# Contributions to the knowledge of the Pterophoridae (Lepidoptera) fauna of Romania

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**Summary**: The paper presents 16 species of plume moths sampled at irregular intervals over the last 31 years in different locations of Romania. Aside from the more widespread species, it presents a number of rarely documented ones and it confirms some older, prior to 1980, records. *Hellinsia tephradactyla* (Hübner, 1813) and *Wheeleria obsoletus* (Zeller, 1841) are recorded for the first time from Transilvania. The larval food plants are given for each of the discussed species, as found in recent literature.

**Rezumat** : Articolul prezintă 16 specii de pteroforide capturate la intervale neregulate pe teritoriul României în ultimii 31 de ani. Pe lângă specii comune şi bine cunoscute de pe întreaga zonă explorată, sunt prezentate şi unele specii mai rar întâlnite. Totodată sunt semnalate câteva specii a căror prezenţă era atestată doar de capturi mai vechi, dinainte de 1980. *Hellinsia tephradactyla* (Hübner, 1813) şi *Wheeleria obsoletus* (Zeller, 1841) sunt semnalate pentru prima oara din Transilvania. Fiecare specie discutată are o scurtă notă de precizare a hranei larvare, compilată din sursele bibliografice.

**Key words**: plume moths, Balkan lepidoptera, Carpathian fauna, Eastern European moths

## Introduction

The Pterophoridae is a family of striking moths, with deep clefts in their wings, causing the primaries to have 2 lobes and the secondaries to have 3. This gives the moths a characteristic feathery appearance in flight, whence their vernacular name of plume moths in many languages („fluturi pană de gâscă'' in Romanian). However, the members of the Agdistinae subfamily deviate from this general plan, as they lack the wing clefts.

This family has been the subject of intense research recently. Several papers have dealt with their local distribution in Bulgaria (Buszko 1979), Poland (Buszko 1986) and Eastern Germany (Sutter 1991). Gielis wrote a pan-European revision of the family (Gielis 1996). The whole Palaearctic fauna is in the process of revision by Arenberger in the Microlepidoptera Palaearctica publication series (Arenberger 1995, 2002, 2005).

In an impressive series of papers published in the 1980's, Nel identified and named the host plants of numerous plume moth species (Nel 1986a, 1986b, 1987a, 1987b, 1988, 1989). The Literature section includes only the papers dealing with the species that are being documented in this study. A comprehensive list of Nel's articles can be found in Gielis's listed work.

Important contributions to understanding the Romanian pterophorid fauna were made by Bigot & Popescu-Gorj (1973a, b). Popescu-Gorj published a list with the species known from Romania in which he lists 51 species and an additional 7 of uncertain occurrence (Popescu-Gorj 1984). More recently, Rákosy *et al.* published a comprehensive, annotated list of the Lepidoptera of Romania, in which he expands the country's Pterophoridae to 66 species with only 2 uncertain occurrences (Rákosy *et al.* 2003).

## Material and methods

I present the results of my personal collecting activities in Romania during the final quarter of the last century and the opening years of this century. I sampled the moths in two ways, either at the night, at light sources situated in desirable positions (fields, pastures, forest edges, etc.), or during the day, by sweeping the vegetation in heaths, meadows, forest clearings, along creeks with a standard collecting net.

The light sources were strong mercury vapor lamps at railroad cabins, bus garages, and lumber mills along with my own, small, portable ultraviolet lamp. I dispatched the specimens in jars containing a solution of 3% liquid ammonia ($NH_3$) and preserved them in envelopes with their wings folded until later (sometimes several years later) when I relaxed and spread them. I identified them by external habitus and sometimes by dissection, using the pictorial sources in Gielis. I obtained his expert opinion for uncertain taxa.

## Results and discussion

During the time of the study I was able to sample 44 plume moth specimens pertaining to 16 species, as tabulated in Table 1. In the listing of the species I followed Gielis' arrangement. This table shows also the locality of origin, the dates of capture and the number of specimens encountered. Furthermore I summarized the species recorded from each locality (Table 1).

The most frequently encountered species were *Emmelina monodactyla* (Linnaeus, 1758), *Stenoptilia pterodactyla* (Linnaeus, 1761), *Crombrugghia distans* (Zeller, 1847) and *Pterophorus pentadactyla* (Linnaeus, 1758) with 13, 6, 4 and 4 specimens respectively. *Merrifieldia tridactyla* (Linnaeus, 1758) yielded 3 specimens. *Pselnophorus heterodactyla* (Müller, 1764) was encountered twice, both times in July, but at an interval of many years and at different locations. *Buszkoiana capnodactylus* (Zeller, 1841) and *Merrifieldia baliodactylus* (Zeller, 1841) were found in pairs at the same place on the same date. The remaining 8 species were single encounters as seen in Table 1.

