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## **New checklist of species of the family Scathophagidae (Diptera) from the Czech Republic, Slovakia and Austria, with notes on some species**

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**A b s t r a c t .** In the present checklist, 85 species of the family Scathophagidae are listed for the Czech Republic (82 for Bohemia, 62 for Moravia), 65 species for Slovakia and 69 for Austria.

**K e y w o r d s :** Scathophagidae, checklists, Austria, Czech Republic, Slovakia, Central Europe, Palaearctic Region.

### **Introduction**

The present status of the family is well-founded and unambiguous, with the following principal characters: lower calypter (squama alaris) greatly reduced and linear, head more or less spherical and eyes in both sexes wide apart, frontal vitta in both sexes wide and without a pair of crossed frontal bristles, second antennomere with distinct and complete dorsal longitudinal seam, venation of wing almost constant and without a strong costal spine at end of subcostal vein, katepisternum with one to three bristles, two pairs of gonapophyses.

The adults occur in sheltered and moist habitats of various types: forest, lowland to montane meadows, littoral vegetation of brooks or rivers, marshes, peat-bogs etc. Adults are phytophagous or predaceous, hunting small insects, whilst others are coprophagous and perhaps saprophagous; several arctic species have often been observed on carrion. The females lay the eggs on the surface of leaves or they are inserted into the leaf tissue or other substrates. The larvae are phytophagous and mine in the leaves of *Nuphar luteum* and stems (*Hydromyza livens*), in *Carex* spp. (*Cordilura* spp.) and particularly in monocotyledonous plants (*Americina* spp.), other larvae live in soil or stagnant and running water; the larvae of some species occur in excrement, feeding mostly as predators; the larval development is only known for a limited number of species. KUTTY et al. (2007) demonstrate that phytophagy in the form of leaf mining is an ancestral larval feeding habit for Scathophagidae and from phytophagy two shifts to saprophagy and one shift to predation has occurred with a second origin of predation from a saprophagous ancestor. The phylogenetic relationships within the family are now generally well understood; two subfamilies, Deliniinae and Scathophaginae (COLLIN 1958), and eight tribes (ŠIFNER 2003) are recognised. The family Scathophagidae along with the families Fannidae, Muscidae and Anthomyiidae constitute the superfamily Muscoidea within the Calypttratae. The

phylogenetic position of the family Scathophagidae among Muscoidea, the phylogenetic relationships within the family Scathophagidae in general, and within the genus *Scathophaga* in particular, as well as the taxonomic status of some species have been investigated using various genetic markers (BERNASCONI et al. 1999, BERNASCONI 2000, BERNASCONI et al. 2000a, b, 2001, 2010). The genus *Scathophaga*, in the existing conception, is distinguished from other genera by important characters. It is noteworthy that the genus *Scathophaga* is not monophyletic according to the molecular study by BERNASCONI et al. (2000a, b, 2001); this is also confirmed by the heterogeneity of certain morphological characters: the shape of male abdominal sternite 5, the shape of male pregonite etc (ŠIFNER 2020).

### Material and methods

The abbreviations used in the text are as follows:

CZ = Czech Republic, B = Bohemia (part of CZ), M = Moravia (part of CZ), Sk = Slovakia, A = Austria.

In this paper two subfamilies are recognised: the Deliniinae and the Scathophaginae (COLLIN 1958); in certain cases, the system proposed by ŠIFNER (2003, 2008) is applied. The tribes, genera and species are arranged alphabetically.

The species deposited in Naturhistorisches Museum in Wien (NHMW) in Austria (all species with labels and dates, det. Šifner since 1973 up to 1975) were used for the comparison general view and species composition of this family in Central Europe. These specimens, for the most part, originate from old entomologists from the end of the 19<sup>th</sup> century (Handlirsch, Mik and many other entomologists from the period of Austria-Hungary) contain very important specimens for study; from a contemporary perspective: rare specimens of great scientific value.

