



<http://dx.doi.org/10.11646/zootaxa.3946.4.1>

<http://zoobank.org/urn:lsid:zoobank.org:pub:120F324E-A5D2-4D47-AE4E-BD4C59308898>

## The Sarcophagidae (Insecta: Diptera) described by Chien-ming Chao and Xue-zhong Zhang

DONG ZHANG<sup>1,3</sup>, MING ZHANG<sup>1</sup>, ZIJUAN LI<sup>1</sup> & THOMAS PAPE<sup>2</sup>

<sup>1</sup>School of Nature Conservation, Beijing Forestry University, Beijing 100083, China

<sup>2</sup>Natural History Museum of Denmark, University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen, Denmark

<sup>3</sup>Corresponding author. E-mail: [ernest8445@163.com](mailto:ernest8445@163.com)

### Table of contents

Abstract .....	452
Introduction .....	452
Format and arrangement of the Catalog .....	452
Nomenclatural catalog .....	453
Genus group name .....	453
<i>Intermedia</i> Chao in Fan .....	453
Species group names .....	453
Subfamily Miltogramminae .....	453
<i>Aleximyia albifrons</i> Chao & Zhang .....	453
<i>Metopia auripulvera</i> Chao & Zhang .....	456
<i>Metopia pollenia</i> Chao & Zhang .....	459
<i>Metopia yunnanica</i> Chao & Zhang .....	461
<i>Miltogramma (Stephanodactylum) bimaculatum</i> Chao & Zhang .....	464
<i>Miltogramma (Pseudomiltogramma) tibitum</i> Chao & Zhang .....	466
<i>Senotainia</i> (s. str.) <i>mongolica</i> Chao & Zhang .....	468
<i>Senotainia neimenguensis</i> Chao & Zhang in Xue & Chao .....	471
<i>Senotainia (Sphixapata) sinerea</i> Chao & Zhang .....	471
<i>Sphenometopa (Tarsaraba) luridimacula</i> Chao & Zhang .....	472
<i>Sphenometopa mesomelaenae</i> Chao & Zhang .....	475
<i>Thereomyia yunnanica</i> Chao & Zhang .....	477
Subfamily Paramacronychiinae .....	479
<i>Agria xiangchengensis</i> Chao & Zhang .....	479
<i>Brachicoma nigra</i> Chao & Zhang .....	481
<i>Sarcophila mongolica</i> Chao & Zhang .....	484
<i>Wohlfahrtia brevicornis</i> Chao & Zhang in Zhang & Chao .....	486
<i>Wohlfahrtia hirtiparafacialis</i> Chao & Zhang in Zhang & Chao .....	489
<i>Wohlfahrtiodes mongolicus</i> Chao & Zhang .....	492
Subfamily Sarcophaginae .....	494
<i>Blaesoxipha (Servaisia) nigradorsalis</i> Chao & Zhang .....	494
<i>Blaesoxipha (Servaisia) nigradorsalis</i> Chao & Zhang .....	494
<i>Blaesoxipha</i> (s. str.) <i>magniforcipis</i> Chao & Zhang .....	495
<i>Blaesoxipha</i> (s. str.) <i>magniforcipis</i> Chao & Zhang .....	497
<i>Heteronychia (Eupierretia) brachystylata</i> Chao & Zhang .....	497
<i>Heteronychia (Eupierretia) brachystylata</i> Chao & Zhang .....	497
<i>Heteronychia (Eupierretia) tenupenialis</i> Chao & Zhang .....	500
<i>Heteronychia (Eupierretia) tenupenialis</i> Chao & Zhang .....	500
<i>Heteronychia</i> (s. str.) <i>rufopicea</i> Chao & Zhang .....	502
<i>Kozlovea cetu</i> Chao & Zhang .....	502
<i>Leucomyia dukoicus</i> Zhang & Chao .....	504
Acknowledgments .....	507
References .....	507