The most frequently encountered species, *Emmelina monodactyla*, appeared in various places (6), virtually in all reasonably warm months of the year, from May until November, as expected from this widespread and year-round flying species. This is also one of the most polyphagous species of the family. Besides the main host plants *Convolvulus arvensis* L., *Calystegia soldanella* (L.) and *Calystegia saepium* (L.), Gielis gives *Chenopodium spp.*, *Atriplex spp.* and *Ipomoea batatas* (L.) as further food sources.

Sutter expands the list with *Polygonium spp.*, *Calluna spp.*, *Erica spp., Vaccinium spp.*, *Senecio spp.* and *Antirrhinum spp.* This outstanding feeding versatility has allowed this species to establish itself in the entire Palaearctic region.

The next most frequently encountered species, *Stenoptilia pterodactyla*, turned up in 4 locations, all in the foothills of the Carpathian Mountains, around the city of Braşov. Its occurrence on Tâmpa Mt. is somewhat surprising because this place is mainly a xeric habitat and the moth's host plant, *Veronica chamaedrys* L. grows in wet meadows, marshes and on shady slopes according to Gielis. The other 3 localities, Lempeş Hill, Vâlcele village and Breţcu village have extensive wet meadows and heaths that allow the host plant to thrive.

Four specimens of *Crombrugghia distans* were recorded from 4 different places, 3 around Bucharest and 1 near Braşov. The June, August, September and October dates seem to confirm the 3 yearly generation flight periods given by Sutter. This is another species with a long food plant list. Aside from the primary *Crepis capillaris* (Wallgren) and *Crepis tectorum* (L.), the larvae are able to utilize various other *Crepis* species as well as *Hieracium pilosella* L., *Picris hieracioides* L., *Sonchus asper* L. and *Cichorium intybus* L. Consequently, the species is widespread from the Atlantic coast in Europe and Northern Africa, through Asia Minor and the Caucasus region, to Southern Siberia.

The 4 specimens of *Pterophorus pentadactyla* were encountered on 3 occasions, in different, low elevation locales in May and July. This scarcity is somewhat surprising because the moth is very widespread and common. It shares the usage of *Convolvulus arvensis* L. and *Calystegia saepium* (L.) with *Emmelina monodactyla*.

*Merrifieldia tridactyla* was found on 2 occasions, in the mountains over 1000 meters in July. The various species of *Thymus* and *Mentha* growing in those places and used as food sources by the larva, allow this species to inhabit higher altitude habitats.

*Pselnophorus heterodactyla* turned up twice, both in mountain forests of low elevation (under 800 m) in July. This elevation plant community contains *Mycelis muralis* L., *Prenanthes purpurea* L. and *Lapsana communis* L. on which the larvae feed. This species is known from a few, older records (prior to 1980). Both my samples are more recent, one from 1981 the second from 1998.

The 2 encountered *Merrifieldia baliodactylus* specimens came from Tâmpa Mt., in Braşov, at 800 m altitude, in mid July. This moth's food plant, *Origanum vulgare* L. grows abundantly there. This is another scarcely recorded species, whose presence I am able to confirm in southern Transilvania.

Two specimens of *Buszkoiana capnodactylus* were sampled along a forest creek near Braşov in May. The host plant, *Petasites hybridus* G., M. & S. grows in wet, shady woodland conditions, along creeks, according to Gielis. The plant is much more widespread than the moth associated with it, of which there are only isolated records. Interestingly, the plant is growing in the Northern United States as an introduced species but the insect has not been found there (Albu 2006).

I found 1 specimen of *Gilmeria tetradactyla* (Linnaeus, 1758) just outside the city of Târgu-Mureş, on the walls of a gas station, in July. This is a very likely place for a moth whose food plant, *Tanacetum vulgare* L. thrives along roadsides.

The only specimen of *Stenoptilia stigmatodactylus* (Zeller, 1852) comes from Tâmpa Mt. in Braşov. It was recorded in July. The larval host plants, *Thymus vulgare* L. and *Scabiosa ochroleuca* L., are abundant on the mountain crest.

