

Presence of *Sarcophaga (Liopygia) argyrostoma* (Robineau-Desvoidy, 1830) (Diptera: Sarcophagidae) in Croatian part of Baranja

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1. Introduction

The flesh fly fauna of Croatia has been partially studied. The first faunistic data were published between the mid 19th century and the beginning of the 20th century (Krčmar et al. 2019). However, more extensive research has been performed before and during World War II by Baranov (1928, 1929, 1930, 1931, 1938, 1939, 1940, 1941a, 1941b, 1942 and 1943). Baranov's work was continued in the doctoral thesis and in a few published articles by Strukan (1964, 1967, 1968, 1970). After desintegration of the Socialist Federal Republic of Yugoslavia data about the fauna of flesh flies of Croatia appeared in Catalogue of the Sarcophagidae of the World (Insecta: Diptera), (Pape 1996). Additionally, new data for Croatian flesh flies fauna or descriptions of new species based on specimens collected in Croatia were found in articles of following entomologists: Povolný and Znojil (1994), Pape (2004), Whitmore (2011), Whitmore et al. (2013) and Krčmar et al. (2019). The aim of this study was to present new records of *Sarcophaga (Liopygia) argyrostoma* (Fig. 1) in Croatian fauna since this species is important from the point of view of forensic entomology, because larvae of this species often inhabit human corpses left indoors.

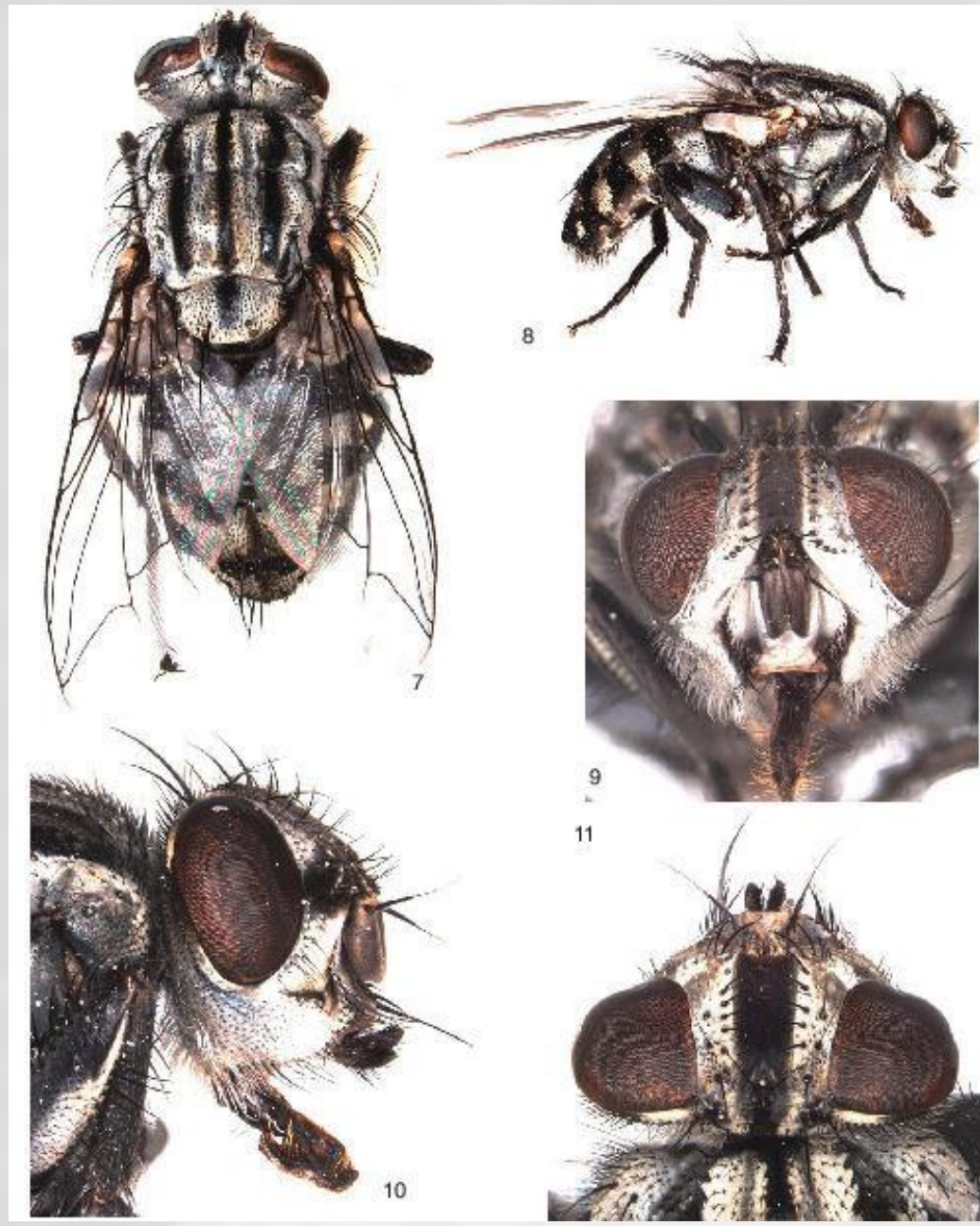


Figure 1. *Sarcophaga (Liopygia) argyrostoma* (Robineau-Desvoidy, 1830 (photo: Dráber-Moňko et al. 2009).