## Abstract

The twenty-nine species-group names of Sarcophagidae proposed by Chien-ming Chao and Xue-zhong Zhang are reviewed. Of these names, twenty-four are available, while five are unavailable *nomina nuda*. Of the twenty-four available names, nine are considered valid, fifteen as invalid: thirteen junior synonyms, one unnecessary replacement name and one junior primary homonym. Holotypes of all species, and allotypes when available, are photographed and the species re-described based on the type material. Eight new synonyms are proposed: *Miltogramma tibita* Chao & Zhang, 1988, **syn. n.** of *Miltogramma taeniata* Meigen, 1824; *Sphenometopa luridimacula* Chao & Zhang, 1988, **syn. n.** of *Sphenometopa stackelbergiana* Rohdendorf, 1967; *Sphenometopa mesomelaenae* Chao & Zhang, 1988, **syn. n.** of *Sphenometopa stelviana* (Brauer & Bergenstamm, 1891); *Sphenometopa altajica* Rohdendorf, 1971, **syn. n.** of *Sphenometopa stelviana* (Brauer & Bergenstamm, 1891); *Sarcophila mongolica* Chao & Zhang, 1988, **syn. n.** of *Sarcophila latifrons* (Fallén, 1817); *Wohlfahrtia brevicornis* Chao & Zhang, 1996, **syn. n.** of *Wohlfahrtia grunini* Rohdendorf, 1969; *Wohlfahrtia hirtiparafacialis* Chao & Zhang, 1996, **syn. n.** of *Wohlfahrtia magnifica* (Schiner, 1862); and *Wohlfahrtiodes mongolicus* Chao & Zhang, 1988, **syn. n.** of *Asiosarcophila kaszabi* Rohdendorf & Verves, 1978. The genus *Asiosarcophila* Rohdendorf & Verves, 1978 is herewith reported from China for the first time, along with the five species *A. kaszabi*, *M. taeniata*, *S. stackelbergiana*, *S. stelviana* and *W. grunini*.

**Key words:** Sarcophagidae, holotype, nomenclature, redescription, China

## Introduction

Prof. Chien-ming Chao (=Jian-ming Zhao) is known as one of the most outstanding experts on tachinids, a famous biologist, entomologist, and taxonomist of China. Prof. Chao was mainly engaged in the systematics of Tachinidae and Sarcophagidae after 1960, making many contributions to the entomology of China. Altogether, he authored or edited 25 monographs and 120 academic papers on taxonomy, biology and ecology throughout his career and published 4 new genera and 277 new species of tachinids (Zhang & Hao, 2008). Chien-ming Chao proposed 23 nominal species of Sarcophagidae, all in collaboration with Mr. Xue-zhong Zhang, and a single genus group name. In recent years, we have been engaged in faunal studies of sarcophagid flies in China, and the first author has visited the National Zoological Museum of China, Chinese Academy of Sciences (NZMC) on several occasions. This provides us with an opportunity to present a comprehensive study of all the nominal species of Sarcophagidae proposed by Chao and Zhang (Chao & Zhang, 1978, 1985, 1988a, b; Zhang & Chao, 1988, 1996a, b). Most types were not adequately described in their original description, and the taxonomic status of the nominal species therefore may be considered unclear or ambiguous. We have re-examined all the types (except one) for a nomenclatural and taxonomic revision of all the species-group names published by Chao and Zhang that are currently assigned to the Sarcophagidae. The primary aim of the present work therefore is to provide detailed redescriptions, photographic documentation and taxonomic assessment of all nominal species of Sarcophagidae proposed by Chao and Zhang, and for completeness we are listing the single genus group name proposed by the former.

## Format and arrangement of the Catalog

The format of the nomenclatural catalog given below is mostly self-explanatory, but some notes on the presentation of information are considered pertinent. Nominal species are separated in their respective subfamilies Miltogramminae, Paramacronychiinae and Sarcophaginae, and within subfamilies they are listed alphabetically according to genus and species epithet.

