and ruins of the bath in an oak forest, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 30.09.2014.

**Remark:** *D. octaedra* is a widely distributed peregrine species (Csuzdi and Zicsi, 2003).

#### ***Dendrodrilus rubidus rubidus* (Savigny, 1826)**

*Enterion rubidum* Savigny, 1826: 182.

*Dendrobaena rubida*: Pop 1949: 490.

*Dendrodrilus rubidus rubidus*: Pop *et al.* 2012: 63.

**Material examined:** **HNHM/16969** 1 ex., jud. Sălaj, Iaz (Krasznajáz), peat bog and ruins of the bath, N47.111°, E22.659°, 320 m, peat bog and ruins of the bath in an oak forest, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 30.09.2014.

#### ***Dendrodrilus rubidus subrubicundus* (Eisen, 1873)**

*Allolobophora subrubicunda* Eisen, 1873: 51.

*Dendrodrilus rubidus subrubicundus*: Pop *et al.*, 2012: 63.

**Material examined:** **HNHM/16970** 1 ex., jud. Sălaj, Iaz (Krasznajáz), peat bog and ruins of the bath, N47.111°, E22.659°, 320 m, peat bog and ruins of the bath in an oak forest, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 30.09.2014.

**Remark:** Both *Dd. rubidus* subspecies are widely distributed peregrine earthworms (Csuzdi and Zicsi, 2003).

#### ***Eisenia lucens* (Waga, 1857)**

*Lumbricus lucens* Waga, 1857: 161.

*Eisenia submontana*: Pop 1949: 473.

*Eisenia lucens*: Pop *et al.* 2012: 63.

**Material examined:** **HNHM/16971** 1 ex., jud. Sălaj, Treznea (Ördögkút), main valley of the Treznea Stream, N47°06.603', E23°03.866', 377 m, beech forest and pasture, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 29.09.2014. **HNHM/16976** 1 ex., jud. Sălaj, Meseş Mts, Huta (Csákyújfalú), N46°59.650', E22°55.688', 560 m, beech forest with stream, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 01.10.2014. **HNHM/16981** 1 ex., jud. Sălaj, Tusa (Tuszatelke), Ponor, N47°00.572', E22°43.385', 878 m, beech forest, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 02.10.2014.

**Remark:** *E. lucens* shows a wider Central European distribution type with its range stretching from the Iberian Peninsula through the Pyrenees, the Alps and the Carpathians to the Balkan Peninsula (Csuzdi and Zicsi, 2003). The specimens are usually found under the bark of fallen logs.

#### ***Lumbricus polyphemus* (Fitzinger, 1833)**

*Enterion polyphemum* Fitzinger, 1833: 552.

*Lumbricus polyphemus*: Pop 1949: 477; Pop *et al.* 2012: 64.

**Material examined:** **HNHM/16972** 1 ex., jud. Sălaj, Treznea (Ördögkút), main valley of the Treznea Stream, N47°06.603', E23°03.866', 377 m, beech forest and pasture, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 29.09.2014.

**Remark:** *L. polyphemus* shows Central European arboreal distribution (Csuzdi and Zicsi, 2003).

***Lumbricus rubellus* Hoffmeister, 1843**

*Lumbricus rubellus* Hoffmeister, 1843: 187, Pop 1949: 478; Pop *et al.* 2012: 64.

**Material examined:** **HNHM/16967** 1 ex., jud. Sălaj, Iaz (Krasznajáz), peat bog and ruins of the bath, N47.111°, E22.659°, 320 m, peat bog and ruins of the bath in an oak forest, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 30.09.2014.

**Remark:** *L. rubellus* is a peregrine earthworms species that has been introduced extratropically all over the world (Csuzdi and Zicsi, 2003).

***Octodrilus compromissus* Zicsi and Pop, 1984**

*Octodrilus compromissus* Zicsi and Pop, 1984: 245.

*Octolasion lissaense*: Pop 1949: 466.

*Octodrilus compromissus compromissus*: Pop *et al.* 2012: 64.

**Material examined:** **HNHM/16962** 1 ex., jud. Sălaj, Tusa (Tuszatelke), Ponor, Izvoarele Barcăului, N47°01.219', E22°44.925', 752 m, edge of beech forest and pasture with spring and stream, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 02.10.2014. **HNHM/16973** 2 ex., jud. Sălaj, Treznea (Ördögkút), main valley of the Treznea Stream, N47°06.603',

E23°03.866', 377 m, beech forest and pasture, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 29.09.2014. **HNHM/16980** 1 ex., jud. Sălaj, Meseş Mts, Pria (Perje), SW slope of Vf. Măgura Priei (Perjei csúcs), N47°00.240', E22°53.796', 838m, *Juncus* bog at the edge of beech forest and pasture, leg. Zs. Bálint, L. Dányi, G. Katona, D. Murányi, 01.10.2014.

**Remark:** *Oc. compromissus* is a Dacian endemism found in Romania and in the Northeastern part of Hungary (Csuzdi and Zicsi, 2003).

**DISCUSSION:**

The recent faunistic survey of Sălaj resulted in recording altogether 12 earthworm species and subspecies, including 9 new records for the region. The new data raised the number of species known from Sălaj to 13 (Table 1.). The earthworm fauna is dominated by peregrine species (46%), while only two wider Dacian endemisms (*D. clujensis*, *Oc. compromissus*) are represented in the area. The center of this distribution type is most probably the Apuseni Mts, from where these species invaded low-lying forest and grassland habitats (Pop *et al.*, 2010). Among the three Central European species, the presence of *E. lucens* and *F. platyura montana*, and also the Balkanic-Alpine *D. attemsi* reflects Carpathian influence. *D. byblica* is probably a Circum-Mediterranean species, but the taxonomical clarification is essential to make exact statements about its real distribution.

**Table 1.**  
List of earthworm species found in Sălaj, Romania.

Species	Distribution type
<i>Aporrectodea caligininosa caliginosa</i> (Savigny, 1826)	Peregrine
<i>Ap. rosea</i> (Savigny, 1826)	Peregrine
<i>Dendrobaena attemsi</i> (Michaelsen, 1902)	Balkanic-Alpine
<i>D. byblica</i> (Rosa, 1893)	Circum-Mediterranean
<i>D. clujensis</i> Pop, 1938	Dacian endemism
<i>D. octaedra</i> (Savigny, 1826)	Peregrine
<i>Dendrodrilus rubidus rubidus</i> (Savigny, 1826)	Peregrine
<i>Dd. rubidus subrubicundus</i> (Eisen, 1873)	Peregrine
<i>Eisenia lucens</i> (Waga, 1857)	Central European
<i>Fitzingeria platyura montana</i> (Černosvitov, 1932)	Central European montane
<i>Lumbricus polyphemus</i> (Fitzinger, 1833)	Central European
<i>L. rubellus</i> Hoffmeister, 1843	Peregrine
<i>Octodrilus compromissus</i> Zicsi & Pop, 1984	Dacian endemism

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