Figure 2. Zmajevac locality (photo: S. Krčmar).

2. Material and methods

2a. Study area

The Croatian part of Baranja is well separated geographical entirety of Eastern Croatian plains. Baranja is triangular in shape and extends from the Drava and Danube Rivers to the border with Hungary. Surface of Croatian part of Baranja is 1147 km² and is predominantly lowland where the absolute altitude does not exceed 250 m.

2b. Samplings and identification

Study of flesh flies fauna diversity in different pond habitats in rural settlements in Croatian part of Baranja was carried out during summer months from 2019 to 2021. In the study area flesh flies were collected using entomological net on seven localities. Identifications and nomenclature followed that of Pape (1987), Povolný and Verves. (1997), Richet et al. (2011) and descriptions and illustrations in Whitmore (2010, 2011) and Whitmore et al. (2013).

3. Results

More than 1200 specimens from subfamily Sarcophaginae were collected. In collected sample, four specimens of species *Sarcophaga (Liopygia) argyrostoma* (Robineau-Desvoidy, 1830) were recorded (Tab. 1). Three specimens of this species were collected during 2019 on the locality of Zmajevac, while during 2021 only one specimens of this species was recorded on the locality of Popovac (Fig 2 and 3). Although, the species is closely associated with human habitations, they were found only on two localities in Croatian part of Baranja.

4. Biology

Sarcophaga (Liopygia) argyrostoma is a common species in some parts of Croatia. Breeding in decaying meat. Larvae of this species are important from the point of view of forensic entomology, because most often inhabits corpses left indoors (Dráber-Moňko et al. 2009). This species occurs in all the zoogeographical regions except Australia and New Zealand. Closely associated with human habitations (Dráber-Moňko et al. 2009). Knowledge of the duration of particular developmental stages of this fly is useful when determining the PMI (post mortem intervalum) (Dráber-Moňko et al. 2009).

5. Summary

The family Sarcophagidae, known as flesh flies due to some species feeding on the soft tissue of different wild and domestic animals (sometimes on human corpses as well), contains about 2800 species distributed worldwide which are divided into three subfamilies: Miltogramminae, Paramacronychiinae and Sarcophaginae. In Croatian fauna, 148 species of flesh flies, from which two were left unnamed, have been recorded so far. Study of flesh flies fauna diversity in different pond habitats in rural settlements in Croatian part of Baranja was carried out during summer months from 2019 to 2021. In the study area flesh flies were collected using entomological net on seven localities. More than 1200 specimens from subfamily Sarcophaginae were collected. In collected sample, four specimens of species *Sarcophaga (Liopygia) argyrostoma* (Robineau-Desvoidy, 1830) were recorded. Three specimens of this species were collected during 2019 on the locality of Zmajevac, while during 2021 only one specimens of this species was recorded on the locality of Popovac. Although, this species is closely associated with human habitations, they were found only on two localities. According to data of older authors, *Sarcophaga (Liopygia) argyrostoma* also inhabits some other parts of Croatia, such as Croatian Adriatic littoral and central part of Croatia. Data on distribution of *Sarcophaga (Liopygia) argyrostoma* species are important from the point of view of forensic entomology because larvae of this species often inhabit human corpses left indoors.

Keywords: Flesh flies, Sarcophagidae, Diptera, Baranja, Croatia



Figure 3. Popovac locality (photo: S. Krčmar).

Table 1. Number of collected specimens of *Sarcophaga (Liopygia) argyrostoma* in the study area.

Locality	Date	No. specimens	Sex
Zmajevac	20.07.2019.	1	♂
Zmajevac	22.08.2019.	1	♂
Zmajevac	6.09.2019.	1	♂
Popovac	13.08.2021.	1	♂
$\Sigma = 2$	4	4	