Table 1: List of scathophagid species recorded in the Czech Republic (CZ), Bohemia (B, part of CZ), Moravia (M, part of CZ), Slovakia (Sk), and Austria (A)

	CZ	B	M	Sk	A	Note
Deliniinae ROBINEAU-DESVOIDY, 1830						
Delinini ŠIFNER, 2003						
<i>Americina</i> MALLOCH, 1923						
<i>media</i> (BECKER, 1894)	x	x	x	x	x	
<i>veratri</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>Delina</i> ROBINEAU-DESVOIDY, 1830						
<i>nigrita</i> (BECKER, 1894)	x	x	x	x	x	
<i>Leptopa</i> ZETTERSTEDT, 1838						
<i>filiformis</i> ZETTERSTEDT, 1838	x	x	x	x	x	
<i>Micropselapha</i> BECKER, 1894						1
<i>basovi</i> OZEROV, 2010	x	x				
<i>filiformis</i> (ZETTERSTEDT, 1846)	x	x	x	x	x	
<i>Mirekiana</i> ŠIFNER, 2012						

	CZ	B	M	Sk	A	Note
<i>anthrax</i> (SCHINER, 1864)	x	x	x	x	x	2
<i>Neochirosia</i> MALLOCH, 1917						
<i>nigriceps</i> (BECKER, 1894)	x	x	x	x	x	
<i>cepelaki</i> TESCHNER, 1987)				x		3
<i>veratri</i> (HENDEL, 1924)				x	x	4
Scathophaginae ROBINEAU-DESVOIDY, 1830						
Amaurosomini ŠIFNER, 2003						
<i>Amaurosoma</i> BECKER, 1894						
<i>armillatum</i> (ZETTERSTEDT, 1846)	x	x	x	x	x	
<i>articulatum</i> BECKER, 1894	x	x	x	x	x	
<i>bernasconii</i> ŠIFNER, 2008	x	x	x			
<i>brevifrons</i> (ZETTERSTEDT, 1838)	x	x	x	x	x	
<i>fasciatum</i> (MEIGEN, 1826)	x	x	x	x		
<i>flavipes</i> (FALLÉN, 1819)	x	x	x	x	x	
<i>inermis</i> BECKER, 1894	x	x	x	x	x	
<i>longicorne</i> (VON ROSER, 1840)					x	
<i>leucostomum</i> (ZETTERSTEDT, 1846)	x	x	x		x	
<i>minutum</i> BECKER, 1894	x	x	x			
<i>puberulum</i> BECKER, 1894	x	x	x	x	x	
<i>tibiellum</i> (ZETTERSTEDT, 1838)	x	x	x	x	x	
<i>Gabreta</i> ŠIFNER, 2015						
<i>macai</i> ŠIFNER, 2015	x	x				
<i>Gonatherus</i> RONDANI, 1856						
<i>planiceps</i> (FALLÉN, 1826)	x	x	x	x		
<i>Julienomyia</i> ŠIFNER, 2015						
<i>miroslavi</i> ŠIFNER, 2015	x	x				
<i>Orthachaeta</i> BECKER, 1894						
<i>pilosa</i> (ZETTERSTEDT, 1838)	x	x	x	x	x	
Cleigastrini ŠIFNER, 2003						
<i>Acerocnema</i> BECKER, 1894						
<i>macrocera</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>Cleigastra</i> MACQUART, 1835						
<i>apicalis</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>Gonarcticus</i> BECKER, 1894						
<i>abdominalis</i> (ZETTERSTEDT, 1846)	x	x			x	
<i>Hexamitocera</i> BECKER, 1894						
<i>loxocerata</i> (FALLÉN, 1826)					x	
<i>martineki</i> ŠIFNER, 2003	x	x	x	x		
<i>Jezekia</i> ŠIFNER, 2009						
<i>kmenti</i> ŠIFNER, 2009	x	x				

