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Contribution to the knowledge of Sphaeroceridae (Insecta: Diptera) associated with animal breeding farms in Morocco

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ABSTRACT. Seventeen species and two genera - *Elachisoma* Rondani, 1880 and *Gonioneura* Rondani, 1880- of Sphaeroceridae are recorded for the first time in Morocco of which 12 species are new to North Africa (*Nudopella hem* (Roháček & Marshall, 1986), *E. bajzae* Papp, 1983, *E. kerteszi* (Duda, 1924), *E. pilosum* (Duda, 1924), *Gonioneura spinipennis* (Haliday, 1836), *Minilimosina* (*Svarciella*) *ismayi* Roháček, 1983b, *Opalimosina* (*Dentilimosina*) *denticulata* (Duda, 1924), *Spelobia talparum* (Richards, 1927), *Nudopella leucoptera* (Haliday, 1836), *Trachyopella* (*Trachyopella*) *lineafrons* (Spuler, 1925), *T. (T.) straminea* Roháček & Marshall, 1986 and *Ischiolepta scabricula* (Haliday, 1836)). The aim of this study was to identify the lesser dung flies associated with five types of livestock (cattle, sheep, horses, goats, and poultry) among the 63 recognized species. These new findings have raised the total number of recognized Sphaeroceridae species in Morocco to 84.

Keywords: lesser dung flies, cattle, sheep, equine, goat, poultry, North Africa

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INTRODUCTION

Sphaeroceridae known as the lesser dung flies, are a relatively large family of acalyptrate Diptera with more than 1,800 described (and at least 5,000 estimated) species in the world (Papp & Roháček, 2021). Probably all species are saprophagous (more precisely, micro-saprophagous) because both larvae and adults are feeding on liquids with microorganisms and decomposed organic substances from decaying animal matter (excrement, carrion), vegetal matter (dead plants and their remnants including forest litter), and fungal (sporocarps of macrofungi) organic matter (Roháček, 1998; Papp & Roháček, 2021). The family is recognized for participating in the decomposition process of all kinds of organic material, being able to be poly-saprophagous or specialists. They found each other in some of their life phases feeding on resources such as fungi feces of various animal carcasses of invertebrates and carcasses of vertebrates. Despite their diverse biology, their medical and economic importance is not relevant, being

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potential mechanical transmitters of pathogens, they are pests in cheese industries, reducing the sanitary standards of manufacturing. There are also reports of intestinal myiasis and damage to the cultivation of mushrooms. Carrion-feeding species are useful post-mortem interval indicators in forensic entomology (Belshaw, 1989; Marshall et al., 2011; Manrique-Saïde et al., 1997).

Despite numerous studies on Sphaeroceridae associated with the faeces of livestock, such as the work by Farkas and Papp (1989) who examined species composition and breeding sites of fly communities in poultry houses in Hungary, or Köhlhorn's (1964) study on the composition of stable dipteran fauna, the relationship between Sphaeroceridae and animal droppings remains underexplored, particularly in Morocco. For instance, Papp (1985a, 1985b) found that the Sphaeroceridae family was the most abundant in sheep and cattle droppings. Furthermore, Papp (1976) reported that species like *Ischiolepta oedopoda*, *Copromyza* (*Borborillus*), and *Coproica dentata* develop in horse manure. Laurence (1954) also noted that small Sphaeroceridae (Borboridae), whose larvae feed on dung, may use the dung as food when they reach adulthood and may shelter in or under the droppings. Additional studies, including those of Hafez (1939), Hammer (1941), Howard (1901), Köhlhorn (1961), and Papp (1971) have contributed valuable insights into the relationship between Sphaeroceridae and livestock faeces. However, the knowledge regarding Sphaeroceridae and their association with livestock in Morocco remains incomplete. This study aims to expand our understanding of this family and its relationship with livestock in Morocco.

The data presented in this article were primarily collected between 2018 and 2021 during 191 field trips across various regions of Morocco, including the Rif, Middle Atlas, High Atlas, and Coastal Meseta (Fig. 1). Before this study, 67 species of Sphaeroceridae had been recorded in Morocco (Kettani et al., 2022). This article introduces new records for Morocco, including two newly documented genera and two potentially undescribed species which will be described in a separate article. With these new findings, the number of known Sphaeroceridae species in Morocco has increased to 84.

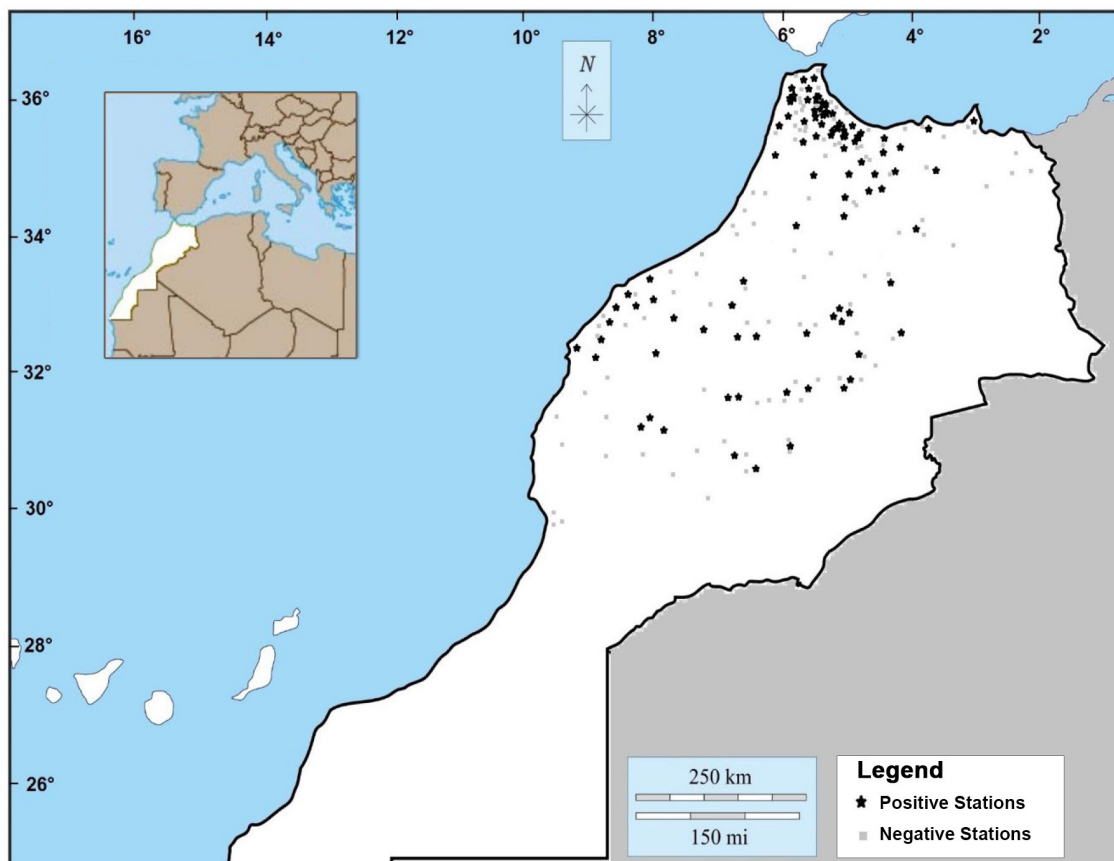


Figure 1. Map showing all collecting sites in Morocco using the GisArc software (GIS, ver. 9.3).

MATERIAL AND METHODS

The material examined consists of Diptera captured in traditional farms located in rural areas of Morocco. The specimens were collected by Bouzzarf and Qalmoun, members of the UAE.FST group affiliated with the Faculty of Sciences, Abdelmalek Essaâdi University (Tetouan, Morocco). Sampling was carried out using a sweep net in all livestock farms (Fig. 2). However, in the poultry farm, a malaise trap was used instead, due to the specific conditions of the site. The study was carried out in 80 farms of different types: 36 cattle farms, 21 sheep farms, 11 horse farms (including donkeys and asses), 8 goat farms and 4 chicken farms (Fig. 3A). A total of 8212 specimens belonging to the family Sphaeroceridae were collected, using sweep nets and malaise traps (Fig. 3B), examined, and preserved in 70% ethanol. Most specimens were captured inside breeding farms or in the nearby surroundings.



Figure 2. Sampling sites and habitat of the lesser dung flies in Morocco. **A.** An example of a traditional farm with Cattle: Chefchaouen, Bab Taza Village. **B.** An example of a contemporary sheep farm: Lmchawir Village, Eljadida. **C.** An illustration of a donkey shelter: Mansoura Village Chefchaouen. **D.** An example of a goat shelter: Youssoufia.



Figure 3. Sampling areas and habitat of Sphaeroceridae in Morocco. **A.** sampling by sweep net near a chicken shelter: Oulad Abbou Village, Settati; **B.** Malaise trap installed outside near a chicken shed in Mansoura Village.

All specimens identified by the late Paul Beuk were stored by species in ethyl alcohol (70%) and identifications were performed using a Wild M3Z stereomicroscope at magnification from 10x to 120x with a LitraPro LP1200 led light (light temperature 5700K). Identified specimens were transferred to ethyl alcohol (70%) in 2 ml vials with locality and identification labels. Whenever necessary, genitalia were prepared using lactic acid following the method described by Beuk (2021), and the genitalia were stored in the vials with the specimens. Keys used to identify genera (and consequently some species because they are placed in monotypic genera) are those of Pitkin (1988), Roháček (1998) and Papp & Roháček (2021). Generic revisions to further identify Sphaerocerinae were those of Han & Kim (1990 – *Ischiolepta* Lioy, 1864), Kim & Han (1990 – *Lotobia* Lioy, 1864) and Kim (1968 – *Sphaerocera* Latreille, 1804) and to further identify Copromyzinae were those of Norrbom & Kim (1985a – *Crumomyia* Macquart, 1835; 1985b – *Copromyza*, Fallén, 1810), Norrbom & Marshall (1988 – *Lotophila* Lioy, 1864), and Papp (1988 – *Norrbomia* Papp, 1988). The monograph of Limosininae by Roháček (1982c, 1983a, 1983b, 1985) sufficed for the identification of most genera therein (*Bifronsina* Roháček, 1983, *Eulimosina* Roháček, 1983, *Gonioneura* Rondani, 1880, *Limosina* Macquart, 1835, *Opalimosina* Roháček, 1983, *Pullimosina* Roháček, 1983, *Spelobia* Spuler, 1924, *Spinilimosina* Roháček, 1983) but several genera were revised elsewhere or required additional literature. The relevant publications are those of Marshall (1986 – *Pullimosina* Roháček, 1983), Marshall & Roháček (1982 – *Telomerina* Roháček 1983), Marshall & Smith (1993 – *Pseudocollinella* Duda, 1924), Papp (1983 – *Elachisoma* Rondani, 1880; 1990 – *Poecilomella* Duda, 1925; 2008 – *Coproica* Rondani, 1861), Roháček (1982a – *Opacifrons* Duda, 1918; 1982b – *Leptocera* Olivier, 1813; 1991 – *Rachispoda* Lioy, 1864; 2010 – *Minilimosina* (*Svarciella*) Roháček, 1983), and Roháček & Marshall (1986 – *Trachyopella* Duda, 1918; 1988 – *Minilimosina* (*Svarciella*)). All identified species from this study have been deposited at the Natuurhistorisch Museum Maastricht, De Bosquetplein, Maastricht, Netherlands, where they remain available for future verification and additional research. We provide an annotated list of the Sphaeroceridae identified in the present work, following the most recent version of Systema Dipteriorum (Papp & Roháček, 2021) and their distribution according to the type of breeding.

The species are listed alphabetically within each subfamily, also sorted alphabetically. Species new for North Africa are marked with one asterisk (*), those new for Morocco are marked with two asterisks (**), and those representing the first records for the RIF, MIDDLE ATLAS, ANTI-ATLAS, HIGH ATLAS, or COASTAL MESETA are indicated with three asterisks (***) (Table 1). Moroccan, North African, and world distributions are given for the species inventoried, with notes on the biology of each species.

RESULTS

Taxonomic hierarchy

Family Sphaeroceridae Macquart, 1835

Subfamily Copromyzinae Stenhammar, 1855

Genus *Copromyza* Fallén, 1810

***Copromyza equina* Fallén, 1820**

Material examined. Equine: RIF. 6♂♂, 4♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 9.III.2019.

Distribution in Morocco. RIF. Oued Laou, Tétouan (Marshall et al., 2011).

General distribution. Afrotropical – Zaire; Australasian: Hawaii (USA); Nearctic – Canada; Neotropical – Costa Rica, Guatemala, Mexico; Oriental – China; Palaearctic – Algeria, Austria, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), Czech Republic, Denmark, Estonia, Finland, France (incl. Corsica), Faeroe Is. (Denmark) (Roháček et al., 2001).

Biology. In our study, this species is found associated with horse farms. It is a strictly coprophagous species, clearly preferring horse dung as a larval substrate, although it has also been reared from cow dung; more rarely, adults are attracted to the excrement of other mammals (cow, sheep, rabbit, dog, man), carrion and compost heaps (Pitkin, 1988).

Genus *Crumomyia* Macquart, 1835

***Crumomyia glabrifrons* (Meigen, 1830)**

Material examined. Equine: RIF. 1♂, 2♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019.

Distribution in Morocco. RIF. Tariouma; MIDDLE ATLAS. Lac Aguelmane (Gatt et al., 2016).

General distribution. Palaearctic – Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Finland, France, Germany, Hungary, Israel, Italy, Netherlands, Norway, Poland, Roumania, Russia (CET, SET), Slovakia, Spain, Sweden, Switzerland, Tadjikistan, Türkiye, Ukraine, former Yugoslavia (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. In our work, the species was associated with equine farms. Found mainly in cold forests and above the timberline in the alpine zone, it was recorded from wet meadows, the entrance region of caves, decayed vegetation, on roe droppings (Troger & Roháček, 1980).

Genus *Lotophila* Lioy, 1864

***Lotophila atra* (Meigen, 1830)**

Material examined. Cattle farm: COASTAL MESETA. 2♂♂, 1♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019; 1♂, Sidi Aabed Village (32°44'16.6"N 9°00'59.0"W), 18.I.2019. RIF. 15♂♂, Moulay Bouchta Village (34°29'34.4"N 5°07'30.0"W), 21.I.2019; 1♂, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.V.2019. **Equine:** RIF. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Sheep husbandry:** COASTAL MESETA. 1♂, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020.

Distribution in Morocco. RIF. Tanger (Marshall et al., 2011).

General distribution. Nearctic – Canada; Oriental – China (SIC), Pakistan; Palaearctic – Afghanistan, Algeria, Austria, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), China, Croatia, Czech Republic, Denmark, Estonia, Finland, France incl. (Corsica), Faeroe Is. (Denmark), Georgia, Germany, Great Britain, Greece (incl. Crete), Hungary, Kazakhstan, Israel, Italy (incl. Sardinia), Japan, Latvia, Lithuania, Macedonia, Madeira (Portugal), Malta, Mongolia, Morocco, Netherlands, North Korea, Norway, Poland, Roumania, Russia, Slovakia, Spain, Sweden, Switzerland, Tadjikistan, Tunisia, Ukraine, Uzbekistan, former Yugoslavia (Roháček et al., 2001).

