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Sciomyzidae of the *Our Planet Reviewed in Corsica 2019-2021* expeditions (Diptera)

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Abstract. – During the *Our Planet Reviewed in Corsica* expeditions in 2019, 2020 and 2021, 134 specimens of 20 species of Sciomyzidae were collected by means of Malaise and pan traps. Eleven species are reported from Corsica for the first time: *Coremacera marginata* (Fabricius, 1775), *Ilione albiseta* (Scopoli, 1763), *Elgiva cucularia* (Linnaeus, 1767), *E. solicita* (Harris, 1780), *Dichetophora obliterata* (Fabricius, 1805), *Sepedon sphegea* (Fabricius, 1775), *S. spinipes* (Scopoli, 1763), *Pherbellia griseola* (Fallén, 1820), *P. dorsata* (Zetterstedt, 1846), *P. nana nana* (Fallen, 1820) and *Ditaeniella grisescens* (Meigen, 1830). This paper supports our present-day knowledge and understanding of the Sciomyzidae of Corsica and we hope that it can serve as a starting point for future faunistic research of Sciomyzidae on the island.

Résumé. – **Sciomyzidae des expéditions *La Planète Revisitée en Corse 2019-2021* (Diptera)**. Lors de la série d'expéditions *La Planète Revisitée en Corse* en 2019, 2020 et 2021, 134 spécimens de 20 espèces de Sciomyzidae ont été collectés à l'aide de pièges Malaise et de pièges colorés. Onze espèces sont signalées de Corse pour la première fois : *Coremacera marginata* (Fabricius, 1775), *Ilione albiseta* (Scopoli, 1763), *Elgiva cucularia* (Linnaeus, 1767), *E. solicita* (Harris, 1780), *Dichetophora obliterata* (Fabricius, 1805), *Sepedon sphegea* (Fabricius, 1775), *S. spinipes* (Scopoli, 1763), *Pherbellia griseola* (Fallén, 1820), *P. dorsata* (Zetterstedt, 1846), *P. nana nana* (Fallen, 1820) et *Ditaeniella grisescens* (Meigen, 1830). Nous espérons que cet article pourra servir de point de départ à une recherche faunistique sur les Sciomyzidae de l'île, et qu'il permettra de mieux comprendre nos connaissances actuelles sur les Sciomyzidae de Corse.

Keywords. – Distribution, faunistics, new records, pan traps

Snail-killing flies (Diptera: Sciomyzidae Macquart, 1846) are one of the ecologically best-known families of Diptera. The fact that their larvae prey on gastropods makes them interesting study organisms as biocontrol agents in applied ecology, as well as in fundamental ecological studies on the evolution of larval feeding behavior. For nearly half of all known species, extensive research has revealed their life cycles, immature stages, and host preferences (Knutson & Vala, 2011; Murphy *et al*., 2012). All species of Sciomyzidae, with only a few exceptions, have malacophagous larvae that feed on species of several families of pulmonate terrestrial and aquatic snails.

The European fauna is considered well-known, with many excellent keys and monographs that allow readily identification (e.g., Rozkošný, 1984, 1987, 1991; Vala, 1989; Barendregt, 2021). Despite the fact that identification of European specimens is straightforward, certain regions are still poorly investigated (e.g., the Iberian Peninsula, see Mortelmans *et al.*, 2021). The snail-killing fly fauna of Corsica has been studied on a number of occasions, although never during a dedicated study, and distributional records are scattered throughout the literature. At present only ten species of Sciomyzidae are known from Corsica (Becker, 1910; Séguy, 1934; Knutson & Berg, 1963; Bratt *et al.,* 1969; Leclercq *et al.,* 1983; Vala, 1989; Vala & Gasc, 1990; Kazerani *et al.,* 2020).

In this paper, we present new records and distribution data of snail-killing flies from Corsica (France) collected during the *Our Planet Reviewed in Corsica* expeditions during 2019-2021.

Material and methods

The material treated in the present paper is the result of collecting activities during the *Our Planet Reviewed in Corsica 2019-2021* expeditions led by the Muséum national d'Histoire naturelle (MNHN, Paris, France). Touroult *et al*. (2023) described the general framework, studied areas, sampling methodologies, and preliminary results of this survey. Nineteen sites in the north and southeast of the island were surveyed according to a semi-standardized protocol, and a large-scale trapping scheme was organized in three sites. Sampling efforts mainly focused on forested habitats at higher altitudes (2019) and on coastal dune, marshland and maquis habitats (2020, 2021). They included a vast array of methods to collect invertebrates, with a special effort on flight-interception traps and pan traps. Two Diptera experts were actively involved in fieldwork activities, i.e., the second author (MP) as Diptera coordinator and taxonomic expert of Dolichopodidae, and Thomas Lebard as taxonomic expert of Syrphidae/Stratiomyidae. During 2019 and 2021 the Diptera coordinator concentrated sampling efforts on the use of pan traps, while both researchers also used sweep nets for collecting. In each of these years (23-30.VI.2019, 18-26.V.2021), a total of 16 sampling sites at four different locations were selected for pan trapping. In each site, five trap units were operational for 3-4 days. A trap unit is composed of one blue, one yellow and one white plastic bowl (inner diameter: 15 cm, depth: 4 cm), that are installed close together at soil surface level. Traps are fixed to the soil with metal pins and filled for 2/3 with a mild formaline solution and detergent. In 2019, this approach was applied in the mountainous region of Alta Rocca (south) whereas lowland marshes and dune habitats were investigated in the same way in the coastal area of southeast Corsica in 2021.