	CZ	B	M	Sk	A	Note
<i>Megaphthalma</i> BECKER, 1894						
<i>pallida</i> (FALLÉN, 1819)	x	x	x	x	x	
<i>Spathephilus</i> BECKER, 1894						
<i>nigriventris</i> (LOEW, 1864)	x	x	x	x	x	
<i>Hajekiana</i> ŠIFNER, 2015						
<i>orlicensis</i> ŠIFNER, 2015	x	x				
Cordilurini ŠIFNER, 2003						
<i>Cordilura</i> FALLÉN, 1810						
<i>aemula</i> (COLLIN, 1958)	x	x	x			
<i>atrata</i> (ZETTERSTEDT, 1846)	x	x	x	x	x	
<i>albilabris</i> (FABRICIUS, 1794)	x	x	x	x	x	5
<i>ciliata</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>picipes</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>pudica</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>rufipes</i> (MEIGEN, 1826)	x	x	x	x	x	6
<i>rufimana</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>umbrosa</i> (LOEW, 1873)	x	x	x	x	x	
<i>Norellisoma</i> WAHLGREN, 1917						
<i>alpestre</i> (SCHINER, 1864)	x	x	x	x	x	
<i>femorale</i> (LOEW, 1864)				x		
<i>flavicorne</i> (MEIGEN, 1826)	x	x	x	x		
<i>ivanae</i> ŠIFNER, 2003						
<i>jelineki</i> ŠIFNER, 2006	x	x	x			
<i>lituratum</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>mirusae</i> ŠIFNER, 1974	x	x	x	x		
<i>nervosum</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>seguyi</i> ŠIFNER, 1973					x	
<i>spinimanum</i> (FALLÉN, 1819)	x	x	x	x	x	
<i>striolatum</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>vonickai</i> ŠIFNER, 2008	x	x				
<i>Parallelomma</i> BECKER, 1894						
<i>albipes</i> (FALLÉN, 1819)	x	x	x	x	x	
<i>Scoliaphleps</i> BECKER, 1894						
<i>ustulata</i> (ZETTERSTEDT, 1838)	x	x	x		x	
Hydromyzini ŠIFNER, 2003						
<i>Chaetosa</i> COCUILLETT, 1898						
<i>punctipes</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>Cosmetopus</i> BECKER, 1894						
<i>dentimanus</i> (ZETTERSTEDT, 1838)	x	x			x	
<i>Hydromyza</i> FALLÉN, 1819						

	CZ	B	M	Sk	A	Note
<i>livens</i> (FABRICIUS, 1874)	x	x			x	
<i>Paracosmetopus</i> HACKMAN, 1956						
<i>helleni</i> HACKMAN, 1956	x	x				
<i>Spaziphora</i> RONDANI, 1856						
<i>hydromyzina</i> (FALLÉN, 1819)	x	x			x	
Gimnomerini ŠIFNER, 2003						
<i>Gimnomera</i> RONDANI, 1867						
<i>alpina</i> ŠIFNER, 2003					x	
<i>castanipes</i> (BECKER, 1894)				x		
<i>cuneiventris</i> (ZETTERSTEDT, 1846)				x		
<i>dorsata</i> (ZETTERSTEDT, 1846)					x	
<i>slovaca</i> ŠIFNER, 2003				x		
<i>tarsea</i> (FALLÉN, 1819)				x		
<i>tatrica</i> ŠIFNER, 2003				x		
<i>Norellia</i> ROBINEAU-DESVOIDY, 1830						
<i>spinipes</i> (MEIGEN, 1826)	x	x	x	x		
Microprosopini ŠIFNER, 2003						7
<i>Acanthocnema</i> BECKER, 1894						
<i>glaucescens</i> (LOEW, 1864)	x	x	x	x	x	
<i>nigrimana</i> (ZETTERSTEDT, 1846)	x	x	x	x	x	
<i>Megaphthalmoides</i> RINGDAHL, 1936						
<i>unilineatus</i> (ZETTERSTEDT, 1838)	x	x	x	x	x	
<i>Microprosopa</i> BECKER, 1894						
<i>pallidicauda</i> ZETTERSTEDT, 1838					x	
<i>haemorrhoidalis</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>gruberi</i> ŠIFNER, 2013				x		
<i>preisleri</i> ŠIFNER, 2013	x	x	x	x		
<i>zemani</i> ŠIFNER, 2013	x	x				
<i>Paramicroprosopa</i> RINGDAHL, 1939						
<i>bartaki</i> ŠIFNER, 1999					x	
<i>ozeroi</i> ŠIFNER, 2008				x		
<i>pokornyi</i> ŠIFNER, 2011	x	x				
<i>Trichopalpus</i> RONDANI, 1856						
<i>fraternus</i> (MEIGEN, 1826)	x	x	x	x	x	
Scathophagini ŠIFNER, 2003						
<i>Coniosternum</i> BECKER, 1894						
<i>fluviale</i> (RONDANI, 1867)	x	x			x	
<i>decipiens</i> (HALIDAY, 1832)					x	
<i>dvoraki</i> ŠIFNER, 2015	x	x				
<i>lapponicum</i> RINGDAHL, 1920	x	x				