Biology. In our work, we found it associated with horse, cattle, and sheep farms. The species is coprophagous as a larva, although it has only been successfully reared from cow dung. Adults occur on the excrement of various kinds (horse, donkey, sheep, pig, dog, man, red deer, roe deer, mouflon, rabbit, and cattle (Roháček, 1989).

Genus *Norrbomia* Papp, 1988

Norrbomia costalis (Zetterstedt, 1847)

Material examined. **Cattle farm:** RIF. 1♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. **Sheep husbandry:** COASTAL MESETA. 1♂, Aït Messaoud Village (31°43'36.0"N 8°05'14.3"W), 26.IV.2019; 2♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020; RIF. 1♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. **Equine:** RIF. 1♂, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019; 2♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 15.V.2021. **Goat:** RIF. 1♀, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019.

General distribution. Palaearctic – Algeria, Austria, Belgium, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Great Britain, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Latvia, Mongolia, Morocco, Netherlands, Norway, Poland, Portugal, Roumania, Russia, Slovakia, Spain, Sweden, Switzerland, Tunisia, Ukraine, former Yugoslavia (Roháček et al., 2001). Morocco (**New record**).

Biology. We found this species in horse, cattle, sheep, and goat farms. It is generally rare but can be locally common, particularly on pastures near large horse farms (Roháček, 1998).

Norrbomia hispanica (Duda, 1923)

Material examined. **Cattle farm:** RIF. 3♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019.

Distribution in Morocco. RIF. Oued Laou, Tétouan (Marshall et al., 2011).

General distribution. Palaearctic – Bulgaria, Czech Republic, Finland, France, Great Britain, Hungary, Italy, Israel, Kazakhstan, Roumania, Russia (SET), Spain (incl. Balearic Is.), Tadjikistan (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. Till now unknown, we found the species associated with cattle farms. The larva develops exclusively in horse droppings.

Norrbomia marginatis (Adams, 1905)

Material examined. **Cattle farm:** COASTAL MESETA. 1♂, 1♀, Sidi Aabed Village (32°44'16.6"N 9°00'59.0"W), 18.I.2019.

Distribution in Morocco. RIF. Oued Laou, Tétouan (Marshall et al., 2011).

General distribution. Afrotropical – Angola, Cape Verde Is., Ethiopia, Kenya, Madagascar, Namibia, Nigeria, South Africa, Togo, Uganda, Zaire, Zimbabwe; Australasian/Oceanic – Australia, Belau, Fiji, Palau, Samoa, Vanuatu; Oriental – China (YUN), India, Malaysia (Sabah), Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand; Palaearctic – Canary Is. (Spain), China (HEB), Egypt, Greece, Israel, Japan, Malta (Roháček et al., 2001), Morocco (Marshall et al., 2011).

Biology. This species was found in cattle droppings.

Norrbomia sordida (Zetterstedt, 1847)

Material examined. **Cattle farm:** RIF. 1♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. **Sheep husbandry:** COASTAL MESETA. 1♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. RIF. 1♂, Boujarah Village (35°34'38.7"N 5°19'02.5"W), 3.V.2019. **Equine:** RIF. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Goat farm:** RIF. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019.

Distribution in Morocco. RIF. Oued Guallet; Atlantic Plain. Larache, Loukkos (Gatt et al., 2016).

General distribution. Australasian/Oceanic – Hawaii (USA); Nearctic – Canada; Neotropical – Bermuda, Guatemala, Mexico; Oriental – India (Punjab); Palaearctic – Austria, Azores, Belgium, Canary Is. (Spain), China (XIN), Denmark, Finland, France, Germany, Great Britain, Greece, Hungary, Israel, Italy, Japan, Kazakhstan, Latvia, Mongolia, Norway, Poland, Roumania, Russia, Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tadjikistan, Türkiye (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. We found this species in cattle, sheep, equine, and goat farms in Morocco. It is a purely coprophagous species normally associated with horse dung, more rarely with cattle droppings on pastures (Papp, 1993).

Subfamily Limosininae Frey, 1921

Genus *Bifronsina* Roháček, 1983

Bifronsina bifrons (Stenhammar, 1855)

Material examined. **Cattle farm:** COASTAL MESETA. 4♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. 7♀♀, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. 50♂♂, 25♀♀, Safi City (32°23'53.0"N 9°10'39.0"W), 7.XI.2018. 2♀♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. 1♀, Tnin Chtouka Village (33°19'13.7"N 8°10'57.1"W), 8.IV.2018. 3♂♂, 5♀♀, Sidi Aabed Village (32°44'16.6"N 9°00'59.0"W), 18.I.2019. MIDDLE ATLAS. 8♂♂, 22♀♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 250♂♂, 161♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29.V.2021. 4♂♂, 3♀♀, Sidi Mansour Village (35°14'16.7"N 3°57'04.5"W), 3.V.2019. 3♂, 1♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. 6♂♂, 10♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 6♀♀, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 2♀♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. 1♂, Moulay Yaakoub Village (34°11'16.2"N 4°58'51.0"W), 7.XI.2018. **Equine:** MIDDLE ATLAS. 1♂, 2♀♀, Bejaad Village (32°46'18.6"N 6°21'18.7"W), 12.XII.2018. RIF. 100♂♂, 116♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 17.V.2021. 2♂♂, 1♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 17.V.2021. 1♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. **Goat:** RIF. 21♂♂, 12♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29.V.2021. 7♀♀, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 2♂♂, 5♀♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. 1♂, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019. **Sheep husbandry:** COASTAL MESETA. 3♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. 13♂♂, 14♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. 1♀, Sidi Maachou Village (33°08'52.8"N 8°07'06.7"W), 14.XII.2018. MIDDLE ATLAS. 1♂, 6♀♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 1♂, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 783♂♂, 798♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 30.V.2021.

Distribution in Morocco. COASTAL MESETA. Birjdid, Lmchawir, Nahda, Oulad Abbou, Safi, Sidi Aabed, Sidi Maachou, Tnin Chtouka; MIDDLE ATLAS. Bejaad, Elksiba; RIF. Aïn Zarka, Al Kachla, Bab Taza, Beni Mazala, Ben Karrich, Dghalyen, Mansoura, Moulay Yaakoub, Sidi Mansour.

General distribution. Afrotropical – Madagascar, Seychelles, South Africa, Zaire; Australasian/Oceanic – Australia (ACT, VIC), Bonin Is. (Japan), French Polynesia (Tahiti), Guam (USA), Hawaii (USA), Kiribati (Tarawa Atoll), Marshall Is., Micronesia (Ponape, Yap Is.), North Mariana Is., New Zealand, Niue, Palau (USA); Nearctic – Canada; Neotropical – Argentina, Barbados, Bermuda, Brazil, Costa Rica, Dominica, Dominican Republic, Ecuador, Galápagos Is. (Ecuador), Jamaica, Mexico (HID), St. Kitts, St. Vincent; Oriental – China (HAI), India (Rajasthan, Uttar Pradesh), Philippines, Taiwan; Palaearctic – Afghanistan, Andorra, Austria, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Great Britain, Hungary, Italy (incl. Sardinia, Sicily), Israel, Japan, Latvia, Madeira (Portugal), Malta, Morocco, Netherlands, Norway, Poland, Roumania, Russia (CET, FE, NET, WS), Slovakia, Slovenia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tadzikistan (Roháček et al., 2001).

Biology. In our study, this species was captured in association with cattle, equine, goats, and sheep. It is a common coprophagous species (Papp, 1978).

Genus *Coproica* Rondani, 1861

Coproica digitata (Duda, 1918)

Material examined. **Cattle farm:** COASTAL MESETA. 4♀♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. **Equine:** RIF. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 17♂♂, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 15.V.2021. 4♂♂, 9♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. **Sheep husbandry:** RIF. 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29.V.2021.

Distribution in Morocco. RIF. Oued Laou, Tétouan (Marshall et al., 2011).

General distribution. Oriental – Pakistan; Palaearctic – Afghanistan, Bulgaria, Canary Is. (Spain), Egypt,

France, Hungary, Israel, Kirghizstan, Macedonia, Roumania, Slovakia, Slovenia, Spain (incl. Balearic Is.), Tunisia, Turkestan, Uzbekistan, former Yugoslavia (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. We found this species associated with cattle, equine, and sheep. Carles-Tolrá (2001) found it associated with equine excrement.

Coproica ferruginata (Stenhammar, 1855)

Material examined. **Cattle farm:** COASTAL MESETA. 4♂♂, 3♀♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. 14♂♂, 15♀♀, Douar Touanssa (31°58'00.1"N 8°58'40.4"W), 7.XI.2019. 2♀♀, El Hawzia Sea (33°15'12.4"N 8°18'33.0"W), 21.I.2019. 34♂♂, 16♀♀, Safi City (32°23'53.0"N 9°10'39.0"W), 7.XI.2018. 19♂♂, 10♀♀, Sidi Aabed Village (32°44'16.6"N 9°00'59.0"W), 18.I.2019. 4♂♂, 5♀♀, Tnin Chtouka Village (33°19'13.7"N 8°10'57.1"W), 8.IV.2018. 32♂♂, 23♀♀, Mazagan Sea (33°16'24.3"N 8°22'13.9"W), 8.XI.2018. MIDDLE ATLAS. 10♂♂, 10♀♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 10♂♂, 12♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 22♂♂, 1♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. 41♂♂, 35♀♀, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 15♂♂, 31♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29.V.2021. 6♂♂, 3♀♀, Tanger City (35°40'38.6"N 5°52'21.6"W), 17.I.2019. 5♂♂, 4♀♀, Sidi Mansour Village (35°14'16.7"N 3°57'04.5"W), 3.V.2019. **Goat farm:** RIF. 1♀, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019. 16♂♂, 7♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 16♂♂, 8♀♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. 5♂♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 10♂♂, 12♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29.V.2021. **Equine:** COASTAL MESETA. 42♂♂, 15♀♀, El Ghorba Village (31°57'29"N 6°32'06"W), 9.XII.2018. RIF. 1♂, 3♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 17.V.2021. 3♂♂, 1♀, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 36♂♂, 35♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 17.V.2021. **Sheep husbandry:** COASTAL MESETA. 10♂♂, 4♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. 231♂♂, 154♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. MIDDLE ATLAS. 2♂♂, 2♀♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 2♂♂, 4♀♀, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.V.2019. 2♂♂, 1♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. 3♂♂, Boujarah Village (35°34'38.7"N 5°19'02.5"W), 3.V.2019. 2♂♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 367♂♂, 291♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 15.V.2021. **Poultry:** RIF. 2♂♂, Had Elgharbia Village (35°31'00.1"N 5°56'00.7"W), 3.V.2019, Malaise trap, coll. Bouzrarf, UAE-FST.

Distribution in Morocco. RIF. Martil, Tétouan (Marshall et al., 2011).

General distribution. Afrotropical – Congo, Ethiopia, Ghana, Nigeria, Seychelles, South Africa, Tanzania, Togo, Zaire; Australasian/ Oceanic – Australia (ACT, NSW, NT, QLD), Fiji, Guam (USA), Hawaii (USA), New Zealand, Niue, Samoa, Tonga; Nearctic – Canada; Neotropical – Argentina, Bahamas, Bermuda, Bolivia, Brazil, Chile, Colombia, Costa Rica, Jamaica, Honduras, Mexico (CHI, NAY), St. Kitts, Surinam; Oriental – China, India (Uttaranchal), Indonesia (Flores, Sumbawa), Pakistan, Sri Lanka, Taiwan; Palaearctic – Afghanistan, Algeria, Andorra, Austria, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), China (BEI, TIB), Cyprus, Czech Republic, Denmark, Egypt, Finland, France (incl. Corsica), Germany, Great Britain, Greece (incl. Crete), Hungary, Italy, Israel, Japan, Latvia, Madeira (Portugal), Malta, Mongolia, Netherlands, North Korea, Norway, Poland, Roumania, Russia (CET, NET), Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tadjikistan, Tunisia, former Yugoslavia (Serbia) (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. We found it associated with cattle, sheep, equine, poultry, and goats. It is a synanthropic species particularly common in decaying matter and excrement (Schiegg & Munari, 1999).

Coproica hirticula Collin, 1956

Material examined. **Cattle farm:** COASTAL MESETA. 1♀, Aït Messaoud Village (31°43'36.0"N 8°05'14.3"W), 26.IV.2019. 10♂♂, 3♀♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. 2♂♂, 4♀♀, Safi City (32°23'53.0"N 9°10'39.0"W), 7.XI.2018. 10♂♂, 5♀♀, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. 1♂, 1♀, Mazagan Sea (33°16'24.3"N 8°22'13.9"W), 8.XI.2018. MIDDLE ATLAS. 2♂♂, 3♀♀, Elksiba

Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 2♂♂, 4♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 1♀, Boujarah Village (35°34'38.7"N 5°19'02.5"W), 6.V.2019. 24♂, 17♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. 1♂, 1♀, Moulay Yaakoub Village (34°11'16.2"N 4°58'51.0"W), 7.XI.2018. 1♀, Gouarat Village (35°40'38.6"N 5°52'21.6"W), 3.VI.2019. **Equine:** COASTAL MESETA. 1♂, 2♀♀, El Ghorba Village (31°57'29"N 6°32'06"W), 9.XII.2018. RIF. 1♂, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 21.IV.2019. 1♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. **Goat farm:** RIF. 64♂♂, 70♀♀, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019. 1♂, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 17.V.2021. 2♂♂, 5♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Sheep husbandry:** COASTAL MESETA. 22♂♂, 9♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. 52♂♂, 40♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. MIDDLE ATLAS. 2♀♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 1♂, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.V.2019. 1♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 10♂♂, 18♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 15.V.2021.

Distribution in Morocco. RIF. Zarka waterfall; ANTI ATLAS. Errachidia (Gatt et al., 2016).

General distribution. Australasian/Oceanic – Australia, New Zealand; Nearctic – Canada; Neotropical – Argentina, Barbados, Brazil, Colombia, Guatemala, Jamaica, Mexico (HID); Oriental – China, Taiwan; Palaearctic – Belgium, Bulgaria, Canary Is. (Spain), Czech Republic, Denmark, Germany, Great Britain, Greece (Crete), Finland, Hungary, Italy, Israel, Japan, Malta, Norway, Poland, Roumania, Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. We found it with cattle, sheep, equine, and goat farms. It is common, chiefly coprophagous but also on carrion and decayed vegetation, cow houses, pastures, grass compos, potato and rape fields (Floren, 1989).

Coproica hirtula (Rondani, 1880)

Material examined. **Cattle farm:** COASTAL MESETA. 1♂, Douar Touanssa (31°58'00.1"N 8°58'40.4"W), 7.XI.2019. 1♀, Safi City (32°23'53.0"N 9°10'39.0"W), 7.XI.2018. 1♂, Mazagan Sea (33°16'24.3"N 8°22'13.9"W), 8.XI.2018. 1♂, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. MIDDLE ATLAS. 1♂, 6♀♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 5♂♂, 7♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. 4♂♂, 1♀, Boujarah Village (35°34'38.7"N 5°19'02.5"W), 6.V.2019. 2♂♂, 3♀♀, Sidi Mansour Village (35°14'16.7"N 3°57'04.5"W), 3.V.2019. **Sheep husbandry:** COASTAL MESETA. 2♂♂, 1♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. RIF. 1♂, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.V.2019. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 13♂♂, 11♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29.V.2021. 1♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. **Goat farm:** RIF. 1♀, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. **Equine:** MIDDLE ATLAS. 3♂♂, 3♀♀, Tadla City (32°20'22"N 6°22'55"W), 9.XII.2018. RIF. 4♂♂, 11♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 17.V.2021. 1♂, 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 28.V.2021. **Poultry:** RIF. 1♀, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.IV.2019, malaise trap, coll. Bouzarraf, UAE-FST.