Type localities are given in their English spelling and as detailed as possible based on the information in the original publications and the original label data. Labels of holotypes and allotypes are cited verbatim (but with Chinese words given in our translation), with lines separated by a slash (/) and different labels separated by a double slash (//). Labels of additional type material are given in non-verbatim, standard notation and in our translation from Chinese where needed.

The “Current identity” of each nominal species is given as assessed by the authors, and with reference to a modern taxonomic treatment when possible. Important diagnostic features are given as “Remarks” when considered of relevance for supporting the status as a valid species.

Wing hyaline (Fig. 30A); subcostal sclerite and basicosta yellow, bare; tegula yellow; costal spine differentiated; vein  $R_1$  bare, three ventral bristles at node of  $R_{2+3}$ - $R_{4+5}$ , vein  $R_{4+5}$  setose dorsally from junction of  $R_{2+3}$  halfway to crossvein r-m, lower calypter white.

Legs yellowish brown; fore femur with one row of dorsal bristles (about 8), one row of ventral bristles (about 7) and one row of posterodorsal bristles (about 10), fore tibia with three anterodorsal, one sub-median posterior and one posterodorsal bristles; mid femur with two median anterior, four anteroventral, one apical posterior and one apical posterodorsal bristles, one row of ventral bristles (about 8), mid tibia with two anterodorsal, one subapical ventral, one subapical posterior and three posterodorsal bristles; hind femur with one apical dorsal bristle, one row of anterodorsal bristles (about 7), one row of anteroventral bristles (about 7) and one row of posteroventral bristles (about 6), hind tibia with three anterodorsal, one sub-median anterior, one sub-median posterior and two posterodorsal bristles.

Abdomen long oval with silvery gray pollinosity; tergites 3 and 4 without median marginal bristles, tergite 5 with strong marginal bristles, epandrium yellowish brown (Fig. 30F), sternites 1 and 2 both with dense and long bristles. Terminalia: Cercus yellow (Fig. 30B).

**Redescription of Female:** Body length about 7.0mm (Fig. 31A). Parafacial  $1.8\times$  as broad as fronto-orbital plate; frontal vitta about  $1.9\times$  as broad as fronto-orbital plate in median part (Fig. 31C); one upper orbital and two proclinate orbital bristles. Mid femur with one row of anterodorsal bristles (about 7), without anterior bristle; hind tibia with three anteroventral bristles. Tergite 4 with one pair of median marginal bristles (Fig. 31E). Other morphological characteristics are similar to those of the male.

## Acknowledgments

We prize the memory of Prof. C.M. Chao, and herewith express our gratitude to him for his outstanding contributions to promote the science of dipterology in China, and we are deeply indebted to Mr. X.Z. Zhang for his many works on Chinese flies. We are grateful to Prof. J. Chen, Mr. J. Yao, Ms. K.Y. Zhang and Ms. H. Liu (National Zoological Museum of China, Chinese Academy of Sciences) for generously providing their help with access to the type specimens. Sincere thanks to Dr. Alexey Solodovnikov (Natural History Museum of Denmark, University of Copenhagen) for kindly translating Russian labels into English, and to Dr. Vera A. Richter (Zoological Institute of Academy of Sciences, St. Petersburg, Russia) for images of a ZIL type. We wish to extend our sincerest thanks to three anonymous reviewers for their helpful suggestions on our manuscript. This study was funded by the Beijing Higher Education Young Elite Teacher Project (No. YETP0771), the Program for New Century Excellent Talents in University (No. NCET-12-0783), the National Nature Science Foundation of China (No. 31201741), and the Carlsberg Foundation (No. 2012\_01\_0433). The data in this research comes from the database of National Digital-Museum of Animal Specimens; this project was supported by the key project of Science-technology basic condition platform from The Ministry of Science and Technology of the People's Republic of China (No. 2005DKA21402).