Species records will ultimately be disclosed and distributed in the frame of the Inventaire national du Patrimoine naturel (https://inpn.mnhn.fr/) and, in the case of this specific survey, via the portal of the MNHN collections (https://science.mnhn.fr/institution/mnhn/item/search/form?lang=fr_FR). These records will be available in GBIF as well. All material collected in this survey is deposited in the collections of the MNHN.

The maps (fig. 1) were created with the open source software R (Rstudio Team, 2019).

Morphological analyses and diagnoses of the specimens were performed with a Euromex NZ1903b stereomicroscope with 60× magnification. Diagnoses of the male genitalia, general measurements, and photographs of the specimens were made by the author by use of a Leica M205 stereomicroscope with a maximum of 160× magnification, at the LifeWatch Marine Observatory (Flanders Marine Institute - VLIZ, Ostend, Belgium). To prepare the male terminalia for examination, the first author employed a technique commonly used to study dipteran terminalia: (1) completely removing the abdomen, (2) soaking it for 10 minutes in warm KOH, (3) soaking it for 20 minutes in tap water, (4) soaking it for another 10 minutes in EtOH-HCl (acidified ethanol), and finally (5) soaking it for 20 minutes in tap water. After examination, the macerated abdomen is placed in a polymer microvial containing a few drops of glycerin, which is pinned beneath the specimen.

Results

The *Our Planet Reviewed in Corsica* 2019-2021 expeditions produced 876 samples that contained Diptera, including 54 samples with Sciomyzidae, rather evenly divided over the three years (2019: n=17, 2020: n=15, 2021: n=22). A total of 136 specimens were retrieved from these samples, belonging to 20 species of Sciomyzidae. The distribution of each of these species is given in fig. 1. In order to relate species occurrences over the three years, abundances of each species are given per year (fig. 2).

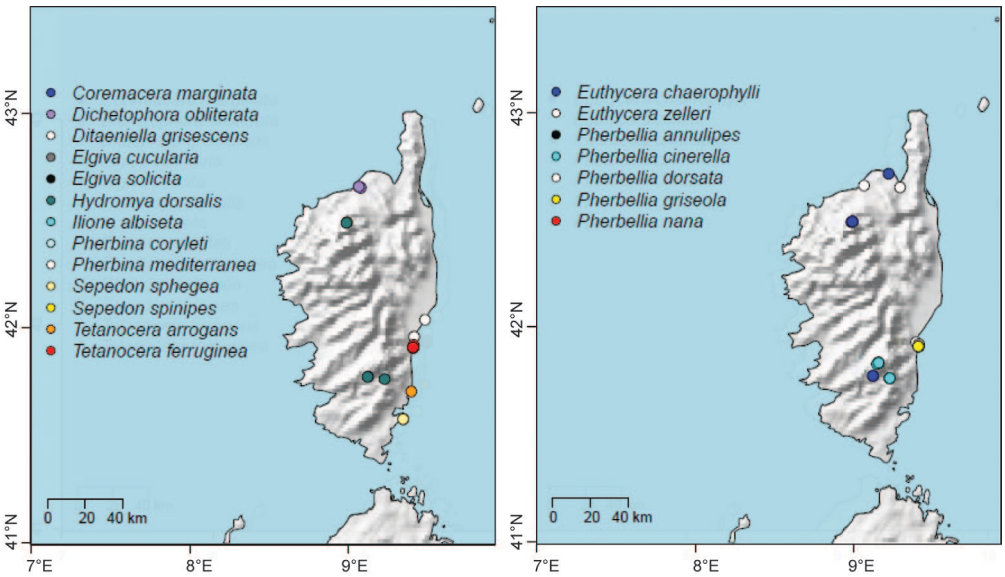

Fig. 1. – Occurrences of Sciomyzidae in Corsica, based on collections as part of the *Our Planet Reviewed in Corsica 2019-2021* expeditions.

Fig. 2. – Overview of collected species and their abundances per year (green: 2019 survey; blue: 2020 survey; purple: 2021 survey).