Table 1. Recorded Pterophoridae species with place and date of origin. Abbreviations: IOR – Intreprinderea de Optică Română; Mt./Mts – Mountain/s; RR – Rail Road

| | **Genus** | **species** | **County** | **Locality** | **Year** | **Month** | **Day** | **NR.** |
|---|---|---|---|---|---|---|---|---|
| 1 | *Gilmeria* | *tetradactyla* | Mureş | Tîrgu-Mureş | 1998 | July | 16 | 1 |
| 2 | *Stenoptilia* | *pterodactyla* | Braşov | Braşov, Timpa Mt., 800 m. | 1982 | June | 12 | 1 |
| | *Stenoptilia* | *pterodactyla* | Braşov | Braşov, Timpa Mt., 800 m. | 1991 | July | 17 | 1 |
| | *Stenoptilia* | *pterodactyla* | Braşov | Braşov, Lempes Hill | 2002 | June | 17 | 1 |
| | *Stenoptilia* | *pterodactyla* | Braşov | Braşov, Lempes Hill | 2007 | May | 29 | 1 |
| | *Stenoptilia* | *pterodactyla* | Covasna | Vîlcele Village | 1981 | June | 19 | 1 |
| | *Stenoptilia* | *pterodactyla* | Covasna | Breţcu Village | 1982 | July | 23 | 1 |
| 3 | *Stenoptilia* | *stigmatodactylus* | Braşov | Braşov, Timpa Mt., 800 m. | 1991 | July | 17 | 1 |
| 4 | *Buszkoiana* | *capnodactylus* | Braşov | Hoghiz, Bogata Forest | 2007 | May | 27 | 2 |
| 5 | *Cnaemidophorus* | *rhododactyla* | Ilfov | Pasarea Forest | 1976 | July | 4 | 1 |
| 6 | *Marasmarcha* | *lunedactyla* | Braşov | Drăuşeni Village | 1981 | June | 20 | 1 |
| 7 | *Oxyptilus* | *parvidactyla* | Hunedoara | Sibişel Village | 2001 | July | 10 | 1 |
| 8 | *Crombrugghia* | *distans* | Ilfov | Chitila Village | 1979 | September | 22 | 1 |
| | *Crombrugghia* | *distans* | Ilfov | Buciumeni RR cabin | 1982 | October | 15 | 1 |
| | *Crombrugghia* | *distans* | Giurgiu | Calugăreni | 1980 | August | 17 | 1 |
| | *Crombrugghia* | *distans* | Braşov | Braşov, Lempes Hill | 2002 | June | 15 | 1 |
| 9 | *Pselnophorus* | *heterodactyla* | Caraş-Severin | Băile-Herculane, Domogled Mt | 1981 | July | 3 | 1 |
| | *Pselnophorus* | *heterodactyla* | Braşov | Hoghiz, Bogata Forest | 1998 | July | 11 | 1 |
| 10 | *Hellinsia* | *osteodactylus* | Ilfov | Bucureşti, IOR Park | 1980 | August | 11 | 1 |

Table 1. Recorded Pterophoridae species with place and date of origin. Abbreviations: IOR – Intreprinderea de Optică Română; Mt./Mts – Mountain/s; RR – Rail Road

| | Genus | species | County | Locality | Year | Month | Day | NR. |
|---|---|---|---|---|---|---|---|---|
| 11 | *Hellinsia* | *tephradactyla* | Braşov | Hoghiz, Bogata Forest | 1998 | July | 11 | 1 |
| 12 | *Emmelina* | *monodactyla* | Ilfov | Chitila Village | 1979 | September | 25 | 1 |
| | *Emmelina* | *monodactyla* | Ilfov | Buciumeni RR cabin | 1980 | November | 27 | 1 |
| | *Emmelina* | *monodactyla* | Ilfov | Buciumeni RR cabin | 1982 | September | 7 | 2 |
| | *Emmelina* | *monodactyla* | Ilfov | Buciumeni RR cabin | 1982 | November | 18 | 1 |
| | *Emmelina* | *monodactyla* | Ilfov | Buciumeni RR cabin | 1982 | November | 22 | 2 |
| | *Emmelina* | *monodactyla* | Ilfov | Bucureşti, IOR Park | 1979 | October | 21 | 1 |
| | *Emmelina* | *monodactyla* | Giurgiu | Calugăreni | 1982 | October | 24 | 1 |
| | *Emmelina* | *monodactyla* | Caraş-Severin | Băile-Herculane | 1998 | June | 28 | 2 |
| | *Emmelina* | *monodactyla* | Braşov | Braşov, Lempes Hill | 2007 | May | 29 | 1 |
| | *Emmelina* | *monodactyla* | Hunedoara | Sibişel Village | 2001 | July | 10 | 1 |
| 13 | *Merrifieldia* | *tridactyla* | Braşov | Fundata Village, Bran Mts. | 1998 | July | 13 | 1 |
| | *Merrifieldia* | *tridactyla* | Prahova | Sinaia, Păduchiosu Mt. | 1998 | July | 12 | 2 |
| 14 | *Merrifieldia* | *baliodactylus* | Braşov | Braşov, Timpa Mt., 800 m. | 1991 | July | 17 | 2 |
| 15 | *Wheeleria* | *obsoletus* | Braşov | Hoghiz, Bogata Forest | 1998 | July | 11 | 1 |
| 16 | *Pterophorus* | *pentadactyla* | Ilfov | Buciumeni RR cabin | 1981 | May | 26 | 1 |
| | *Pterophorus* | *pentadactyla* | Braşov | Braşov, Timpa Mt., 800 m. | 1998 | July | 14 | 1 |
| | *Pterophorus* | *pentadactyla* | Hunedoara | Sibişel Village | 2001 | July | 10 | 2 |