	CZ	B	M	Sk	A	Note
<i>mihalyii</i> ŠIFNER, 1975	x	x				
<i>nelsoni</i> ŠIFNER, 2003	x	x				
<i>obscurum</i> (FALLÉN, 1819)	x	x	x	x	x	
<i>tinctinerve</i> BECKER, 1894	x	x			x	
<i>Scatomyza</i> FALLÉN, 1810						8
<i>scybalaria</i> (LINNAEUS, 1758)	x	x	x	x	x	
<i>Scathophaga</i> MEIGEN, 1803						9
<i>analís</i> (MEIGEN, 1826)	x	x	x	x	x	10
<i>cineraria</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>furcata</i> (SAY, 1823)	x	x	x	x	x	
<i>inquinata</i> (MEIGEN, 1826)	x	x	x	x	x	
<i>jizerensis</i> ŠIFNER, 2004	x	x				
<i>lutaria</i> (FABRICIUS, 1794)	x	x	x	x	x	
<i>karmazini</i> ŠIFNER, 2018					x	
<i>pictipennis</i> (OLDENBERG, 1923)	x	x			x	
<i>stercoraria</i> (LINNAEUS, 1758)	x	x	x	x	x	
<i>merdaria</i> (FABRICIUS, 1794)	x	x	x	x	x	11
<i>suilla</i> (FABRICIUS, 1794)	x	x	x	x	x	
<i>moravensis</i> ŠIFNER, 2006	x	x	x			
<i>taeniopa</i> (RONDANI, 1867)	x	x	x		x	
<i>vlastae</i> ŠIFNER, 2000				x		

### Notes

#### Note 1

In the genus *Micropselapha* two species were included: *M. basovi* OZEROV, 2010 and *M. bohémica* BARTÁK & KUBÍK, 2012; for details see the papers with descriptions and notes (ŠIFNER 2018: 1641).

#### Note 2

For details see ŠIFNER 2018: 1641.

#### Note 3

For details see ŠIFNER 2018: 1642 with a comment. I have a basic reservation: the description of *Chirosia cepeleki* is based only on the colour characters, and on the terminalia characters of both sexes etc.

#### Note 4

From a taxonomic point of view, the species *Neochirosia veratri* (HENDEL, 1920) is very complex and, moreover, is probably connected with the plant hosts. In my opinion, the validity of this species is disputable and further comparative studies are necessary; I conditionally accept Ozerov's nomenclatural act.

**Note 5**

*Phrosia albilabris* should be considered as *Cordilura albilabris*, therefore a Scathophaginae and not a Deliniinae (see: BERNASCONI et al. (2000) Mol. Phyl. Evol. **16**: 308-315; KUTTY et al. (2007) Cladistics **23**: 64-83. New synonymy at present.

**Note 6**

New name of *Cordilura pubera* (auct., nec LINNAEUS, 1758); in detail see ŠIFNER 2018: 1643.

**Note 7**

ŠIFNER (2013) reclassified the genus *Microprosopa* and the subgenus *Paramicroprosopa* sensu RINGDAHL, 1936 which he raised to the generic rank, providing the key to the genera of the Micoprosopini.

**Note 8**

The genus *Scatomyza* FALLÉN, 1810 was revalidated by OZEROV & KRIVOSHEINA (2011); it differs from *Scathophaga* MEIGEN, 1803 by the presence of a metacoxal bridge (VOCKEROTH 2010: 1268, Fig. 7).

**Note 9**

The genus *Scathophaga*, in the existing conception, is distinguished from others by a sequence morphological characters. It is noteworthy that the genus is not monophyletic according to the molecular study by BERNASCONI et al. (2000a, b, 2001); this fact is also confirmed by the heterogeneity of certain morphological characters (see also ŠIFNER, 2020).

**Note 10**

For details see ŠIFNER 2020 (52/1): 733.

**Note 11**

For details see ŠIFNER 2020 (52/1): 735.

**Corrigendum**

In the paper of BERNASCONI & ŠIFNER (2020), the species *Scathophaga oasis* OZEROV & FREIDBERG, 2010 from Israel and Egypt (Sinai Peninsula) was inadvertently omitted from the list of species.

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**Zusammenfassung**

In dieser Arbeit wird eine neue Checkliste für die Arten der Familie Scathophagidae für Tschechien,

Slowakei und Österreich erstellt. Aus Tschechien sind 85 Arten (Böhmen: 82 Arten, Mähren: 62 Arten), aus der Slowakei 65 Arten und aus Österreich 69 Arten bekannt.

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