6. References

- Baranov N (1928) Tachinidensammlung des zoologischen Museums in Zagreb. Glasnik Hrvatskoga Prirodoslovnoga Društva 39-40: 196-200.
Baranov (1929) Beitrag zur Kenntnis der Gattung *Sarcophaga* (Mg.) Böttcher (Dipt., Tach.). Neue Beiträge zur Systematische Insektenkunde 4: 142-153.
Baranov N (1930) Die jugoslavischen *Sarcophaga*-Arten der *camaria*-Gruppe. Encyclopédie entomologique Série B II (Diptera) 5: 19-25.
Baranov N (1931) Über einen neuen Fundort von *Blaesoxipha arenicola* Rohden, nebst einer Beschreibung des Weibchens (Dipt., Sarcoph.). Entomologisches Nachrichtenblatt, Troppau 5: 77-78.
Baranov N (1938) Raupenfliegen (Tachinidae s.l.) welche auf der Adria-Insel Pag bei trinken von Meerwasser gefangen wurden. Encyclopédie entomologique Série B II (Diptera) 9: 103-107.
Baranov N (1939) *Sarcophaga pagensis* sp. n. Veterinarski Arhiv 9: 618-622. [In Croatian with German abstract.]
Baranov N (1940) Die Düngestätten im Dorfe Metajna als Brutplätze der Hausfliegen. Veterinarski Arhiv 10: 193-213. [In Croatian with German abstract.]
Baranov N (1941a) Ergänzung zu Die Düngestätten im Dorfe Metajna als Brutplätze der Hausfliegen. Veterinarski Arhiv 11: 139-148. [In Croatian with German abstract.]
Baranov N (1941b) Zweiter Beitrag zur Kenntnis der Gattung *Sarcophaga* s.l. Veterinarski Arhiv 11: 361-404. [In Croatian with German abstract.]
Baranov N (1942) Sarcophagen im Unabhängigen Staate Kroatien. Veterinarski Arhiv 12: 497-659. [In Croatian with German abstract.]
Baranov N (1943) *Wohlfahrtia magnifica* Schin., als Erreger der Schweine-Myiasis in Kroatien. Veterinarski Arhiv 13: 447-456. [In Croatian with German abstract.]
Dráber-Moňko A, Malewski T, Pomorski J, Los M, Slipinski P (2009) On the morphology and mitochondrial DNA barcoding of the flesh fly *Sarcophaga (Liopygia) argyrostoma* (Robineau-Desvoidy, 1830) (Diptera: Sarcophagidae) – an important species in forensic entomology. Annales Zoologici 59:465-493.
Krčmar S, Whitmore D, Pape T, Buenaventura E (2019) Checklist of the Sarcophagidae (Diptera) of Croatia, with new records from Croatia and other Mediterranean countries. ZooKeys 831: 95-155.
Pape T (1987) The Sarcophagidae (Diptera) of Fennoscandia and Denmark. Fauna Entomologica Scandinavica, 19. E. J. Brill/Scandinavian Science Press Ltd., Leiden-Copenhagen, 203 pp.
Pape T (1996) Catalogue of the Sarcophagidae of the world (Insecta: Diptera). Memoirs on Entomology, International 8: 1-558.
Pape T (2004) Fauna Europaea: Diptera, Sarcophagidae. Fauna Europaea version 2.4. <http://www.faunaeur.org> [Accessed September 14th, 2021].
Povolný D, Verves YuG (1997) The Flesh-Flies of Central Europe (Insecta, Diptera, Sarcophagidae). Spixiana, Suppl. 24: 1-264.
Povolný D, Znojil V (1994) Versuch eines vergleich zwischen Sarcophaginae-Taxozönosen der dalmatinischen Adria-Küste, der bulgarischen Schwarzmeerküste, der griechischen ägäischen und ionischen Küste und jeweils anschließender Binnenland-Gebiete (Diptera: Sarcophagidae). Entomologia Generalis 18: 115-130.
Richet R, Blackith RM, Pape T (2011) *Sarcophaga* of France (Diptera: Sarcophagidae). Pensoft Publishers, Sofia-Moscow, 327 pp.
Whitmore D (2010) Systematics and phylogeny of *Sarcophaga (Heteronychia)* (Diptera, Sarcophagidae). PhD dissertation. Università degli Studi di Roma "La Sapienza", Dipartimento di Biologia Animale e dell'Uomo, Rome, Italy., 257 pp.
Whitmore D (2011) New taxonomic and nomenclatural data on *Sarcophaga (Heteronychia)* (Diptera: Sarcophagidae), with description of six new species. Zootaxa 2778: 1-57.
Whitmore D, Pape T, Cerretti P (2013) Phylogeny of *Heteronychia*: the largest lineage of *Sarcophaga* (Diptera: Sarcophagidae). Zoological Journal of the Linnean Society 169: 604-639.
Strukan D (1964) Contribution to the knowledge of Sarcophaginae species and types in Yugoslavia. PhD dissertation, University of Zagreb, Zagreb, Croatia [In Croatian with English abstract.]
Strukan D (1967) Remarques sur deux Sarcophaginae peu connus de Yougoslavie (Diptera Sarcophagidae). Cahiers des Naturalistes, Bulletin NP, n.s. 23: 45-47.
Strukan D (1968) *Phytosarcophaga destructrix* Malloch – un nouveau membre de la faune de la Yougoslavie et du continent d'Europe. Matica Srpska Zbornik za Prirodne Nauke 34: 163-165. [In Serbian with French abstract.]
Strukan D (1970) Les Parasarcophaginae de Yougoslavie (Sarcophagidae – Diptera). Matica Srpska Zbornik za Prirodne Nauke 38: 90-114. [In Serbian with French abstract.]