I sampled 1 specimen of *Cnemidophorus rhododactyla* ([Denis & Schiffermüller], 1775) in Pasărea Forest near Bucharest in July. Its food plant is *Rosa canina* L. along with other *Rosa* species, including *Rosa rugosa* Thunb., which is widely cultivated in Eastern North America. Consequently, this species has a holarctic distribution area.

The sole *Marasmarcha lunaedactyla* (Haworth, 1811) specimen comes from the village Drăuşeni, 80 km north of Braşov, a place with a mixture of xeric and riparian habitats. It was encountered in June in a heath. Its larvae feed on *Ononis repens* L. and other *Ononis* species, which, according to Gielis, grow in dry meadows and along roadsides.A sample of *Oxyptilus parvidactyla* (Haworth, 1811) came from Sibişel village, in the foothills of the Retezat Mountains, in July. The moth does not stray far from its food plant, *Hieracium pilosella* L.

The *Hellinsia osteodactylus* (Zeller, 1841) record comes from a patch of undeveloped land inside the city of Bucharest, in August. On this small patch grow strands of *Solidago virgaurea* L. and *Senecio nemorensis* L., which are this insect's food plants.

The only specimen of *Hellinsia tephradactyla* (Hübner, 1813) was encountered in Bogata forest, near Braşov, in July. This species' food source is somewhat similar to the previous one's, namely *Solidago virgaurea* L. along with *Aster bellidiastrum* Scop. and *Bellis perennis* L. This species is not recorded as occurring in Transilvania by Rákosy *et al.*, so it is most likely a first record for the region.

The same Bogata forest yielded one sample of *Wheeleria obsoletus* (Zeller, 1841) in July. The larva is recorded feeding on *Phlomis cretica* Pers. and *Marrubium peregrinum* L. In the past this species was only known to occur south of the Carpathian Mountains. As the previous species, this appears to be a first record for Transilvania.

The 16 species of the Pterophoridae family recorded in this study represent 24 % of the recognized fauna of the country (66 species). Some of the species are cosmopolitan (*Em. monodactyla*, *Cn. rhododactylus*, *Cr. distans*, *Pt. pentadactyla*). Others have a more limited and patchy distribution (*Gi. tetradactyla*, *Bu. capnodactylus*, *Ma. lunedactyla*, *Wh. obsoletus*).

A conspicuous absence from this study's results is the representation of the genus *Agdistis*. Aside from the usual serendipity factor associated with any fieldwork, this lack of records is probably explained by the mainly southern and southeastern distribution of this genus, in parts of Romania that I did not sample.

From Table 1 it becomes apparent that the surroundings of Braşov and Bucharest were the most investigated areas. Braşov and Covasna county localities yielded 12 of the 16 recorded species (75%). Ilfov and Giurgiu county localities, including the city of Bucharest produced 5 of the 16 species (31%). Hunedoara, Caraş-Severin, Prahova and Mureş county localities were visited very sporadically and consequently contributed very few records.

The 31 years long time span of this study, from 1976 to 2007, is somewhat misleading. The 3 years from 1979 to 1982 saw a more concertated and yearround sampling effort. During the next 8 years, from 1983 to 1990, there was no collecting at all. Beginning in 1991, the sampling was resumed sporadically, during 1 or 2 weeks of summer vacationing, in irregular years.

## Conclusions

Between 1976 and 2007, I was able to record 16 pterophorid species through sporadic sampling of a limited area of Romania. This represents roughly a quarter of the recognized fauna of the country, listed at 66 species. I did not generate any new records for the territory, but I recorded *He. tephradacyla* and *Wh. obsoletus* for the first time in Transilvania. I also confirmed several sporadically encountered species: *Gi. tetradactyla*, *Bu. capnodactylus*, *Ma. lunedactyla* and *Me. baliodactylus*.

The ongoing research in this family's biology has offered me the opportunity to list the most pertinent food plants for all the encountered species, allowing for a more complete picture of these fascinating insects.

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