## References

- Allen, H.W. (1926) North American species of two-winged flies belonging to the tribe Miltogrammini. *Proceedings of the United States National Museum*, 68, 1–106.  
<http://dx.doi.org/10.5479/si.00963801.68-2610.1>
- Brauer, F. & Bergenstamm, J.E. von (1891) Die Zweiflügler des Kaiserlichen Museums zu Wien. V. Vorarbeiten zu einer Monographie der Muscaria Schizometopa (exclusive Anthomyidae). Pars II. *Denkschriften Der Akademie Der Wissenschaften In Wien*, 58, 39–446.
- Chao, C.M. & Zhang, X.Z. (1978) A new species of *Kozlovea* Rohdendorf from China (Diptera: Sarcophagidae). *Acta Entomologica Sinica*, 21, 445–446.
- Chao, C.M. & Zhang, X.Z. (1985) Diptera: Sarcophagidae. In: Huang, F.S., Han, Y.H. & Zhang, X.Z. (Eds.), The insect fauna of the Mt. Tuomuer area in Tianshan. In: The Mountain Climbing Scientific Expedition Team of Chinese Academy of Sciences (Ed.), *Biota of Tuomuer Region, Tianshan*. Xinjiang's People's Press, Ürümqi, pp. 131–133. [total page number 353 pp.]
- Chao, C.M. & Zhang, X.Z. (1988a) New species of Agriinae, Miltogrammatinae and Macronychiinae from China (Diptera:

- Sarcophagidae). *Sinozoologia*, 6, 273–288.
- Chao, C.M. & Zhang, X.Z. (1988b) Four new species of Sarcophaginae from Mt. Tomuer, Xinjiang, China. *Acta Zootaxonomica Sinica*, 13, 75–80.
- Fan, Z.D. (1992) *Key to the common flies of China. 2<sup>nd</sup> Edition*. Science Press, Beijing, 1032 pp.
- Fallén, K.F. (1817) Beskrifning öfver de i Sverige funna fluge arter, som kunna föras till släktet *Musca*. Första Afdelningen. *Kongliga Vetenskaps Academiens Nya Handlingar, Ser. 3*, 1816, 226–254.
- Giroux, M., Pape, T. & Wheeler, T.A. (2010) Towards a phylogeny of the flesh flies (Diptera: Sarcophagidae): morphology and phylogenetic implications of the acrophallus in the subfamily Sarcophaginae. *Zoological Journal of the Linnean Society*, 158, 740–778.  
<http://dx.doi.org/10.1111/j.1096-3642.2009.00561.x>
- Hendel, F. (1907) Nomina nova für mehrere Gattungen der acalyptraten Musciden. *Wiener Entomologische Zeitung*, 26, 98.
- ICZN (1999) *International Code of Zoological Nomenclature. Fourth edition adopted by the International Union of Biological Sciences*. International Trust for Zoological Nomenclature, London, 306 pp.  
<http://dx.doi.org/10.5962/bhl.title.50608>
- Jacentkovský, D. (1941) Die Raupenfliegen (Tachinoidea) Mährens und Schlesiens. *Práce Moravské přírodovědecké společnosti*, 13, 1–64.
- Kurahashi, H. & Chaiwong, T. (2007) Two new species of *Protomiltogramma* from Thailand (Diptera, Sarcophagidae). *Japanese Journal of Systematic Entomology*, 13, 173–178.
- Kurahashi, H. & Chaiwong T. (2013) Keys to the flesh flies of Thailand, with description of a new species of *Robineauella* Enderlein (Diptera: Sarcophagidae). *Medical Entomology and Zoology*, 64, 83–101.
- Kurahashi, H. & Leh, M.U. (2008) Two new species of *Protomiltogramma* from Malaysia (Diptera, Sarcophagidae). *Japanese Journal of Systematic Entomology*, 14, 1–6.
- Lehrer, A.Z. (2003) La révision du genre *Sarcophila* Rondani en Israel et la description de deux espèces nouvelles afro-asiatiques (Diptera, Sarcophagidae). *Belgian Journal of Entomology*, 5, 79–87.
- McAlpine, J.F. (1981) Morphology and terminology – adults. In: McAlpine, J.F., Peterson, B.V., Shewell, G.E., Teskey, H.J., Vockeroth, J.R. & Wood, D.M. (Eds.), *Manual of Nearctic Diptera. Vol. 1. Monograph 27*. Research Branch, Agriculture Canada, Ottawa, pp. 9–63.
- Meigen, J.W. (1824) *Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten*. Vierter Theil. Schulz-Wundermann, Hamm. xii + 428 pp. + pls. 33–41.
- Meigen, J.W. (1826) *Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten*. Fünfter Theil. Schulz, Hamm, 412 pp.
- Meigen, J.W. (1830) *Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten*. Sechster Theil. Schulz, Hamm, 401 pp.
- O'Hara, J.E., Cerretti, P., Pape, T. & Evenhuis, N.L. (2011) Nomenclatural studies toward a world list of Diptera genus-group names. Part II: Camillo Rondani. *Zootaxa*, 3141, 1–268.
- Pape, T. (1987) The Sarcophagidae (Diptera) of Fennoscandia and Denmark. *Fauna Entomologica scandinavica*, 19, 1–203.
- Pape, T. (1992) Redefinition of *Agria* Robineau-Desvoidy, *Angiometopa* Brauer & Bergenstamm and *Toxonagria* Shewell, with the description of a new species (Diptera: Sarcophagidae). *Entomologica scandinavica*, 23, 307–317.  
<http://dx.doi.org/10.1163/187631292X00137>
- Pape, T. (1994) The world *Blaesoxipha* Loew, 1861 (Diptera: Sarcophagidae). *Entomologica scandinavica Supplement*, 45, 1–247.
- Pape, T. (1996) Catalogue of the Sarcophagidae of the world (Insecta: Diptera). *Memoirs on Entomology, International*, 8, 1–558.
- Povolný, D. & Verves, Yu.G. (1997) The flesh-flies of Central Europe (Insecta, Diptera, Sarcophagidae). *Spixiana Supplement*, 24, 1–260.
- Rohdendorf, B.B. (1925) Nouvelles espèces paléarctiques du genre *Sarcophaga* Mg., Bött. (Diptera, Tachinidae). *Entomologicheskoe Obozrenie*, 19, 53–60.
- Rohdendorf, B.B. (1930) 64h. Sarcophaginae. *Die Fliegen der Palaearktischen Region*, 11, 1–48.
- Rohdendorf, B.B. (1935) 64h. Sarcophaginae. *Die Fliegen der Palaearktischen Region*, 11, 49–128.
- Rohdendorf, B.B. (1937) Fam. Sarcophagidae. (P. 1). *Fauna USSR*, 19, 1–501.
- Rohdendorf, B.B. (1967) The Palearctic species of the genus *Sphenometopa* Townsend (Diptera, Sarcophagidae). *Entomologicheskoe Obozrenie*, 46, 450–467.
- Rohdendorf, B.B. (1969) Some new species of Sarcophaginae (Diptera, Sarcophagidae) from Asia. *Entomologicheskoe Obozrenie*, 48, 943–950.
- Rohdendorf, B.B. (1971) 64h. Sarcophaginae. *Die Fliegen der Palaearktischen Region*, 11, 129–176.
- Rohdendorf, B.B. & Verves, Yu.G. (1978) Sarcophaginae (Diptera, Sarcophagidae) from Mongolia. *Annales Historico-Naturales Musei Nationalis Hungarici*, 70, 241–258.
- Rohdendorf, B.B. & Verves, Yu.G. (1980) On the fauna of Sarcophagidae (Diptera) of the Mongolian People's Republic. III. Miltogrammatinae. *Insects of Mongolia*, 7, 445–518.
- Schiner, I.R. (1862) *Fauna Austriaca. Die Fliegen (Diptera). Nach der analytischen Methode bearbeitet, mit der Charakteristik sämmtlicher europäischer Gattungen, der Beschreibung aller in Deutschland vorkommenden Arten und der*