Table I. – Occurrences per species (expressed as number of specimens) per locality [2019: montane forests in Alta Rocca (south), 2020: coastal dunes, marshlands and maquis (north), and 2021: mainly coastal marshlands (southeast)].

	2019 - Mausoléo - Tartagine	2019 - Olmi-Cappella - Tartagine	2019 - Olmi-Cappella - Tartagine, forest house	2019 - Serra-di-Scopamène - Castellu d'Ornucciu	2019 - Serra-di-Scopamène et Sorbollano	2019 - Zonza - Samulaghia	2020 - Oletta	2020 - Palasca	2020 - Palasca - Agriates, Cruschininca	2020 - Santo-Pietro-di-Tenda	2021 - Localities unknown	2021 - Ghisonaccia - Pinia	2021 - Portivechju - Lavu Santu	2021 - Porto-Vecchio - Carrataghju	2021 - Serra-di-Fiumorbo - Mignataja	2021 - Solaro - littoral zone of the Airbase BA	2021 - Solenzara - Base aérienne 126	2021 - Ventiseri	2021 - Ventiseri - Airbase BA 126	2021 - Ventiseri - beach SE of Airbase BA 126	2021 - Ventiseri - littoral zone of the Airbase BA
Coremacera marginata (Fabricius, 1775)									2												
Dichetophora obliterata (Fabricius, 1805)					2		2	1	1												
Ditaeniella grisescens (Meigen, 1830)															2						
Elgva cucularia (Linnaeus, 1767)																	2				3
Elgva solicita (Harris, 1780)																					3
Euthycera chaerophylli (Fabricius, 1798)	2	7	8	17	4	2				2								10			
Euthycera zelleri (Loew, 1847)							3	1										1			
Hydromya dorsalis (Fabricius, 1775)		3			2	2													3	3	3
Ilione albiseta (Scopoli, 1763)	2																				
Pherbellia annulipes (Zetterstedt, 1846)																			3		
Pherbellia cinerella (Fallén, 1820)				12		5											2				
Pherbellia dorsata (Zetterstedt, 1846)																	1				
Pherbellia griseola (Fallén, 1820)																	29		5		
Pherbellia nana nana (Fallén, 1820)													2						31		
Pherbina coryleti (Scopoli, 1763)										2					2		6				
Pherbina mediterranea Mayer, 1953												1									
Sepedon sphegea (Fabricius, 1775)	4													1							
Sepedon spinipes (Scopoli, 1763)														4			10				
Tetanocera arrogans Meigen, 1830													1				1				
Tetanocera ferruginea Fallén, 1820																3					1
	Mountains of Alta Rocca (S)							Agriate region (N)			Coastal region (SE)										

In table I, the occurrences per species and locality —2019: montane forests in Alta Rocca (south), 2020: coastal dunes, marshlands and maquis (north), and 2021: mainly coastal marshlands (southeast)— are given, allowing for comparison between years and/or regions studied. Especially *Euthycera chaerophylli* (Fabricius, 1798), *Ilione albiseta* (Scopoli, 1763) and *Hydromya dorsalis* (Fabricius, 1775) are of importance with their main distributions in the montane forests, while the bulk of the other species was encountered only in Agriate and southeastern coastal regions. Finally, table II presents an overview of all Sciomyzidae ever reported from Corsica. This checklist includes 21 species, with nine rediscovered species, and 11 species that are recorded from Corsica for the first time. Figures 3-4 present two sites where a few species were encountered in numbers.

Table II. – Checklist of Sciomyzidae of Corsica, based on literature and collections made during the *Our Planet Reviewed in Corsica 2019-2021* expeditions.