Distribution in Morocco. RIF. Zarka waterfall; ANTI ATLAS. Errachidia (Gatt et al., 2016).

General distribution. Afrotropical – Congo, Ethiopia, Ghana, Kenya, Madagascar, Nigeria, Seychelles, Yemen, Zaire; Australasian/ Oceanic – Bonin Is. (Japan), Guam (USA), Hawaii (USA), Kiribati (Onotoa Atoll), Marshall Is., Micronesia (Kapingamarangi Atoll, Satawal I., Yap Is.), New Zealand, Northern Mariana Is. (Saipan), Papua New Guinea, Palau, Pitcairn Is.; Nearctic – Canada; Neotropical – Chile; Oriental – China (HKG), India, Malaysia, Nepal, Pakistan, Sri Lanka, Taiwan, Vietnam; Palaearctic – Afghanistan, Andorra, Austria, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), Czech Republic, Egypt, Finland, Germany, Great Britain, Greece (Thira), Hungary, Italy, Israel, Japan, Latvia, Madeira (Portugal), Malta, Netherlands, North Korea, Norway, Poland, Roumania, Russia (CET), Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tunisia, Uzbekistan, former Yugoslavia (Serbia); South Atlantic: Saint Helena (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. In our study, this species is found associated with equine, cattle, sheep, and goats, and connected with animal husbandry, cow houses, potato and rape fields, and grass compost (Floren, 1989).

Coproica lugubris (Haliday, 1835)

Material examined. **Cattle farm:** COASTAL MESETA. 1♂, 1♀, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. RIF. 2♂♂, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 1♂, Ain Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 3♂♂, 1♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. **Equine:** RIF. 1♂, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 17.V.2021. **Goat farm:** RIF. 1♂, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Sheep husbandry:** MIDDLE ATLAS. 1♂, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 30.V.2021.

Distribution in Morocco. RIF. M'Diq, Oued Laou, Smir, Tétouan (Marshall et al., 2011).

General distribution. Australasian/Oceanic – Papua New Guinea; Oriental – China (HKG), India (Uttar Pradesh), Pakistan, Taiwan; Palaearctic – Afghanistan, Andorra, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France (incl. Corsica), Germany, Great Britain, Greece (Crete), Hungary, Israel, Italy (incl. Pantelleria I., Sardinia), Japan, Kazakhstan, Kirghizstan, Latvia, Lithuania, Macedonia, Netherlands, North Korea, Norway, Poland, Roumania, Russia (CET, FE, NET, SET), Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tadjikistan, Tunisia, former Yugoslavia (Serbia) (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. This species was collected from cattle, sheep, equine, and goat farms in this research. It is found in pastures, cow houses, grass compost, and potato fields according to Floren (1989).

Coproica pusio (Zetterstedt, 1847)

Material examined. **Cattle farm:** RIF. 1♂, 2♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Goat farm:** RIF. 1♂, 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019.

Distribution in Morocco. RIF. Oued Laou, Smir lagoon (Gatt et al., 2016).

General distribution. Oriental – Pakistan; Palaearctic – Afghanistan, Andorra, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Great Britain, Hungary, Japan, Italy, Latvia, Norway, Mongolia, Russia (NET, ES, SET), Slovakia, Spain, Sweden, Switzerland, former Yugoslavia (Serbia) (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. It was captured with cattle and goat farms in this study. According to Floren (1989), it is chiefly on cattle droppings, cow houses, dunghill, pastures, potato and rape fields, and grass compost.

Coproica rohaceki Carles-Tolrá, 1990

Material examined. **Cattle farm:** COASTAL MESETA. 22♂♂, 6♀♀, Sidi Mansour Village (35°14'16.7"N 3°57'04.5"W), 3.V.2019. MIDDLE ATLAS. 1♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 1♂, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 144♂♂, 72♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29.V.2021. 2♂♂, 3♀♀, Ain Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 2♂♂, 1♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. 9♂♂, 5♀♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. 3♂♂, 1♀, Boujarah Village (35°34'38.7"N 5°19'02.5"W), 6.V.2019. **Goat farm:** RIF. 1♂, 2♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 10♂♂, 15♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 17.V.2021. 22♂♂, 7♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 21.IV.2019. 7♂♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 1♀, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019. 19♂♂, 10♀♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. **Equine:** RIF. 31♂♂, 20♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 28.V.2021. **Poultry:** RIF. 1♀, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.IV.2019, Malaise trap, coll. Bouzrarf, UAE-FST. **Sheep husbandry:** MIDDLE ATLAS. 11♂♂, 9♀♀, Khouribga (32°54'32.7"N 6°57'59.0"W), 13.VI.2021. RIF. 4♂♂, 2♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 302♂♂, 229♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021. 1♂, 4♀♀, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 1♂, 1♀ Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.V.2019.

Distribution in Morocco. RIF. Oued Amsa, Oued Moulay Bouchta (Gatt et al., 2016).

General distribution. Palaearctic – Canary Is. (Spain), Italy, Japan, Malta, Norway, Spain (incl. Balearic Is.) (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. In our work, this species was found in cattle, sheep, poultry, equine, and goat farms. It is strongly psychrophilous, chiefly collected on decaying fungi and leaves and moss in damp meadows. It is also found in small mammals' burrows and caves' entrance regions (Schiegg & Munari, 1999).

Coproica rufifrons Hayashi, 1991

Material examined. **Cattle farm:** COASTAL MESETA. 1♂, 3♀♀, Douar Touanssa (31°58'00.1"N 8°58'40.4"W), 7.XI.2019. 2♂♂, 9♀♀, Safi City (32°23'53.0"N 9°10'39.0"W), 7.XI.2018. 1♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. 1♂, Sidi Aabed Village (32°44'16.6"N 9°00'59.0"W), 18.I.2019. MIDDLE ATLAS. 2♂♂, 3♀♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. **RIF.** 1♂, 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29.V.2021. 1♂, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 1♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. 3♂♂, 3♀♀, Moulay Yaakoub Village (34°11'16.2"N 4°58'51.0"W), 7.XI.2018. **Goat farm:** RIF. 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 17.V.2021. **Equine:** RIF. 2♂♂, 2♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 28.V.2021. **Sheep husbandry:** COASTAL MESETA. 2♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. MIDDLE ATLAS. 1♂, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 14♂♂, 11♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021. 2♂♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019.

Distribution in Morocco. RIF. Issaguen (Gatt et al., 2016).

General distribution. Australasian/Oceanic – Papua New Guinea, Solomon Is.; Nearctic – USA (FL); Neotropical – Argentina, Bermuda, Brazil, Bolivia, Ecuador, Galápagos Is. (Ecuador), Grenada, Mexico, St. Kitts; Oriental – China (HKG), Pakistan, Taiwan; Palaearctic – Canary Is. (Spain), Japan (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. We found this species in cattle, sheep, equine, and goat farms. According to Falk et al. (2016), its biology is unknown, larvae probably develop in decaying vegetable matter, although they may invade grass and reed stems. Adults recorded from June to September.

Coproica vagans (Haliday, 1833)

Material examined. **Cattle farm:** COASTAL MESETA. 20♂♂, 17♀♀, Douar Touanssa (31°58'00.1"N 8°58'40.4"W), 7.XI.2019. 3♂♂, 2♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. 77♂♂, 46♀♀, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. 38♂♂, 27♀♀, Safi City (32°23'53.0"N 9°10'39.0"W), 7.XI.2018. 79♂♂, 48♀♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. 3♂♂, 3♀♀, Sidi Aabed Village (32°44'16.6"N 9°00'59.0"W), 18.I.2019. MIDDLE ATLAS. 86♂♂, 87♀♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 2♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 64♂♂, 32♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29.V.2021. 58♂, 17♀♀, Moulay Yaakoub Village (34°11'16.2"N 4°58'51.0"W), 7.XI.2018. 3♂♂, 5♀♀, Sidi Mansour Village (35°14'16.7"N 3°57'04.5"W), 3.V.2019. 6♂♂, 4♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 3♂♂, 3♀♀, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 2♂♂, 7♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. 6♂♂, 1♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. 10♂♂, 8♀, Touima Village (35°07'35.8"N 2°56'08.3"W), 18.I.2018. 11♂♂, 14♀♀, Boujarah Village (35°34'38.7"N 5°19'02.5"W), 6.V.2019. **Equine:** COASTAL MESETA. 3♂♂, 3♀♀, El Ghorba Village (31°57'29"N 6°32'06"W), 9.XII.2018. MIDDLE ATLAS. 29♂♂, 19♀♀, Bejaad Village (32°46'18.6"N 6°21'18.7"W), 12.XII.2018. RIF. 3♂♂, 7♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 17.V.2021. 15♂♂, 9♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 28.V.2021. **Goat farm:** RIF. 2♂♂, 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 17.V.2021. 4♂♂, 3♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 21.IV.2019. 2♂♂, 2♀♀, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 15♂♂, 3♀♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. 32♂♂, 15♀♀, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019. **Sheep husbandry:** COASTAL MESETA. 127♂♂, 94♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. 81♂♂, 50♀♀,

Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. 3♂♂, 3♀♀, Sidi Maachou Village (33°08'52.8"N 8°07'06.7"W), 14.XII.2018. MIDDLE ATLAS. 1♂, 4♀♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. RIF. 112♂♂, 76♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021.

Distribution in Morocco. ANTI ATLAS. Errachidia, Oued Ziz; Sahara. Merzouga (Gatt et al., 2016).

General distribution. Afrotropical – Ethiopia, South Africa, Tanzania, Zaire; Australasian/Oceanic – Australia (QLD), Guam (USA), Hawaii (USA); Nearctic – Canada; Neotropical – Argentina, Bermuda, Bolivia, Chile, Mexico (MEX); Oriental – Taiwan; Palaearctic – Afghanistan, Algeria, Andorra, Austria, Azerbaijan, Belgium, Bulgaria, Canary Is. (Spain), Cyprus, Czech Republic, Denmark, Egypt, Finland, France (incl. Corsica), Georgia, Germany, Great Britain, Greece (incl. Crete, Thíra), Hungary, Iceland, Italy (incl. Sardinia), Ireland, Israel, Japan, Latvia, Macedonia, Madeira (Portugal), Malta, Mongolia, Netherlands, Norway, Poland, Roumania, Russia (CET, NET, SET), Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tadjikistan, Tunisia, Türkiye, former Yugoslavia (Serbia); South Atlantic: Saint Helena (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. It was found in cattle, sheep, equine, and goat farms. According to Floren (1989), it starts in excrement and decaying matter, cow houses, pastures, grass compost, potato, and rape fields.

Genus *Elachisoma* Rondani 1880

Genus first reported from Morocco.

Elachisoma aterrimum (Haliday, 1833)

Material examined. **Cattle farm:** COASTAL MESETA. 1♂, 3♀♀, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. RIF. 6♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 5♂♂, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. **Sheep husbandry:** COASTAL MESETA. 1♂, 2♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. 8♂♂, 4♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. RIF. 5♂♂, 3♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021.

Distribution in Morocco. COASTAL MESETA. Lmchawir, Nahda, Oulad Abbou; RIF. Aïn Zarka, Ben Karrich, Mansoura.

General distribution. Afrotropical – Zaire; Nearctic – Canada; Palaearctic – Afghanistan, Austria, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), Cyprus, Czech Republic, Denmark, Egypt, Finland, Germany, Great Britain, Hungary, Ireland, Italy, Latvia, Madeira (Portugal), Malta, Netherlands, Poland, Roumania, Russia (NET), Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tadjikistan; South Atlantic: Saint Helena (Roháček et al., 2001); Morocco (**New record**).

Biology. This species was found in cattle and sheep farms in our work. It is coprophilous on the excrement of large herbivores, in cow stables, and on manure heaps. The species is also reported from decaying vegetation, pastures, grass compost, and stumps of oaks (Schiegg & Munari, 1999).

Elachisoma bajzae Papp, 1983

Material examined. **Cattle farm:** COASTAL MESETA. 1♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. **Sheep husbandry:** COASTAL MESETA. 2♂♂, 2♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. 4♂♂, 1♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. RIF. 6♂♂, 4♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021. 1♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019.

General distribution. Palaearctic – Canary Is. (Spain), Czech Republic, Greece (Crete), Hungary, Italy, Slovakia, Spain (incl. Balearic Is.), Switzerland (Roháček et al., 2001). Morocco (**New record for North Africa**).

Biology. We found this species on cattle and sheep farms. It is also associated with cattle droppings and poultry (Carles-Tolrá, 2001).

Elachisoma kerteszi (Duda, 1924)

Material examined. **Cattle farm:** COASTAL MESETA. 1♂, Douar Touanssa (31°58'00.1"N 8°58'40.4"W),

7.XI.2019. 1♂, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. 1♂, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. RIF. 1♂, 3♀♀, Moulay Yaakoub Village (34°11'16.2"N 4°58'51.0"W), 7.XI.2018. 2♂♂, 1♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. **Sheep husbandry:** RIF. 1♂, 3♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021.

General distribution. Palaearctic – Canary Is. (Spain), Bulgaria, Hungary, Spain (incl. Balearic Is.) (Roháček et al., 2001). Morocco (**New record for North Africa**).

Biology. In our study, this species was found in cattle and sheep farms. According to Carles-Tolrá (2001), it is associated with equine.

Elachisoma pilosum (Duda, 1924)

Material examined. Cattle farm: COASTAL MESETA. 1♀, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. 1♀, Safi City (32°23'53.0"N 9°10'39.0"W), 7.XI.2018. 1♂, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. RIF. 4♂♂, 3♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. **Sheep husbandry:** COASTAL MESETA. 2♂♂, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. RIF. 2♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021.

General distribution. Oriental – Indonesia (Java), Malaysia; Palaearctic – Afghanistan, Belgium, Czech Republic, Germany, Great Britain, Hungary, Latvia, Malta, Poland, Roumania, Slovakia, Spain, Switzerland, Sweden (Roháček et al., 2001). Morocco (**New record for North Africa**).

Biology. This species was found in cattle and sheep farms. Often found together with *E. aterrimum* on cow houses, dunghill, potato and rape fields, deciduous forests, and hills (Floren, 1989).

Genus *Gonioneura* Rondani, 1880 [New generic record for Morocco]

Gonioneura spinipennis (Haliday, 1836)

Material examined. Cattle farm: COASTAL MESETA. 1♂, El Hawzia Sea (33°15'12.4"N 8°18'33.0"W), 21.I.2019.

General distribution. Nearctic – Canada; Oriental – Pakistan; Palaearctic – Afghanistan, Andorra, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy, Iceland, Ireland, Kirghizstan, Latvia, Macedonia, Netherlands, Norway, Poland, Roumania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, former Yugoslavia (Serbia) (Roháček et al., 2001). Morocco (**New record for North Africa**).

Biology. In our work, the species was found only associated with cattle farms. In the literature, it is known to be a very common species, found on various decayed matter such as excrement, carrion, compost heaps, decayed vegetation, and fungi (Schiegg & Munari, 1999).

Genus *Leptocera* Olivier, 1813

Leptocera fontinalis (Fallén, 1826)

Material examined. Cattle farm: RIF. 2♂♂, 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Equine:** RIF. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019.