- Aufzählung aller bisher beschriebene europäischen Arten. Vol. 1.* Gerold, Wien, 674 pp.  
<http://dx.doi.org/10.5962/bhl.title.8525>
- Schiner, I.R. (1868) Diptera. In: *Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859, unter den Befehlen des Commodore B. von Wüllerstorff-Urbair. Zoologischer Theil. Band II. Abtheilung 1.* K. Gerold's Sohn, Wien, 388 pp.  
<http://dx.doi.org/10.5962/bhl.title.1597>
- Séguy, E. (1941) Études sur les mouches parasites. 2. Calliphorides, calliphorines (suite), sarcophagines et rhinophorides de l'Europe occidentale et méridionale. *Encyclopédie Entomologique*, Série A, 21, 1–436.
- Townsend, C.H.T. (1908) The taxonomy of the muscoidean flies, including descriptions of new genera and species. *Smithsonian Miscellaneous Collections*, 51, 1–138.
- Verves, Yu.G. (1982) 64h. Sarcophaginae. *Die Fliegen der Palaearktischen Region*, 11, 235–296.
- Verves, Yu.G. (1984) On the fauna of Sarcophagidae (Diptera) of the Mongolian People's Republic. V. New data on sarcophagid flies from Mongolia and neighbouring territories. *Insects Mongolia*, 9, 527–562.
- Verves, Yu.G. (1985) 64h. Sarcophaginae. *Die Fliegen der Palaearktischen Region*, 11, 297–440.
- Verves, Yu.G. (1993) 64h. Sarcophaginae. *Die Fliegen der Palaearktischen Region*, 11, 441–504.
- Verves, Yu.G. (1994) The new names for two species from the genus *Senotainia* Macquart (Diptera: Sarcophagidae). *Dipterological Research*, 5, 85.
- Verves, Yu.G. (2001) The composition of Paramacronychiinae (Sarcophagidae, Diptera) with the descriptions of two new genera. *International Journal of Dipterological Research*, 12, 145–149.
- Whitmore, D. (2011) New taxonomic and nomenclatural data on *Sarcophaga* (*Heteronychia*) (Diptera: Sarcophagidae), with description of six new species. *Zootaxa*, 2778, 1–57.
- Xue, W.Q. & Chao, C.M. (1998) *Flies of China. Vol. 2.* Liaoning Science and Technology Press, Shenyang, pp. 1366–2425.
- Zhang, C.T. & Hao, J. (2008) Chien-ming Chao, 1927–2007. *The Tachinid Times*, 21, 2–6.
- Zhang, M., Chen, Y.O., Pape, T. & Zhang, D. (2013) Review of the genus *Agria* (Diptera, Sarcophagidae) from China. *ZooKeys*, 310, 41–55.  
<http://dx.doi.org/10.3897/zookeys.310.5346>
- Zhang, X.Z. & Chao, C.M. (1988) A new species of *Leucomyia* B. B. (Diptera: Sarcophagidae). *Sinozoologia*, 6, 289–290.
- Zhang, X.Z. & Chao, C.M. (1996a) Diptera Sarcophagidae, In: Wu, S.G. & Feng, Z.J. (Eds.), *The biology and human physiology in the Hoh Xil Region. The Series of the Comprehensive Scientific Expedition to the Hoh Xil Region.* Science Press, Beijing, pp. 214–217.
- Zhang, X.Z. & Chao, C.M. (1996b) Diptera: Sarcophagidae, In: Huang, F.S. (Ed.), *Insects of the Karakorum—Kunlun Mountains. The Series of the Scientific Expedition to the Qinghai—Xizang Plateau.* Science Press, Beijing, pp. 245–251.