	Species	Literature records from Corsica	Current status
	Pherbellia Robineau-Desvoidy, 1830		
1	*P. cinerella* (Fallén, 1820)	Vala (1989)	rediscovered
2	*P. annulipes* (Zetterstedt, 1846)	Bratt *et al.* (1969); Vala (1989); Kazerani *et al.* (2020)	rediscovered
3	*Pherbellia nana nana* (Fallen, 1820)		first record for Corsica
4	*P. dorsata* (Zetterstedt, 1846)		first record for Corsica
5	*P. griseola* (Fallén, 1820)		first record for Corsica
	Sepedon Latreille, 1804		
6	*S. spinipes* (Scopoli, 1763)		first record for Corsica
7	*S. sphegea* (Fabricius, 1775)		first record for Corsica
	Ditaeniella Sack, 1939		
8	*D. grisecens* (Meigen, 1830)		first record for Corsica
	Dichetophora Rondani, 1868		
9	*D. obliterata* (Fabricius, 1805)		first record for Corsica
	Pherbina Robineau-Desvoidy, 1830		
10	*P. mediterranea* Mayer, 1953	Vala & Gasc (1990); Vala (1989)	rediscovered
11	*P. coryleti* (Scopoli, 1763)	Vala (1989)	rediscovered
	Euthycera Latreille, 1829		
12	*E. chaerophylli* (Fabricius, 1798)	Leclercq *et al*. (1983)	rediscovered
13	*E. zelleri* (Loew, 1847)	Becker (1910); Leclercq *et al.* (1983); Vala & Reidenbach (1984); Vala (1989)	rediscovered
	Hydromya Robineau-Desvoidy, 1830		
14	*H. dorsalis* (Fabricius, 1775)	Knutson & Berg (1963); Vala (1989)	rediscovered
	Tetanocera Duméril, 1800		
15	*T. arrogans* Meigen, 1830	Séguy (1934)	rediscovered
16	*T. ferruginea* Fallen, 1820	Becker (1910)	rediscovered
	Elgiva Meigen, 1838		
17	*Elgiva cucularia* (Linnaeus, 1767)		first record for Corsica
18	*Elgiva solicita* (Harris, 1780)		first record for Corsica
	Ilione Haliday, 1837		
19	*I. trifaria (*Loew, 1847)	Knutson & Berg (1963); Vala (1989)	not rediscovered
20	*I. albiseta* (Scopoli, 1763)		first record for Corsica
	Coremacera Rondani, 1856		
21	*C. marginata* (Fabricius, 1775)		first record for Corsica

DISCUSSION

Hitherto, 10 species were known from Corsica, and the following 11 species can be added to this list as the result of the *Our Planet Reviewed in Corsica 2019-2021* expeditions: *Coremacera marginata* (Fabricius, 1775), *Dichetophora obliterata* (Fabricius, 1805), *Ditaeniella grisescens* (Meigen, 1830), *Elgiva cucularia* (Linnaeus, 1767), *Elgiva solicita* (Harris, 1780), *Ilione albiseta*, *Pherbellia dorsata* (Zetterstedt, 1846), *Pherbellia griseola* (Fallén, 1820), *Pherbellia nana nana* (Fallén, 1820), *Sepedon sphegea* (Fabricius, 1775), and *Sepedon spinipes* (Scopoli, 1763) (table I). This is only a small proportion of the European fauna, and it is expected that more species occur in Corsica. Despite the wide array of applied methods and intensive

Fig. 3-4. – Sites with large abundances of Sciomyzidae (Diptera). – **3**, Serra-di-Scopamène, Castellu d'Ornucciu, forest bordering pozzines, habitat of *Euthycera chaerophylli and Pherbellia cinerella*. – **4**, Solenzar, "base aérienne 126", swamp in coastal dunes, habitat of *Pherbellia griseola (Photos by Marc Pollet).*

sampling efforts during the *Our Planet Reviewed* expeditions, only a small temporal snapshot was taken (i.e., only a few autumn samples in 2020, and nearly only springtime samples in 2019 and 2021). It is thus very likely that many summer and autumn species have been missed. For example, *Psacadina verbekei* Knutson, Rozkošný & Berg, 1975*, Ilione trifaria* (Loew, 1847) and *Salticella fasciata* (Meigen, 1830) are three common species in the Mediterranean but reach their activity peak in summer and autumn (Vala, 1989; Mortelmans, 2015). Also, *Ilione unipunctata* (Macquart, 1849) and *Euthycera alaris* Vala, 1983, are expected to occur in Corsica, as they are known from Sardinia (Knutson & Berg, 1967; Vala, 1983; Contini & Rivosecchi, 1984).

All species currently recorded from Corsica are considered common, with a wide distribution in Europe, with the exception of *Euthycera zelleri* (Loew, 1847) —see below. Of special interest is the occurrence of *Ilione albiseta*, a common species in Central and Northern Europe, but rather scarce in the Mediterranean Basin. Vala (1989) compared the distribution range of *I. albiseta* (the 'northern species') and *I. trifaria* (the 'southern species'). The resulting map in Vala (1989) now appears largely outdated as the range of both species already proved to overlap exceedingly. However, the map is still useful to see the distributional gradient between both species, which highlights the current exceptional occurrence of *I. albiseta* in Corsica. Furthermore, the occurrence of *E. zelleri* is noteworthy, as this is a rare species that is considered a western Mediterranean endemic. The species was recorded from Corsica previously (Becker, 1910), but has always been encountered in very low abundances only (never collected in series). Finally, of importance, is the abundant occurrence of *E. chaerophylli* observed in 2019. These abundances are corresponding to Séguy (1934), who documents high abundances of *E. chaerophylli* in high altitude regions in southern France ("between 100 and 2,100m").

During this survey, overall abundances were very low (fig. 2), and most species were only caught as singletons. Only one Corsican species, *I. trifaria*, has not been rediscovered during the *Our Planet Reviewed in Corsica 2019-2021* expeditions.

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