Distribution in Morocco. RIF. M'Diq, Smir, Tétouan (Marshall et al., 2011).

General distribution. Afrotropical – all records doubtful; Nearctic – Canada; USA; Neotropical – all records doubtful; Palaearctic – Afghanistan, Andorra, Austria, Azores (Portugal), Belgium, Bulgaria, China (TIB), Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faeroe Is. (Denmark), Finland, France, Georgia, Germany, Great Britain, Greece (Crete), Hungary, Iceland, Ireland, Italy (incl. Sardinia, Sicily), Latvia, Kazakhstan, Macedonia, Madeira (Portugal), Malta, Netherlands, Norway, Poland, Portugal, Roumania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tadjikistan, Tunisia, Ukraine, Uzbekistan, former Yugoslavia (Montenegro) (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. In this research, we found it with equine and cattle farms. According to the literature, it is common in wet shady places probably, a variety of places grass compost, maple in sap, cow houses, cowpats, potato fields (Floren, 1989).

Leptocera nigra Olivier, 1813

Material examined. **Cattle farm:** COASTAL MESETA. 4♂♂, 8♀♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. RIF. 2♂♂, 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 1♂, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 14.V.2021. 1♂, 1♀, Moulay Bouchta Village (34°29'34.4"N 5°07'30.0"W), 21.I.2019. 2♂♂, 1♀, Aït Messaoud Village (31°43'36.0"N 8°05'14.3"W), 26.IV.2019. 2♂♂, 4♀♀, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.V.2019. 4♂♂, 2♀♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. **Equine:** RIF. 4♂♂, 2♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 1♂, 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 9.III.2019. 2♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. 1♀, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. **Poultry:** RIF. 2♂♂, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 26.IV.2019, malaise trap, coll. Bouzrarf, UAE-FST. **Sheep husbandry:** COASTAL MESETA. 1♂, 4♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. 4♂♂, 1♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. RIF. 1♂, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 26.V.2021. 1♂, 2♀♀, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. 2♂♂, 1♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. 1♀, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.V.2019. 5♂♂, 1♀, Jnane Nich Forest (35°17'14.0"N 4°51'30.2"W), 8.I.2019.

Distribution in Morocco. MIDDLE ATLAS. Azrou (Roháček et al., 2001).

General distribution. Afrotropical – Botswana, Cameroon, Cape Verde Is., Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Ruanda-Burundi, South Africa, Zaire; Oriental – India (Uttaranchal), Nepal, Pakistan; Palaearctic – Algeria, Afghanistan, Andorra, Armenia, Austria, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), Croatia, Cyprus, Czech Republic, Dalmatia, Denmark, Egypt, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Italy (incl. Pantelleria I., Sardinia, Sicily), Iran, Israel, Japan, Jordan, Latvia, Lithuania, Macedonia, Madeira (Portugal), Malta, Morocco, Netherlands, North Korea, Norway, Poland, Portugal, Roumania, Russia, Slovakia, Slovenia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tadzikistan, Tunisia, Türkiye, Uzbekistan, former Yugoslavia (Montenegro, Serbia); South Atlantic: Saint Helena (Roháček et al., 2001).

Biology. We found it with cattle, sheep, poultry, and equine farms. It is coprophilous, usually occurring in association with the dung of sheep, cattle, and horses. It is also reported from dead leaves and from caves, where usually the entrance region is inhabited (Schiegg & Munari, 1999).

Genus *Limosina* Macquart, 1835*Limosina silvatica* (Meigen, 1830)

Material examined. **Cattle farm:** RIF. 1♂, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018.

Distribution in Morocco. RIF. Issaguen, Talassemtane; MIDDLE ATLAS. Azrou, Khénifra (Gatt et al., 2016).

General distribution. Palaearctic – Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy, Netherlands, Norway, Poland, Roumania, Russia (CET, NET, SET), Slovakia, Spain, Sweden, Switzerland, Tunisia, Ukraine, former Yugoslavia (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. In our study, this species was associated with cattle farms. It is developing in decayed vegetation in woodland areas, and by streams in deciduous forests (Floren, 1989).

Genus *Minilimosina* Roháček, 1983*Minilimosina (Svarciella) ismayi* Roháček, 1983

Material examined. **Cattle farm:** RIF. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Goat farm:** RIF. 1♂, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019.

General distribution. Palaearctic – Spain (Roháček et al., 2001). Morocco (New record for North Africa).

Biology. We found this species in cattle and goat droppings.

Minilimosina (Svarciella) vitripennis Zetterstedt, 1847

Material examined. **Cattle farm:** RIF. 1♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. **Equine:** RIF. 1♂, 2♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Sheep husbandry:** RIF. 1♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019.

Distribution in Morocco. MIDDLE ATLAS. Azrou (Gatt et al., 2016).

General distribution. Nearctic – Canada; Palaearctic – Afghanistan, Andorra, Austria, Belgium, Bulgaria, Canary Is. (Spain), Cyprus, Czech Republic, Denmark, Estonia, Faeroe Is. (Denmark), Finland, France, Germany, Great Britain, Hungary, Iceland, Italy, Latvia, Macedonia, Mongolia, Netherlands, North Korea, Norway, Poland, Roumania, Russia (FE, SET, WS), Slovakia, Spain, Sweden, Switzerland, former Yugoslavia (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. This species is found in cattle, sheep, and equine farms. The literature shows its presence in woods and woodland meadows, mountain birch forceps, damp deciduous forests, lake shores, moorland, garden, cow house, potato and rape fields (Floren, 1989).

Genus *Nudopella* Roháček & Marshall, 1986

Nudopella hem (Roháček & Marshall, 1986)

Material examined. **Cattle farm:** RIF. 1♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018.

General distribution. Palaearctic – Azores (Portugal), Canary Is. (Spain), Czech Republic, Madeira (Portugal), Portugal (Roháček et al., 2001). Morocco (**New record for North Africa**).

Biology. The species was captured in cattle droppings.

Nudopella leucoptera (Haliday, 1836)

Material examined. **Cattle farm:** RIF. 1♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. **Goat farm:** RIF. 1♂, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Sheep husbandry:** RIF. 2♂♂, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021.

General distribution. Afrotropical – Ethiopia, Zaire; Australasian/Oceanic – Hawaii Is. (USA); Nearctic – Canada; Oriental – Sri Lanka; Palaearctic – Afghanistan, Andorra, Azores (Portugal), Belgium, Canary Is. (Spain), Czech Republic, Denmark, Finland, Germany, Great Britain, Hungary, Ireland, Italy, Malta, Portugal, Roumania, Slovakia, Spain, Sweden, Switzerland; South Atlantic: Saint Helena (Roháček et al., 2001). Morocco (**New record for North Africa**).

Biology. We collected it in cattle, sheep, and goat farms. *Nudopella leucoptera* is also found associated with bovine excrement, sheep, equine, and pigs (Carles-Tolrá, 2001).

Genus *Opacifrons* Duda, 1918

Opacifrons coxata (Stenhammar, 1855)

Material examined. **Cattle farm:** RIF. 1♂, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 14.V.2021.

Distribution in Morocco. RIF. M'Diq, Oued Laou, Smir, Tétouan (Marshall et al., 2011).

General distribution. Afrotropical – Ethiopia, Madagascar, South Africa, Zaire (all need verification); Oriental – all records doubtful; Palaearctic – Afghanistan, Andorra, Armenia, Austria, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), Czech Republic, Denmark, Egypt, Estonia, Finland, France (incl. Corsica), Germany, Great Britain, Greece (incl. Crete), Hungary, Iran, Italy (incl. Sardinia), Latvia, Lithuania, Macedonia, Madeira (Portugal), Malta, Mongolia, Netherlands, Norway, Poland, Portugal, Roumania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tadjikistan, Tunisia, former Yugoslavia (Montenegro, Serbia) (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. *Opacifrons coxata* was found associated with cattle farms. In the literature, it is common in boggy and marshy habitats, larvae develop in mud, wet meadows, marshy land, on river and lake shores, potato and rape fields, and cow houses (Floren, 1989).

Genus *Opalimosina* Roháček, 1983

Opalimosina (*Dentilimosina*) *denticulata* (Duda, 1924)

Material examined. **Cattle farm:** RIF. 1♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. **Goat farm:** RIF. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019.

General distribution. Palaearctic – Andorra, Austria, Belgium, Czech Republic, Finland, Germany, Great Britain, Hungary, Italy, Poland, Roumania, Slovakia, Spain, Sweden, Switzerland (Roháček et al., 2001); Morocco (**New record for North Africa**).

Biology. We captured the species in cattle and goat farms. According to Floren (1989), it is coprophagous, in Central Europe, often at higher altitudes, cow houses, gardens, and damp meadows.

Opalimosina (*Opalimosina*) *mirabilis* (Collin, 1902)

Material examined. **Cattle farm:** RIF. 11♂♂, 14♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018.

Distribution in Morocco. RIF. Oued Laou, Tétouan (Marshall et al., 2011).

General distribution. Australasian/Oceanic – Australia, New Zealand, Hawaii (USA). Nearctic – Canada; Neotropical – Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico (VRC); Oriental – Nepal, Pakistan; Palaearctic – Andorra, Austria, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Iran, Italy, Japan, Latvia, Netherlands, North Korea, Norway, Madeira (Portugal), Malta, Mongolia, Poland, Roumania, Russia, Slovakia, Spain, Sweden, Switzerland, Tunisia (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. It is found in cattle farms in this work, chiefly coprophagous. Floren (1989) found the species to be extremely common in cow stables (Schiegg & Munari, 1999).

Genus *Poecilomella* Duda, 1925

Poecilomella *angulata* (Thomson, 1869)

Material examined. **Equine:** MIDDLE ATLAS. 1♀, Bejaad Village (32°46'18.6"N 6°21'18.7"W), 12.XII.2018.

Distribution in Morocco. RIF. Martil, Tétouan (Marshall et al., 2011).

General distribution. Afrotropical – Angola, Burundi, Ethiopia, Cameroon, Cape Verde Is., Congo, Gabon, Kenya, Madagascar, Malawi, Nigeria, South Africa, Tanzania, Togo, Uganda, Zaire; Australasian/ Oceanic – all published records doubtful; Nearctic – USA (FL, TX); Neotropical – Bermuda, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Haiti, Mexico, Paraguay, Peru, Puerto Rico, Santa Lucia, St. Vincent; Palaearctic – Canary Is. (Spain) (Roháček et al., 2001), Morocco (Marshall et al., 2011).

Biology. In this work, this species is found in equine droppings.

Genus *Pseudocollinella* Duda, 1924

Pseudocollinella *jorlii* (Carles-Tolrá, 1990)

Material examined. **Cattle farm:** RIF. 1♂, 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 14.V.2021.

Distribution in Morocco. MIDDLE ATLAS. Aguelmane (Marshall et al., 2011).

General distribution. Palaearctic – Algeria, Azores (Portugal), Canary Is. (Spain), Great Britain, Italy (incl. Sardinia, Sicily), Malta, Morocco, Portugal, Slovakia, Spain (Roháček et al., 2001).

Biology. Not found in the literature. We captured the species in cattle droppings.

Genus *Pullimosina* Roháček, 1983

Pullimosina (*Pullimosina*) *heteroneura* (Haliday, 1836)

Material examined. **Cattle farm:** COASTAL MESETA. 11♀, 2♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. 5♂♂, 12♀, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. 15♂, 21♀♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. 2♂♂, 4♀♀, Sidi Aabed Village (32°44'16.6"N 9°00'59.0"W), 18.I.2019. 1♀, Mazagan Sea (33°16'24.3"N 8°22'13.9"W), 8.XI.2018. **MIDDLE ATLAS.** 1♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. **RIF.** 2♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 27.IV.2019. 3♂♂, 1♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 1♂, Sidi Mansour Village (35°14'16.7"N 3°57'04.5"W), 3.V.2019. 1♂, Touima Village (35°07'35.8"N 2°56'08.3"W), 18.I.2019. **Equine:** COASTAL MESETA. 2♂♂, El Ghorba Village (31°57'29"N 6°32'06"W), 9.XII.2018. 1♂, Sidi Maachou Village (33°08'52.8"N 8°07'06.7"W), 14.XII.2018. **RIF.** 1♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 17.V.2021. 2♂♂, 3♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. **Goat farm:** **RIF.** 1♂, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 21.IV.2019. 1♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. 1♂, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019. **Sheep husbandry:** COASTAL MESETA. 46♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. 2♂♂, 3♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. **RIF.** 1♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019.

Distribution in Morocco. RIF. Oued Laou, Tétouan (Marshall et al., 2011).

General distribution. Afrotropical – Cape Verde Is., Uganda, South Africa; Australasian/Oceanic – Australia, Hawaii (USA), New Zealand; Nearctic – Canada; Neotropical – Argentina, Bermuda, Ecuador, Mexico (BCN); Oriental – Taiwan; Palaearctic – Afghanistan, Algeria, Austria, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Greece (incl. Crete), Hungary, Iceland, Israel, Italy (incl. Pantelleria I., Sardinia, Sicily), Japan, Latvia, Macedonia, Madeira (Portugal), Malta, Netherlands, Norway, Poland, Portugal, Roumania, Russia (CET, FE, NET), Slovakia, Slovenia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tadjikistan, Tunisia; South Atlantic: Gough I. (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. We found this species in cattle, sheep, goat, and equine farms. According to Floren (1989) it is developing in various decayed vegetation, cow houses, grass compost, dunghill, potato and rape fields, lake and seashores, and bird's nest on dung beetle.

Pullimosina (P.) zayensis Marshall, 1986

Material examined. **Cattle farm:** COASTAL MESETA. 1♂, 1♀, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. 3♂♂, 1♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. **Equine:** HIGH ATLAS. 1♂, El Ghorba Village (31°57'29"N 6°32'06"W), 9.XII.2018. **Sheep husbandry:** COASTAL MESETA. 2♂♂, 1♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020.

Distribution in Morocco. COASTAL MESETA. Birjdid, Lmchawir, Nahda; HIGH ATLAS. El Ghorba.

General distribution. Nearctic – USA; Neotropical – Argentina, Bolivia, Brazil, Dominican Republic, Galápagos Is. (Ecuador), Honduras, Jamaica, St. Kitts, Trinidad, Venezuela; Palaearctic – Canary Is. (Spain), Malta, Morocco, Portugal, Spain (incl. Balearic Is.) (Roháček et al., 2001).

Biology. It was collected in cattle, sheep, and equine farms. According to Carles-Tolrá (2001), this species is found also in sheep droppings.

Genus *Rachispoda* Lioy, 1864

Rachispoda acrosticalis (Becker, 1903)

Material examined. **Cattle farm:** RIF. 2♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 14.V.2021.

Distribution in Morocco. RIF. M'Diq, Smir, Tétouan (Marshall et al., 2011).

General distribution. Afrotropical – Botswana, Cape Verde Is., Madagascar, South Africa, Sudan, Tanzania, Zaire; Palaearctic – Algeria, Azores (Portugal), Canary Is. (Spain), Egypt, Greece, Israel, Italy (Sicily), Malta, Spain, Türkiye (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. In this study, this species was recorded in cattle droppings.

***Rachispoda brevior* (Roháček, 1983)**

Material examined. **Sheep husbandry:** RIF. 1♂, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.V.2019.

Distribution in Morocco. Atlantic Plain. Oued Bou-Regreg (Marshall et al., 2011).

General distribution. Palaearctic – Austria, Bulgaria, Czech Republic, Great Britain, Greece (Crete), Hungary, Israel, Italy (incl. Sardinia), Malta, Morocco, Roumania, Slovakia, Spain, Tunisia, former Yugoslavia (Montenegro, Serbia) (Roháček et al., 2001).

Biology. We reported this species from sheep droppings.

***Rachispoda fuscipennis* (Haliday, 1833) (Fig. 4)**

Material examined. **Cattle farm:** COASTAL MESETA. 1♂, 1♀, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. 1♀, Mazagan Sea (33°16'24.3"N 8°22'13.9"W), 8.XI.2018.

Distribution in Morocco. Eastern Morocco. Oued Bou-Regreg (Roháček et al., 2001).

General distribution. Afrotropical – Madagascar, Namibia, Saudi Arabia, Yemen, Zaire; Australasian/Oceanic – Australia, Guam (USA), Hawaii (USA), New Zealand; Oriental – Taiwan; Nearctic – Canada; Neotropical – Bahamas, Bermuda, Galápagos Is. (Ecuador), Mexico (SIN); Palaearctic – Afghanistan, Algeria, Austria, Azerbaijan, Azores (Portugal), Belgium, Bulgaria, Canary Is. (Spain), Czech Republic, Denmark, Egypt, Finland, France, Germany, Great Britain, Greece, Iraq, Israel, Italy (incl. Sardinia, Sicily), Latvia, Japan, Jordan, Kirghizstan, Malta, Mongolia, Morocco, Netherlands, Norway, Poland, Portugal, Roumania, Russia, Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tunisia, Türkiye, Uzbekistan, former Yugoslavia (Serbia); South Atlantic: Saint Helena (Roháček et al., 2001).

Biology. Halophilic species associated with saline or brackish environments. The larvae develop in moist substrates containing decomposing organic matter. Adults are observed on the ground near salty wetlands, where they feed on organic debris (Roháček, 1991). In our study, this species is recorded in coastal areas associated with cattle excrement.

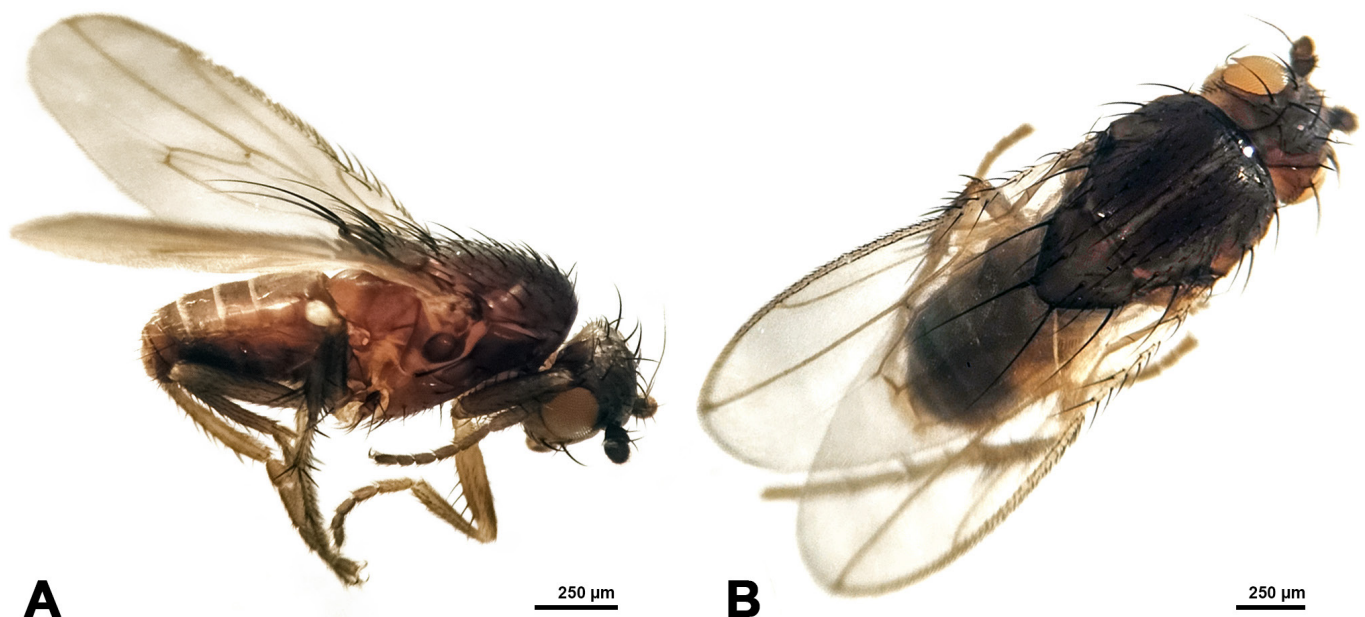


Figure 4. *Rachispoda fuscipennis* (Haliday, 1833). **A.** Lateral view of the adult showing the general body shape and wing coloration; **B.** Dorsal view illustrating the thoracic structure, abdomen, and arrangement of setae.

Genus *Spelobia* Spuler, 1924

Spelobia baezi (Papp, 1977)

Material examined. Cattle farm: RIF. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 11♂♂, 4♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018.

Distribution in Morocco. RIF. Aïn Zarka, Bab Taza (Marshall et al., 2011).

General distribution. Palaearctic – Andorra, Canary Is. (Spain), Great Britain (England), Italy (Sardinia, Sicily), Morocco, Spain (Roháček et al., 2001).

Biology. Found in cattle farms in this study. According to Carles-Tolrá (2001), it is reported from cattle droppings.

Spelobia clunipes (Meigen, 1830)

Material examined. Cattle farm: RIF. 6♂♂, 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 20♂♂, 12♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 1♂, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. **Equine:** RIF. 9♂♂, 2♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Goat farm:** RIF. 1♀, Beni Mazala Village (35°51'38.7"N 5°23'22.9"W), 28.IV.2019. 1♀, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019. **Sheep husbandry:** RIF. 1♂, Stehat Village (34°49'41.3"N 4°56'36.3"W), 8.I.2019.

Distribution in Morocco. RIF. Dardara, Issaguen, Mtahen, Majjou waterfall, Martil, Onsar Akboul, Oued Afertane, Oued Mhannech, Oued Tahaddart (Gatt et al., 2016).

General distribution. Nearctic – Canada; Palaearctic – Afghanistan, Andorra, Austria, Azores (Portugal), Belgium, Bulgaria, China, Czech Republic, Denmark, Estonia, Faeroe Is. (Denmark), Finland, France, Germany, Great Britain, Hungary, Iceland, Ireland, Italy (incl. Sicily), Latvia, Lithuania, Macedonia, Mongolia, Netherlands, Norway, Poland, Portugal, Roumania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tadjikistan, Tunisia, Ukraine, Uzbekistan, former Yugoslavia (Montenegro, Serbia) (Roháček et al., 2001). Morocco (Gatt et al., 2016).

Biology. This species is found in cattle, sheep, equine, and goat farms. This corroborates the literature data since Schiegg & Munari (1999) qualified it as poly-saprophagous with very large ecological tolerance.

Spelobia hungarica (Villeneuve, 1917)

Material examined. Cattle farm: COASTAL MESETA. 2♂♂, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. RIF. 1♂, Moulay Bouchta Village (34°29'34.4"N 5°07'30.0"W), 21.I.2019.

Distribution in Morocco. RIF. Martil, Tétouan (Marshall et al., 2011).

General distribution. Palaearctic – Denmark, Germany, Greece (Crete), Hungary, Italy (incl. Sardinia), Israel, Spain (Balearic Is.), Tunisia (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. We found it associated with cattle farms. But Roháček (1983a) reported the species from equine droppings.

Spelobia palmata (Richards, 1927)

Material examined. Cattle farm: RIF. 1♂ 1♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018.

General distribution. Palaearctic – Andorra, Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Faeroe Is. (Denmark), Finland, France, Germany, Great Britain, Greece (incl. Crete), Hungary, Italy, Norway, Roumania, Russia (NET, SET), Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tunisia (Roháček et al., 2001). Morocco (**New record**).

Biology. Found only in cattle farms in this work. Chiefly necrophagous species, reported from wet biotopes in forests, meadows with bushes, runs, and nests of small mammals, decayed fungi, marl pits, rotting apples, sap runs, grass compost, and ungulate droppings. It is frequently captured by soil traps (Schiegg & Munari, 1999).

Spelobia quaesita Roháček, 1983.

Material examined. **Cattle farm:** COASTAL MESETA. 1♂, Aït Messaoud Village (31°43'36.0"N 8°05'14.3"W), 26.IV.2019. RIF. 1♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. **Equine:** RIF. 1♂, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 2♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 15.V.2021. 1♂, Dghalyen Village (35°51'03.5"N 5°23'16.6"W), 1.V.2019. **Goat farm:** RIF. 1♀, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019. **Sheep husbandry:** COASTAL MESETA. 2♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020.

Distribution in Morocco. COASTAL MESETA. Aït Messaoud, Nahda; RIF. Aïn Zarka, Al Kachla, Bab Taza, Mansoura.

General distribution. Palaearctic – Algeria, Morocco, Spain (Roháček et al., 2001).

Biology. It is found in cattle, sheep, and equine farms. According to Carles-Tolrá (2001), it is recorded in caves.

Spelobia talparum (Richards, 1927)

Material examined. **Cattle farm:** RIF. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Goat farm:** RIF. 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019.

General distribution. Palaearctic – Afghanistan, Andorra, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy, Latvia, Lithuania, Norway, Portugal, Russia (SET), Slovakia, Spain, Sweden, Switzerland, Ukraine (Roháček et al., 2001); Morocco (**New record for North Africa**).

Biology. In our field work, the species was found in cattle and goat farms. According to the literature data, females were frequently collected during migration searching for new burrows for oviposition, potato, wheat, oats, and rape fields, mountain birch forests, deciduous forests, wet meadows and marshes, heather, moss, ruderal land (Floren, 1989).

Genus Spinilimosina Roháček, 1983*Spinilimosina brevicostata* (Duda, 1918)

Material examined. **Cattle farm:** COASTAL MESETA. 3♂♂, 3♀♀, Safi City (32°23'53.0"N 9°10'39.0"W), 7.XI.2018. 1♂ 1♀, Sidi Aabed Village (32°44'16.6"N 9°00'59.0"W), 18.I.2019. **Equine:** HIGH ATLAS. 1♀, El Ghorba Village (31°57'29"N 6°32'06"W), 9.XII.2018.

Distribution in Morocco. COASTAL MESETA. Safi, Sidi Aabed; HIGH ATLAS. El Ghorba.

General distribution. Afrotropical – Ethiopia, Madagascar, South Africa, Zaire; Australasian/Oceanic – Hawaii (USA), Papua New Guinea; Nearctic – USA; Neotropical – Bermuda, Brazil, Dominican Republic, Honduras, Jamaica, St. Kitts (Nevis); Oriental – Nepal, Sri Lanka, Taiwan; Palaearctic – Afghanistan, Azores (Portugal), Canary Is. (Spain), Czech Republic, Egypt, Finland, Germany, Great Britain, Hungary, Israel, Italy, Madeira (Portugal), Malta, Morocco, Poland, Russia (SET), Spain, Tunisia, former Yugoslavia (Roháček et al., 2001).

Biology. Like in the literature, we found *Spinilimosina brevicostata* associated with cattles and equines. In effect, Carles-Tolrá (2001) found it in the faeces of cattle and horses.

Genus Telomerina Roháček, 1983*Telomerina flavipes* (Meigen, 1830)

Material examined. **Cattle farm:** RIF. 1♂, 1♀, Touima Village (35°07'35.8"N 2°56'08.3"W), 18.I.2018. **Sheep husbandry:** COASTAL MESETA. 1♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020.

General distribution. Afrotropical – South Africa; Australasian/ Oceanic – Australia (NSW), New Zealand; Nearctic – Canada, Greenland (subfossil), USA; Neotropical – Brazil, Chile, Juan Chile (Fernandez Is.), Mexico; Oriental – Taiwan; Palaearctic – Afghanistan, Andorra, Andorra, Austria, Belgium, Bulgaria, Canary Is. (Spain), Czech Republic, Denmark, Egypt, Finland, France, Germany,

Great Britain, Greece, Hungary, Iceland, Israel, Italy (incl. Sicily, Pantelleria I.), Iran, Japan, Malta, Mongolia, Netherlands, Norway, Poland, Roumania, Russia (CET, NET, SET), Slovakia, Spain, Sweden, Switzerland, Tadjikistan, Tunisia, former Yugoslavia (Roháček et al., 2001). Morocco (**New record**).

Biology. Captured in cattle and sheep farms in this work. It is known to be cosmopolitan, common, chiefly necrophagous but also related to excrements: cow houses and grass compost, bird's nests (Floren, 1989).

Telomerina pseudoleucoptera (Duda, 1924)

Material examined. **Equine:** RIF. 1♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 17.V.2021.

Distribution in Morocco. RIF. Majjou waterfall (Gatt et al., 2016).

General distribution. Palaearctic – Andorra, Belgium, Bulgaria, Czech Republic, Denmark, Finland, Germany, Great Britain, Hungary, Italy, Netherlands, Norway, Russia (NET), Slovakia, Spain, Sweden, Switzerland (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. This species is associated with equine farms in this research. It is chiefly coprophagous on the dung of large herbivores. It is also recorded from pastures, cow stables, cow droppings, faeces, grass compost, and potato fields (Schiegg & Munari, 1999).

Genus *Trachyopella* Duda, 1918

Trachyopella (Trachyopella) atomus (Rondani, 1880)

Material examined. **Cattle farm:** RIF. 1♂, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29.V.2021.

General distribution. Afrotropical – Zaire; Australasian/ Oceanic – Guam (USA), Hawaii (USA); Palaearctic – Afghanistan, Azores (Portugal), Belgium, Czech Republic, Germany, Great Britain, Hungary, Italy, Madeira (Portugal), Malta, Netherlands, Poland, Roumania, Slovakia, Spain, Sweden, Switzerland, Tadjikistan (Roháček et al., 2001); Morocco (**New record**).

Biology. In this study, the species is found associated with cattle farms. However, according to Carles-Tolrá (2001), it was found in sheep droppings.

Trachyopella (T.) coprina (Duda, 1918)

Material examined. **Cattle farm:** COASTAL MESETA. 1♂, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. 2♂♂, 3♀♀, Birjdid Village (33°22'06.7"N 8°00'52.8"W), 21.I.2019. RIF. 1♂, 1♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 2♂♂, 6♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. **Sheep husbandry:** COASTAL MESETA. 6♂♂, 7♀♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2020. RIF. 1♂, 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021.

Distribution in Morocco. RIF. Oued Jnane Niche (Gatt et al., 2016).

General distribution. Afrotropical – Zaire; Nearctic – USA; Palaearctic – Belgium, Czech Republic, Germany, Great Britain, Greece (Crete), Hungary, Israel, Italy, Netherlands, Malta, Spain, Sweden (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. We collected the species in cattle and sheep farms. Carles-Tolrá (2001) related it also with cattles but, with equine instead of with sheep.

Trachyopella (T.) lineafrons (Spuler, 1925)

Material examined. **Cattle farm:** RIF. 2♂♂, 2♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. **Sheep husbandry:** RIF. 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 30.V.2021.

General distribution. Australasian/Oceanic – New Zealand; Nearctic – Canada; Neotropical – Argentina; Palaearctic – Afghanistan, Belgium, Canary Is. (Spain), Czech Republic, Finland, Germany, Great Britain, Greece, Hungary, Norway, Slovakia, Spain, Sweden, Switzerland (Roháček et al., 2001). Morocco (**New record for North Africa**).

Biology. In this research, the species was found on cattle and sheep farms. According to Carles-Tolrá (2001), it was found associated with cattle, equine, pigs, and rabbits.

Trachyopella (T.) melania (Haliday, 1836)

Material examined. **Cattle farm:** COASTAL MESETA. 1♀, Lmchawir Village (32°46'23.1"N 8°29'06.5"W), 17.I.2019. 1♂, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. **Sheep husbandry:** COASTAL MESETA. 7♂♂, 5♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019.

Distribution in Morocco. RIF. M'Diq, Oued Nwawel (Gatt et al., 2016).

General distribution. Palaearctic – Andorra, Belgium, Czech Republic, Finland, France, Germany, Great Britain, Hungary, Ireland, Malta, Mongolia, Netherlands, Norway, Roumania, Slovakia, Spain, Sweden, Switzerland (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. Found with cattle and sheep farms. According to Carles-Tolrá (2001), the species is associated with cattle, equine, pigs, and rabbits.

Trachyopella (T.) straminea Roháček & Marshall, 1986

Material examined. **Cattle farm:** MIDDLE ATLAS. 1♀, Elksiba Village (32°34'10.9"N 6°02'43.1"W), 7.XI.2018. **Goat farm:** RIF. 1♂, 1♀, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019. **Sheep husbandry:** COASTAL MESETA. 3♂♂, 1♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019. RIF. 20♂♂, 7♀♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021.

General distribution. Nearctic – Canada; Palaearctic – Andorra, Canary Is. (Spain), Czech, Republic, Greece (Crete), Hungary, Malta, Slovakia, Spain (Roháček et al., 2001). Morocco (**New record for North Africa**).

Biology. We captured the species, like Carles-Tolrá (2001) in both sheep and cattle farms, but also in goat farms instead of poultry ones.

Trachyopella (T.) (sp.)

Material examined. **Sheep husbandry:** RIF. 2♂♂, 1♀, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 23.V.2021.

Remarks. That is probably an undescribed species. Further specimens including females are needed to confirm its identity.

Subfamily Sphaerocerinae Macquart, 1835

Genus *Ischiolepta* Lioy, 1864*Ischiolepta vaporariorum* (Fallén, 1820)

Material examined. **Cattle farm:** RIF. 3♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 2♂♂, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 1♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. **Goat farm:** RIF. 1♂, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Sheep husbandry:** COASTAL MESETA. 1♀, Nahda Village (32°14'22.9"N 8°33'12.2"W), 21.I.2019.

Distribution in Morocco. RIF. Aïn Tissemlal, Oued Guallet (Gatt et al., 2016).

General distribution. Nearctic – Canada, USA. Palaearctic – Afghanistan, Austria, Belgium, Czech Republic, Finland, Germany, Great Britain, Hungary, Iran, Ireland, Kazakhstan, Latvia, Netherlands, Norway, Poland, Roumania, Russia, Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tadjikistan, Tunisia (Roháček et al., 2001). Morocco (Kettani et al., 2022).

Biology. We found it with cattle, goat, and sheep farms. According to Floren (1989), it is common, developing in various matters, cow houses, dunghill, pastures, grass compost, urinal, maple in sap, wet meadows, lake shores, and Swamps.

Ischiolepta scabricula Haliday, 186

Material examined. **Cattle farm:** RIF. 1♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018.

General distribution. Afrotropical – Ghana, South Africa, Tanzania; Nearctic – Canada (OR); Neotropical –

Brazil; Oriental – India (Orissa); Palaearctic – Afghanistan, Austria, Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Great Britain, Hungary, Ireland, Italy, Japan, Roumania, Slovakia, Spain, Sweden, Switzerland (Roháček et al., 2001). Morocco (**New record for North Africa**).

Biology. This species was found in cattle droppings in this study. But, according to Hayashi (1986), it is collected on dung, grass compost, potato fields, and cow houses.

Ischiolepta pusilla (Haliday, 1836)

Material examined. **Cattle farm:** RIF. 1♂, 2♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. **Equine:** RIF. 2♂♂, 1♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. **Sheep husbandry:** COASTAL MESETA. 2♀♀, Oulad Abbou Village (33°06'59.8"N 7°56'13.4"W), 3.III.2019.

Distribution in Morocco. RIF. Oued Laou, Tétouan (Marshall et al., 2011).

General distribution. Australasian/Oceanic – Australia (territory not given), New Zealand; Nearctic – Canada; Neotropical – Argentina, Chile; Palaearctic – Austria, Belgium, Bulgaria, Canary Is. (Spain); Czech Republic, Denmark, Egypt, Faeroe Is. (Denmark), Finland, France, Germany, Great Britain, Hungary, Iceland, Iran, Italy (incl. Sicily), Japan, Latvia, Madeira (Portugal), Malta, Netherlands, Norway, Poland, Roumania, Russia (CET, NET, SET, WS), Slovakia, Spain, Sweden, Switzerland, Tunisia, former Yugoslavia (Serbia) (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. This study associates the species with cattle, equine, and sheep farms. According to Floren (1989), it is found on cow house.

Genus *Lotobia* Lioy, 1864

Lotobia africana (Becker, 1907)

Material examined. **Cattle farm:** RIF. 1♀, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3.V.2019.

Distribution in Morocco. RIF. Afrasso.

General distribution. Afrotropical – Rwanda, South Africa, Zaire; Palaearctic – France (Corsica), Hungary, Israel, Morocco, Slovenia, Tunisia (Roháček et al., 2001).

Biology. According to the present study, the species grows in cattle faeces.

Lotobia pallidiventris (Meigen, 1830)

Material examined. **Equine:** RIF. 1♂, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019.

Distribution in Morocco. RIF. M'Diq, Oued Laou, Tétouan (Marshall et al., 2011).

General distribution. Afrotropical – Ethiopia, Rwanda, South Africa, Zaire; Oriental – India (Assam), Nepal, Pakistan; Palaearctic – Afghanistan, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France (incl. Corsica), Germany, Great Britain, Hungary, Italy (incl. Sardinia), Israel, Japan, Kazakhstan, Kirghizia, Latvia, Mongolia, Roumania, Russia, Slovakia, Spain (incl. Balearic Is.), Switzerland, Tadjikistan, Tunisia, Uzbekistan, former Yugoslavia (Roháček et al., 2001). Morocco (Marshall et al., 2011).

Biology. In our work, this species is found in equine farms. According to Papp, this species is developing in droppings of large mammals (Papp, 1979).

Genus *Sphaerocera* Latreille, 1804

Sphaerocera curvipes Latreille, 1805

Material examined. **Cattle farm:** RIF. 1♂, Mansoura Village (34°50'02.9"N 4°57'49.7"W), 29. V.2021. 3♀♀, Aïn Zarka Village (35°31'12.7"N 5°20'42.8"W), 23.XII.2018. 8♂♂, 4♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 1♀, Gouarat Village (35°40'38.6"N 5°52'21.6"W), 3.VI.2019. 10 ♂♂. 6♀♀, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 27.IV.2019. **Equine:** RIF. 1♂, Ben Karrich Village (34°49'55.2"N 4°58'30.0"W), 19.IV.2019. **Goat farm:** RIF. 2♀♀, Bab Taza Village (35°02'43.2"N 5°13'47.8"W), 28.IV.2019. 2♂♂, Al Kachla Village (35°50'40.6"N 5°23'12.6"W), 4.V.2019. **Sheep husbandry:** RIF. 6♂♂, 1♀, Afrasso Village (35°51'37.4"N 5°23'16.0"W), 3. V.2019.

Distribution in Morocco. RIF. Afrasso, Aïn Zarka, Al Kachla, Bab Taza, Ben Karrich, Gouarat, Mansoura.

General distribution. Afrotropical – Ethiopia; Australasian/ Oceanic – Australia (ACT, NSW), New Zealand; Nearctic – Canada; Neotropical – South America; Oriental – India, Pakistan; Palaearctic – Afghanistan, Algeria, Austria, Azores (Portugal), Belgium, Bulgaria, China (TIB), Czech Republic, Denmark, Egypt, Estonia, Faeroe Is. (Denmark), Finland, France (incl. Corsica), Germany, Great Britain, Greece (incl. Crete), Hungary, Iceland, Iran, Israel, Italy (incl. Sardinia, Sicily), Japan, Latvia, Lithuania, Macedonia, Madeira (Portugal), Malta, Mongolia, Morocco, Netherlands, Norway, Poland, Roumania, Russia, Slovakia, Spain (incl. Balearic Is.), Sweden, Switzerland, Tadjikistan, Tunisia, Ukraine, former Yugoslavia (Roháček et al., 2001).

Biology. We found this species associated with cattle, sheep, equine, and goats. According to Floren (1989), it has a wide ecological tolerance, larvae are chiefly coprophagous, cow houses, cow dung, pastures, potato fields, maple sap, grass compost, and on nettles.

DISCUSSION

Sphaeroceridae were consistently present across all surveyed farms, including those housing cattle, sheep, equines, goats, and poultry. Notably, cattle farms exhibited the highest species richness, with 36 species recorded. This was followed by sheep farms with 21 species, equine farms with 11 species, goat farms with 8 species, and poultry farms with four species. Sampling conducted on breeding farms in Morocco has proven to be an effective approach for studying the Sphaeroceridae fauna. The observed imbalance between collected males (4,491) and females (3,727) may be attributed to environmental conditions generally less favourable for females. A key factor influencing this disparity is the type of stable (open, semi-open, or closed), which affected variations in humidity (50% to 79%), temperature (4°C to 36°C), and light intensity (though not measured).

In closed stables, where light intensity was low, humidity high, and temperature lower than outdoor conditions, we observed a higher number of females compared to males. This was particularly evident for species such as *Crumomyia glabrifrons*, *Norrbomia costalis*, *Coproica digitata*, *Opalimosina mirabilis*, and *Telomerina flavipes*. This preference of females for enclosed environments can be attributed to their inclination to select sites favourable for feeding and oviposition. These conditions, characterized by lower light and higher humidity, likely offer the essential resources and shelter necessary for successful reproduction. Müller et al. (2016) claim that these environments lead to the rapid growth of insect populations, which may cause animal health issues and reduce agricultural exploitation's productivity. The differing sampling conditions in open stables, characterized by high light intensity, low humidity, and elevated temperatures, led to the capture of a higher number of males compared to females. This trend was particularly evident in species such as *Copromyza equina*, *Lotophila atra*, *Bifronsina bifrons*, *Spelobia clunipes*, *Trachyopella straminea*, and *Sphaerocera curvipes*.

Species of Sphaeroceridae are primarily saprophagous, with larvae developing in decaying organic matter. However, much of our understanding of their dietary habits is derived from adult collection records. Since adults are generally more abundant on or near larval feeding substrates (Roháček, 1982a), these records provide valuable insights into the suitability of specific environments as larval habitats. Richards (1930) highlighted that Sphaeroceridae species collected from dung are typically not restricted to the excrement of a single host species. Instead, these coprophilous species exhibit broad ecological tolerance. Cattle farms were the richest in specificity among the farms studied, with species such as *Norrbomia hispanica*, *Opacifrons coxata* and *Spelobia palmata*. These results correspond to previous work (Hammer, 1941; Carles-Tolrá, 2001), which highlights the importance of cattle farms as essential habitats for Sphaeroceridae. Five species were exclusively found on horse farms, such as *Copromyza equina*, *Crumomyia glabrifrons* and *Poecilosomella angulata*. Notably, Richards (1930) reported that *Copromyza equina* is primarily associated with horse manure, although it can occasionally be found on cow dung. The other species have also been linked to equine excrement in previous studies by Carles-Tolrá (2001), Pitkin (1988), Hammer (1941), and Hussey (1957) (Table 2).

Table 1. Species of Sphaeroceridae from Morocco.

Species	RIF	HIGH ATLAS	MIDDLE ATLAS	ANTI ATLAS	SAHARA	COASTAL MESETA
<i>Copromyza equina</i> Fallén, 1820	X					
<i>Crumomyia glabrifrons</i> (Meigen, 1830)	X		X			
<i>Lotophila atra</i> (Meigen, 1830)	X					X***
<i>Norrbomia costalis</i> (Zetterstedt, 1847)	X**					X**
<i>Norrbomia hispanica</i> (Duda, 1923)	X					
<i>Norrbomia marginatis</i> (Adams, 1905)	X					X***
<i>Norrbomia sordida</i> (Zetterstedt, 1847)	X					X
<i>Bifronsina bifrons</i> (Stenhammar, 1855)	X		X			X
<i>Coproica digitata</i> (Duda, 1918)	X					X***
<i>Coproica ferruginata</i> (Stenhammar, 1855)	X		X***			X***
<i>Coproica hirticula</i> Collin, 1956	X		X***	X		X***
<i>Coproica hirtula</i> (Rondani, 1880)	X		X***	X		X***
<i>Coproica lugubris</i> (Haliday, 1835)	X		X***			X***
<i>Coproica pusio</i> (Zetterstedt, 1847)	X					
<i>Coproica Roháčeki</i> Carles-Tolrá, 1990	X		X***			X***
<i>Coproica rufifrons</i> Hayashi, 1991	X		X***			X***
<i>Coproica vagans</i> (Haliday, 1833)	X***		X***	X	X	X***
<i>Elachisoma aterrimum</i> (Haliday, 1833)	X*					X*
<i>Elachisoma bajzae</i> Papp, 1983	X*					X*
<i>Elachisoma kerteszi</i> (Duda, 1924)	X*					X*
<i>Elachisoma pilosum</i> (Duda, 1924)	X*					X*
<i>Gonioneura spinipennis</i> (Haliday, 1836)						X*
<i>Leptocera fontinalis</i> (Fallén, 1826)	X					
<i>Leptocera nigra</i> Olivier, 1813	X***		X			X***
<i>Limosina silvatica</i> (Meigen, 1830)	X		X			
<i>Minilimosina (Svarciella) ismayi</i> Roháček, 1983	X*					
<i>Minilimosina (Svarciella) vitripennis</i> Zetterstedt, 1847	X***		X			
<i>Nudopella hem</i> (Roháček & Marshall, 1986)	X**					
<i>Nudopella leucoptera</i> (Haliday, 1836)	X*					
<i>Opacifrons coxata</i> (Stenhammar, 1855)	X					
<i>Opalimosina (Dentilimosina) denticulata</i> (Duda, 1924)	X*					
<i>Opalimosina (Opalimosina) mirabilis</i> (Collin, 1902)	X					
<i>Poecilomella angulata</i> (Thomson, 1869)	X		X***			
<i>Pseudocollinella jorlii</i> (Carles-Tolrá, 1990)	X***		X			
<i>Pullimosina (Pullimosina) heteroneura</i> (Haliday, 1836)	X		X***			X***
<i>Pullimosina (P.) zayensis</i> Marshall, 1986		X***				X***
<i>Rachispoda acrostichalis</i> (Becker, 1903)	X					
<i>Rachispoda brevior</i> (Roháček, 1983)	X***					X
<i>Rachispoda fuscipennis</i> (Haliday, 1833)	X					
<i>Spelobia baezi</i> (Papp, 1977)	X***					
<i>Spelobia clunipes</i> (Meigen, 1830)	X					
<i>Spelobia hungarica</i> (Villeneuve, 1917)	X					X***
<i>Spelobia palmata</i> (Richards, 1927)	X**					
<i>Spelobia quaesita</i> Roháček, 1983	X***					X***
<i>Spelobia talparum</i> (Richards, 1927)	X*					
<i>Spinilimosina brevicostata</i> (Duda, 1918)		X***				X***
<i>Telomerina flavipes</i> (Meigen, 1830)	X**					X**
<i>Telomerina pseudoleucoptera</i> (Duda, 1924)	X					
<i>Trachyopella (Trachyopella) atomus</i> (Rondani, 1880)	X**					
<i>Trachyopella (T.) coprina</i> (Duda, 1918)	X					X***
<i>Trachyopella (T.) lineafrons</i> (Spuler, 1925)	X*					
<i>Trachyopella (T.) melania</i> (Haliday, 1836)	X					X***
<i>Trachyopella (T.) straminea</i> Roháček & Marshall, 1986	X*		X*			X*
<i>Ischiolepta (pusilla or vaporariorum)</i> (Fallén, 1820)	X					X***
<i>Ischiolepta scabricula</i> Haliday, 1836	X*					
<i>Lotobia africana</i> (Becker, 1907)	X					
<i>Lotobia pallidiventris</i> (Meigen, 1830)	X					
<i>Sphaerocera curvipes</i> Latreille, 1805	X					

Table 2. Review of literature on the associations of Sphaeroceridae with livestock farms.

Species	Cattle	Sheep	Equine	Goat	Poultry/birds	Pig	Rabbit
<i>Copromyza equina</i>			Richards, 1930*				
<i>Crumomyia glabrifrons</i>	Carles-Tolrá, 2001*		*				
<i>Lotophila atra</i>	Carles-Tolrá, 2001*	Roháček, 1989*	Pitkin, 1986*			Roháček, 1989	Roháček, 1989
<i>Norrbomia costalis</i>	*	*	Pitkin, 1986*	*			
<i>Norrbomia hispanica</i>	*						
<i>Norrbomia marginatis</i>	*						
<i>Norrbomia sordida</i>	Pitkin, 1988*	*	Carles-Tolrá, 2001; Pitkin 1988*	*			
<i>Bifronsina bifrons</i>	Carles-Tolrá, 2001*	Carles-Tolrá, 2001*	Pitkin, 1988*	*		Pitkin, 1988	
<i>Coproica digitata</i>	*	*	Carles-Tolrá, 2001*				
<i>Coproica ferruginata</i>	Hammer, 1941; Carles-Tolrá, 2001*	Carles-Tolrá, 2001; Pitkin 1988*	Hammer, 1941; Pitkin, 1988; Carles-Tolrá, 2001*	*	Pitkin, 1988*	Pitkin, 1988; Carles-Tolrá, 2001	
<i>Coproica hirticula</i>	Pitkin, 1988; Carles-Tolrá, 2001*	Carles-Tolrá, 2001*	*	*	Carles-Tolrá, 2001	Pitkin, 1988	Pitkin, 1988
<i>Coproica hirtula</i>	Carles-Tolrá, 2001*	Carles-Tolrá, 2001*	*	*	Pitkin, 1988; Carles-Tolrá, 2001*	Pitkin, 1988	Pitkin, 1988
<i>Coproica lugubris</i>	Pitkin, 1988; Carles-Tolrá, 2001*	Carles-Tolrá, 2001; Pitkin, 1988*	Pitkin, 1988; Carles-Tolrá, 2001*	*		Pitkin, 1988	Pitkin, 1988
<i>Coproica pusio</i>	*			*		Pitkin 1988	
<i>Coproica Roháčeki</i>	Carles-Tolrá, 2001*	Carles-Tolrá, 2001*	*	*	Carles-Tolrá, 2001*		
<i>Coproica rufifrons</i>	*	*	*	*			
<i>Coproica vagans</i>	Carles-Tolrá, 2001*	Carles-Tolrá, 2001*	Pitkin, 1988*	*	Pitkin, 1988	Pitkin, 1988	Pitkin, 1988
<i>Elachisoma aterrimum</i>	Carles-Tolrá, 2001*	Carles-Tolrá, 2001*	Pitkin, 1988			Pitkin, 1988	
<i>Elachisoma bajzae</i>	Carles-Tolrá, 2001*	*			Carles-Tolrá, 2001		
<i>Elachisoma kerteszi</i>	*	*	Carles-Tolrá, 2001				
<i>Elachisoma pilosum</i>	Carles-Tolrá, 2001*	Carles-Tolrá, 2001*				Pitkin, 1988	
<i>Gonioneura spinipennis</i>	Pitkin, 1988; Carles-Tolrá, 2001*		Pitkin, 1988			Pitkin, 1988	Pitkin, 1988
<i>Leptocera fontinalis</i>	Pitkin, 1988*		Pitkin, 1988*				Pitkin, 1988
<i>Leptocera nigra</i>	(*)	(*)	(*)		(*)		
<i>Limosina silvatica</i>	Roháček, 1983; Pitkin, 1988; Carles-Tolrá, 2001*		Pitkin, 1988				Pitkin, 1988
<i>Minilimosina ismayi</i>	*(?)			*(?)			
<i>Minilimosina vitripennis</i>	Carles-Tolrá, 2001*	*					
<i>Nudopella hem</i>	*(?)						
<i>Nudopella leucoptera</i>	Roháček & Marshall, 1986; Carles-Tolrá, 2001*	Roháček & Marshall, 1986; Carles-Tolrá, 2001*	Roháček & Marshall, 1986	*		Roháček & Marshall, 1986; Pitkin, 1988	
<i>Nudopella</i> sp. (n.?)				*			
<i>Opacifrons coxata</i>	(*)						
<i>Opalimosina denticulata</i>	Pitkin, 1988; Carles-Tolrá, 2001*		Pitkin, 1988	*			
<i>Opalimosina mirabilis</i>	Pitkin, 1988; Carles-Tolrá, 2001*	Pitkin, 1988; Carles-Tolrá, 2001	Pitkin, 1988	Pitkin, 1988	Pitkin, 1988	Pitkin, 1988	
<i>Poecilomella angulata</i>			*				
<i>Pseudocollinella jorlii</i>	(*)						
<i>Pullimosina heteroneura</i>	Pitkin, 1988; Carles-Tolrá, 2001*	Carles-Tolrá, 2001; Pitkin, 1988*	Pitkin, 1988*	Pitkin, 1988*	Carles-Tolrá, 2001	Pitkin, 1988	Pitkin, 1988
<i>Pullimosina zayensis</i>	*	Carles-Tolrá, 2001*	*				
<i>Rachispoda acrosticalis</i>	*(?)						
<i>Rachispoda brevior</i>		(*)					
<i>Rachispoda fuscipennis</i>	Carles-Tolrá, 2001*						
<i>Spelobia baezi</i>	Carles-Tolrá, 2001*						
<i>Spelobia clunipes</i>	Hussey, 1957; Pitkin, 1988; Carles-Tolrá, 2001*	Carles-Tolrá, 2001; Pitkin, 1988*	Richards, 1930; Hussey, 1957; Pitkin, 1988*	*			
<i>Spelobia hungarica</i>	*		Roháček, 1983a				
<i>Spelobia palmata</i>	(Pitkin, 1988) (*)	(Pitkin, 1988)					
<i>Spelobia quaesita</i>	*	*	*	*			
<i>Spelobia talparum</i>	*			*			
<i>Spinilimosina brevicostata</i>	Carles-Tolrá, 2001*		Carles-Tolrá, 2001*	Pitkin, 1988			Pitkin, 1988

Species	Cattle	Sheep	Equine	Goat	Poultry/birds	Pig	Rabbit
<i>Telomerina flavipes</i>	Carles-Tolrá, 2001*	*					
<i>Telomerina pseudoleucoptera</i>	Carles-Tolrá, 2001		Pitkin, 1988*				
<i>Trachypella atomus</i>	Roháček & Marshall, 1986,*	Carles-Tolrá, 2001	Roháček & Marshall, 1986			Roháček & Marshall, 1986; Pitkin, 1988	
<i>Trachypella coprina</i>	Carles-Tolrá, 2001*	*	Roháček & Marshall, 1986				
<i>Trachypella lineafrons</i>	Roháček & Marshall, 1986; Pitkin, 1988*	*	Roháček & Marshall, 1986			Pitkin, 1988	Roháček & Marshall, 1986
<i>Trachypella melania</i>	Roháček & Marshall, 1986; Carles-Tolrá, 2001*	*	Roháček & Marshall, 1986			Roháček & Marshall, 1986; Pitkin, 1988	Roháček & Marshall, 1986
<i>Trachypella straminea</i>	Carles-Tolrá, 2001*	Carles-Tolrá, 2001*		*	Carles-Tolrá, 2001		
<i>Trachypella</i> sp.	*	*					
<i>Ischiolepta pusilla</i>	Carles-Tolrá, 2001*	Carles-Tolrá, 2001*	Pitkin, 1988	*		Carles-Tolrá, 2001	
<i>Ischiolepta scabricula</i>	Carles-Tolrá, 2001*	Carles-Tolrá, 2001			Carles-Tolrá, 2001		
<i>Ischiolepta vaporariorum</i>	*	*	*				
<i>Lotobia africana</i>	*						
<i>Lotobia pallidiventris</i>	Carles-Tolrá, 2001		Pitkin, 1988*				
<i>Sphaerocera curvipes</i>	Pitkin, 1988; Carles-Tolrá, 2001*	Carles-Tolrá, 2001; Pitkin, 1988*	Richards, 1930; Pitkin, 1988*	*			

* indicates that a species was recorded on this type of farm during the present study; (*) indicates that a species was reported on this type of farm, although literature data suggest it may not develop in dung; *(?) indicates that a species was found on this type of farm, but no specific information is available on its larval biology.

Sheep and goat farms exhibited low specific richness. The occurrence of *Rachispoda brevior* on sheep farms is often associated with moist conditions (Roháček, 1991). Dung from poultry facilities yielded species such as *Coproica ferruginata*, *Coproica Roháčeki*, and *Leptocera nigra*. These observations corroborate earlier reports of coprophilous assemblages on poultry substrates, including *Coproica vagans* and *Opalimosina mirabilis* (Pitkin, 1988; Carles-Tolrá, 2001) (Table 2). While Roháček (1989) documented the occurrence of *Lotophila atra* in the same context, Carles-Tolrá (2001) also observed that *Ischiolepta pusilla* and *Coproica ferruginata* were linked to pig farms. Similarly, Pitkin (1988) documented several Sphaeroceridae species linked to pig farming, including *Bifronsina bifrons*, *Coproica vagans*, *Elachisoma aterrimum*, and *Trachypella* (*Trachypella*) *melania*. In our study, these species were also recorded in other types of livestock farms, however, pig farms were not included within the scope of this research. Certain species demonstrated a broader habitat preference, being present across three types of livestock farms. For instance, *Lotophila atra* and *Ischiolepta vaporariorum* were recorded on cattle, sheep, and horse farms. Roháček (1989) previously identified *Lotophila atra* in association with pig and rabbit excrement, while Pitkin (1986) reported its presence on horse farms. Furthermore, species such as *Nudopella leucoptera*, *Trachypella straminea*, and *Ischiolepta pusilla* were found on cattle, sheep, and goat farms. Notably, *Lotophila atra* had already been observed by Roháček (1989) in sheep, rabbit, and pig farms, further emphasizing its adaptability to diverse environments. The species *Sphaerocera curvipes* was detected across all four types of livestock farming systems (Cattle, Sheep, Equine, and Goats). Hussey (1957) reported that both *Spelobia clunipes* and *Sphaerocera curvipes* are commonly encountered on equine and cattle farms. Similarly, Richards (1930) recorded 29 species associated with dung, 15 of which were either restricted to or predominantly abundant on dung. Among these, *Spelobia clunipes*, *Copromyza equina*, and *Sphaerocera curvipes* were particularly noted as being common on horse manure but rarely found on cow dung (Pitkin, 1986). These findings are especially significant for *Pullimosina heteroneura*, which Hussey (1957) identified as one of the most frequently encountered species associated with stable manure. The results of this study are a continuation of previous works, such as those of Carles-Tolrá (2001), Pitkin (1986), and Hammer (1941), which confirm that cattle and horse farms are important habitats for Sphaeroceridae. However, some species presented ecologies that were not previously known, such as for *Nudopella* (n.) sp., reserved for goat farms, or *Rachispoda brevior*, mainly linked to sheep farms.

The biogeographic analysis of the Sphaeroceridae family showed that all the species inventoried in this study have a Palaearctic distribution, thus, no species endemic to Morocco has been recorded. Overall, 63% of the recorded species exhibit broad geographical ranges; Several taxa occur both in the Palaearctic and the Afrotropical (South African) regions, for example: *Lotobia africana*, or in the Nearctic (*Sphaerocera curvipes*, *Spelobia clunipes*), while some are primarily Afrotropical, including *Trachyopella* (*Trachyopella*) *coprina* and *Rachispoda acrostichalis*. In addition, 33% of the species have a limited distribution in the Palaearctic, such as *Opalimosina* (*Dentilimosina*) *denticulata*, *Rachispoda brevior*, and *Spelobia talparum* (Roháček et al., 2001). 43% of the Sphaeroceridae fauna is associated with the Iberian distribution: 42 species are shared with Spain and 13 with Portugal. About 56% of the studied species are in common with the other North African countries, in particular Tunisia with 30 shared species, Algeria with 10 species, and Egypt with 15 species in common; no species are shared with Libya (Carles-Tolrá, 2002). Among the Fauna inventoried in this study, three species are considered exotic being probably accidentally introduced in Morocco from their natural range; these are *Norrbomia hispanica*, native to the Mediterranean European region (France, Italy, Spain), *Coproica rufifrons* originating from Asia, and *Coproica pusio* originating from Europe, human activities such as trade or agriculture is the main factors responsible for the dispersion of insects, which leads to the appearance of exotic species, thus promoting the modification of the faunal composition of countries.

This study makes a significant contribution to the understanding of the variety of the Sphaeroceridae fauna in Moroccan farms, by highlighting significant disparities in the specific composition depending on the different types of farms. In particular, cattle farms were important sources of diversity, while sheep, goat and poultry farms showed more specific and less varied communities. Intensity environmental variations, such as humidity, temperature, and light intensity influenced the distribution of species and sexes. The results we obtained confirm that Sphaeroceridae are relevant ecological indicators for evaluating environmental conditions and the quality of organic substrates on farms. Furthermore, comparisons with previous data support the hypothesis that some species exhibit high ecological plasticity, while others prefer specific substrates or habitats.

AUTHOR'S CONTRIBUTION

The authors confirm their contribution to the article as follows: The late Paul Beuk had a significant role in conducting this research, he identified the Sphaeroceridae material and revised the manuscript but he passed away before the publication of the article. We honor his memory and his valuable role in this work and are very saddened by his death; K. Bouzrarf: Writing the original project, collecting specimens in the field, and revising the manuscript; A. Qalmoun: Writing the original project, collecting specimens in the field and revising the manuscript; R. Akhrif: Revising the manuscript; B. Belqat: Conceptualization and supervision of the work, revision, correction and edition of the manuscript. The authors read and approved the final version of the manuscript.

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AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the Diptera Collection of the Natuurhistorisch Museum Maastricht, De Bosquetplein 6-7, NL-6211KJ Maastricht, Netherlands, and are available from the curator, upon request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

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REFERENCES

- Belshaw, R. (1989) A note on the recovery of *Thoracochaeta zosteræ* (Haliday) (Diptera: Sphaeroceridae) from archaeological deposits. *Circaea*, 6 (1), 39–41.
- Beuk, P.L.Th. (2021) Vier voor Nederland nieuwe soorten vliegen uit een 20e-eeuws monster. *Natuurhistorisch Maandblad*, 111 (1), 17–22.
- Carles-Tolrá, M. (2001). Datos taxonómicos y ecológicos de 304 especies de dípteros acalípteros (Diptera, Acalyptrata). *Boletín de la Sociedad Entomológica Aragonesa*, 28, 89–103.
- Carles-Tolrá, M. (2002) Catálogo de los Diptera de España, Portugal y Andorra (Insecta). *Monografías de la Sociedad Entomológica Aragonesa*, 8, 1–323.
- Falk, S.J., Ismay, J.W. & Chandler, P.J. (2016) A Provisional Assessment of the Status of Acalyptratae flies in the UK. *Natural England Commissioned Reports*, nº 217.
- Farkas, R. & Papp, L. (1989) Species composition and breeding sites of fly communities (Diptera) in caged-layer houses in Hungary. *Parasitologia Hungarica*, 22, 93–98.
- Floren, F. (1989) Distribution, phenology and habitats of the lesser dung fly species (Diptera, Sphaeroceridae) of Sweden and Norway, with notes from adjacent countries. *The lesser dung flies of Sweden and Norway*, 22, 65–68.
- Gatt, P., Kettani, K. & Ebejer, M.J. (2016) New records of lesser dung flies (Diptera, Sphaeroceridae) from Morocco. *Dipterists Digest*, 23, 77–82.
- Hafez, M. (1939) Some ecological observations on the insect fauna of dung. *Bulletin de la Société d'Entomologie*, 23, 241–287.
- Hafez, M. (1947) Further additions to the Dipterous fauna of dung in Egypt, with some ecological observations. *Bulletin de la Société d'Entomologie*, 30, 307–316.
- Hammer, O. (1941) *Biological and Ecological Investigations on Flies Associated with Pasturing Cattle and their Excrement*. Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening, København. 105, 257 p.
- Han, H.Y. & Kim, K.C. (1990) Systematics of *Ischiolepta* Lioy (Diptera: Sphaeroceridae). *Annals of the Entomological Society of America*, 83 (3), 409–443. <https://doi.org/10.1093/aesa/83.3.409>
- Hayashi, T. (1986) Studies on the sphaerocerid flies of synanthropy and hygienic importance in Japan (Diptera): II. Records of the forty species. *Medical Entomology and Zoology*, 37 (3), 193–204. <https://doi.org/10.7601/mez.37.193>
- Howard, L.O. (1901) Diptera bred from cow-manure. *The Canadian Entomologist*, 33, 42–44. <https://doi.org/10.4039/Ent3342-2>
- Hussey, N.W. (1957) Observations on the Sphaeroceridae (Borboridae, Diptera) associated with stable manure. *Annals and Magazine of Natural History*, 10 (118), 762–766. <https://doi.org/10.1080/00222935708656029>
- Kettani, K., Ebejer, M.J., Ackland, D.M., Bächli, G., Barraclough, D., Barták, M., Tolrá, M.C., Černý, M., Cerretti, P., Chandler, P., et al. (2022) Catalogue of the Diptera (Insecta) of Morocco—an annotated checklist, with distributions and a bibliography. *ZooKeys*, 1094, 1–466. <https://doi.org/10.3897/zookeys.1094.62644>
- Kim, K.C. (1968) Revision of *Sphaerocera*, with description of a new genus, *Afromyia* (Diptera: Sphaeroceridae). *Annals of the Entomological Society of America*, 61 (2), 296–312. <https://doi.org/10.1093/aesa/61.2.296>
- Kim, K.C. & Han, H.Y. (1990) Systematics of the genus *Lotobia* Lioy (Diptera: Sphaeroceridae). *Journal of African Zoology*, 104 (5), 385–434.
- Kühlhorn, F. (1961) Über das Vorkommen verschiedener Dipteren (Zweiflügler) in den einzelnen Stallarten und ihr Verteilungsverhalten innerhalb des Stallraumes. *Gesundheitswesen und Desinfektion*, 10, 1–9.

- Kühlhorn, F. (1964) Über die Dipterenfauna des Stallbiotops. *Beiträge zur Entomologie Berlin*, 14, 85–118.
- Laurence, B.R. (1954) The larval inhabitants of cow pats. *Journal of Animal Ecology*, 23, 234–260.
<https://doi.org/10.2307/1982>
- Manrique-Saide, P.C. & Delfín-González, H. (1997) Importance of flies as vectors potential diarrheal diseases in humans. *Brazilian Journal of Biomedicine*, 8, 163–170.
- Marshall, S.A. (1986) A revision of the Nearctic species of the genus *Pullimosina* (Diptera, Sphaeroceridae). *Canadian Journal of Zoology*, 64 (2), 522–536. <https://doi.org/10.1139/z86-077>
- Marshall, S.A. & Roháček, J. (1982) A revision of the genus *Telomerina* Roháček (Diptera, Sphaeroceridae). *Systematic Entomology*, 9 (2), 127–163. <https://doi.org/10.1111/j.1365-3113.1984.tb00511.x>
- Marshall, S.A. & Smith, I.P. (1993) A revision of the Nearctic *Pseudocollinella* Duda (Diptera; Sphaeroceridae). *Canadian Journal of Zoology*, 71 (4), 835–857. <https://doi.org/10.1139/z93-109>
- Marshall, S.A., Roháček, J., Dong, H. & Buck, M. (2011) The state of Sphaeroceridae (Diptera: Acalyptratae): world catalog update covering the years 2000–2010, with new generic synonymy, new combinations, and new distributions. *Acta Entomologica Musei Nationalis Pragae*, 51 (1), 217–298.
- Müller, G.C., Schlein, Y. & Junnila, A. (2016) Control of insect breeding in livestock facilities. *Journal of Entomology and Agriculture*, 16, 15–31.
- Norrbom, A.L. & Kim, K.C. (1985a) Systematics of *Crumomyia* Macquart and *Alloborborus* Duda (Diptera: Sphaeroceridae). *Systematic Entomology*, 10 (2), 167–225. <https://doi.org/10.1111/j.1365-3113.1985.tb00527.x>
- Norrbom, A.L. & Kim, K.C. (1985b) Taxonomy and phylogenetic relationships of *Copromyza* Fallén (s.s.) (Diptera: Sphaeroceridae). *Annals of the Entomological Society of America*, 78 (3), 331–347.
<https://doi.org/10.1093/aesa/78.3.331>
- Norrbom, A.L. & Marshall, S.A. (1988) New record and phylogenetic analysis of *Lotophila* Lioy (Diptera: Sphaeroceridae). *Proceedings of the Entomological Society of Ontario*, 119, 17–33.
- Papp, L. (1971) Ecological and production biological data on the significance of flies breeding in Cattle droppings. *Acta Zoologica Academiae Scientiarum Hungaricae*, 17, 91–105.
- Papp, L. (1976) Ecological and zoogeographical data on flies developing in excrement droppings (Diptera). *Acta Zoologica Academiae Scientiarum Hungaricae*, 22, 119–138.
- Papp, L. (1978) New record and records of Sphaeroceridae (Diptera) from Afghanistan. *Acta Zoologica Hungaricae*, 24, 149–168.
- Papp, L. (1979) New species and records of Sphaeroceridae (Diptera) from the USSR. *Annales Historico-Naturales Musei Nationalis Hungarici*, 7, 19–29.
- Papp, L. (1983) Three new record of *Elachisoma* Rondani, 1880 (Diptera: Sphaeroceridae). *Acta Zoologica Academiae Scientiarum Hungaricae*, 29 (4), 451–459.
- Papp, L. (1985a) Flies (Diptera) developing in sheep droppings in Hungary. *Acta Zoologica Hungarica*, 31 (4), 367–379.
- Papp, L. (1985b) The role of taxonomy in the control of flies pestering grazing cattle and sheep in Hungary. *Veterinary Parasitology*, 18, 197–202. [https://doi.org/10.1016/0304-4017\(85\)90044-5](https://doi.org/10.1016/0304-4017(85)90044-5)
- Papp, L. (1988) A review of the Afrotropical species of *Norrbomia* gen. n. (Diptera, Sphaeroceridae, Copromyzini). *Acta Zoologica Hungarica*, 34 (4), 393–408.
- Papp, L. (1990) A review of the Afrotropical species of *Poecilomella* Duda (Diptera, Sphaeroceridae). *Annales Historico-Naturales Musei Nationalis Hungarici*, 81, 133–151.
- Papp, L. (1993) Flies (Diptera) on and in pasture dung in Hungary: a further contribution. *Folia Entomologica Hungarica*, 54, 107–114.
- Papp, L. (2008) A review of the Old World *Coproica* Rondani, 1861 (Diptera, Sphaeroceridae), with descriptions of twelve New record. *Acta Zoologica Academiae Scientiarum Hungaricae*, 54 (Suppl. 2), 1–45.
- Papp, L. & Roháček, J. (2021) Sphaeroceridae (Lesser dung flies). In: Kirk-Spriggs, A.H. & Sinclair, B.J. (eds) *Manual of Afrotropical Diptera. Brachycera Cyclorhapha, excluding Calyptratae*. South African National Biodiversity Institute, Pretoria, pp. 2145–2192.
- Pitkin, B.R. (1986) Bait, habitat preferences and the phenology of some lesser dung flies (Diptera: Sphaeroceridae) in Britain. *Journal of Natural History*, 20, 1283–1295. <https://doi.org/10.1080/00222938600770851>
- Pitkin, B.R. (1988) Lesser dung flies. Diptera: Sphaeroceridae. *Handbooks for the Identification of British Insects*, 10 (5), 1–175.
- Richards, O.W. (1930) The British species of Sphaeroceridae (Borboridae, Diptera). *Proceedings of the Zoological Society of London*, 1930 (2), 261–345. <https://doi.org/10.1111/j.1096-3642.1930.tb00979.x>

- Roháček, J. (1982a) *Leptocera* (*Opacifrons*) *digna* sp. n. (Diptera, Sphaeroceridae) from Bulgaria with a key to the Palaearctic species of the subgenus. *Acta Entomologica Bohemoslovaca*, 79 (1), 64–72.
- Roháček, J. (1982b) Revision of the subgenus *Leptocera* (s.str.) of Europe (Diptera, Sphaeroceridae). *Entomologische Abhandlungen Dresden*, 46 (1), 1–44.
- Roháček, J. (1982c) A monograph and re-classification of the previous genus *Limosina* Macquart (Diptera, Sphaeroceridae) of Europe. Part I. *Beiträge zur Entomologie*, 32 (2), 195–282.
- Roháček, J. (1983a) A monograph and re-classification of the previous genus *Limosina* Macquart (Diptera, Sphaeroceridae) of Europe. Part II. *Beiträge zur Entomologie*, 33 (1), 3–195.
- Roháček, J. (1983b) A monograph and re-classification of the previous genus *Limosina* Macquart (Diptera, Sphaeroceridae) of Europe. Part III. *Beiträge zur Entomologie*, 33 (2), 203–255.
- Roháček, J. (1985) A monograph and re-classification of the previous genus *Limosina* Macquart (Diptera, Sphaeroceridae) of Europe. Part IV. *Beiträge zur Entomologie*, 35 (1), 101–179.
- Roháček, J. (1991) A monograph of *Leptocera* (*Rachispoda* Lioy) of the West Palaearctic area (Diptera, Sphaeroceridae). *Časopis Slezského zemského Muzea, Opava* (A), 40, 97–288.
- Roháček, J. (1998) Family Sphaeroceridae. In: Papp, L. & Darvas, B. (eds) *Contributions to a Manual of Palaearctic Diptera*, vol. 3., *Higher Brachycera*. Science Herald, Budapest, pp. 463–496.
- Roháček, J. [2009](2010) West Palaearctic *Minilimosina* (*Svarciella*): a new species, new records, key and taxonomical notes (Diptera: Sphaeroceridae). *Časopis Slezského Muzea Opava*, 58, 97–114.
- Roháček, J. (1989) Sphaeroceridae (Diptera) of Czechoslovakia. Part 1. *Lotophila* Lioy and *Copromyza* Fallen. *Časopis Slezského Zemského Muzea, Opava* (A), 38, 1–16.
- Roháček, J. & Marshall, S.A. (1986) The genus *Trachypella* Duda (Diptera, Sphaeroceridae) of the Holarctic Region. *Monografie Museo Regionale di Scienze Naturali*, 3, 1–109.
- Roháček, J. & Marshall, S.A. (1988) A review of *Minilimosina* (*Svarciella*) Roháček, with descriptions of fourteen new record (Diptera: Sphaeroceridae). *Insecta Mundi*, 2 (3–4), 241–282.
- Roháček, J., Marshall, S.A., Norrbom, A.L., Buck, M., Quiros, D.I. & Smith, I. (2001) *World catalog of Sphaeroceridae* (Diptera). Slezského Zemské Muzeum, Opava. 414 p.
- Schiegg, K. & Munari, L. (1999) Sphaeroceridae (Diptera) collected in the Forest Reserve Sihlwald (Kt. Zurich). *Bulletin de la Société Entomologique Suisse*, 72, 65–73.
- Troger, H. & Roháček, J. (1980) Über die Sphaeroceridae-Fauna (Diptera) im Raum Obergurgl (Zentralalpen. Tirol): *Faunistik, Taxonomie, Ökologie. Beiträge zur Entomologie*, 30, 15–33.

مطالعه دوبالان خانواده Sphaeroceridae (Insecta: Diptera) مرتبط با دامداری‌ها در مراکش

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چکیده: حضور هفده گونه و دو جنس از دوبالان خانواده Sphaeroceridae شامل *Elachisoma* Rondani, 1880 و *Nudopella hem* و *Gonioneura* Rondani, 1880 برای اولین بار در مراکش ثبت شد که میان آنها، ۱۲ گونه شامل *E. pilosum* (Duda, 1924)، *E. kerteszi* (Duda, 1924)، *E. bajzae* Papp, 1983 (Roháček & Marshall, 1986)، *Minilimosina* (Svarciella) *ismayi* Roháček, 1983، *Gonioneura spinipennis* (Haliday, 1836)، 1924، *Spelobia talparum* (Richards, 1927)، *Opalimosina* (Dentilimosina) *denticulata* (Duda, 1924)، *T. (T.) Trachyopella* (Trachyopella) *lineafrons* (Spuler, 1925)، *Nudopella leucoptera* (Haliday, 1836) و *straminea* Roháček & Marshall, 1986 و *Ischiolepta scabricula* (Haliday, 1836) برای فون شمال آفریقا نیز جدید هستند. هدف این مطالعه مشخص کردن گونه‌های مرتبط با پنج نوع دامداری (گاو، گوسفند، اسب، بز و طیور) از میان ۶۳ گونه شناخته‌شده در مراکش بود. با در نظر گرفته یافته‌های جدی، تعداد کل گونه‌های شناخته شده خانواده Sphaeroceridae در مراکش به ۸۴ افزایش یافت.

واژگان کلیدی: مگس‌های فضولات کوچک، گاو، گوسفند، اسب، بز، طیور، شمال آفریقا