

Review of Afrotropical Scathophagidae (Diptera)

Обзор двукрылых семейства Scathophagidae (Diptera)
Афротропической области

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KEY WORDS: Diptera, Scathophagidae, *Scathophaga*, review, Afrotropical regionКЛЮЧЕВЫЕ СЛОВА: Diptera, Scathophagidae, *Scathophaga*, обзор, Афротропическая область

ABSTRACT. The family Scathophagidae in the Afrotropical Region is reviewed and now includes 5 species in the genus *Scathophaga* Meigen, 1803. The status of *Scathophaga helenae* (Thomson) is in need of clarification. Lectotypes are designated for *Scopeuma alata* Becker, 1914, *Scopeuma socia* Becker, 1914, and *Scopeuma foetulecta* Ségué, 1966. *Scathophaga longiaculeata* sp.n. is described from material from Ethiopia. The distinctive characters of the species are discussed and partly figured. A key to the species is provided. Data on the biology and distribution of Afrotropical Scathophagidae are summarized.

РЕЗЮМЕ. Приводится обзор афротропических двукрылых семейства Scathophagidae. 5 видов отмечено в Афротропической области. *Scathophaga helenae* (Thomson) нуждается в перепроверке. Обозначены лектотипы для *Scopeuma alata* Becker, 1914, *Scopeuma socia* Becker, 1914 и *Scopeuma foetulecta* Ségué, 1966. Дано описание нового вида *Scathophaga longiaculeata* sp.n. из Эфиопии. Обсуждаются отличительные для видов признаки. Приведена определительная таблица видов. Суммированы данные по биологии и распространению.

Introduction

The Scathophagidae is a small family of calyptrate Diptera with the following combination of characters: antennal pedicel with complete dorsal suture; eyes dichoptic in both sexes, separated by a broad frontal vitta in males as well as in females; frontal vitta without setae; lower calypter linear; meron bare, without setae; ventral surface of scutellum without hairs.

The world fauna currently comprises a little over 350 species in 49 genera [Vockeroth, 1977, 1980, 1987,

1995; Albuquerque, 1984; Sun, 1996; Šifner, 2008; Ozerov, 2009]. Some 340 species in 48 genera are recorded from the Holarctic. The Oriental fauna contains 6 species in 4 genera. The endemic monotypic genus *Scatogera* Albuquerque, 1984 and 5 *Scathophaga* species are known from the Neotropics. No Scathophagidae are known to occur in Australia and Oceania.

The Afrotropical fauna contains 4 species, all in the genus *Scathophaga* Meigen, 1803 [Vockeroth, 1980]. This genus is distinguished from other scathophagid genera by the following combination of characters: propisternum covered with hairs at middle or on anterior part; anepisternum completely or almost completely covered with hairs; with hairs behind first thoracic spiracle; tibia of fore leg of both sexes without an anteroventral row of long and strong or spine-like setae; tibia of mid leg at middle without a long and strong seta anteriorly; R_{2+3} without imperfect crossveins; scutellum with 2 pairs (apical and basal) or 3 pairs (apical, discal and basal) of strong setae.

Pont [in Werner et al., 2006] concluded that *Scathophaga soror* (Wiedemann, 1818), described from South Africa and almost always treated as a synonym of the common Holarctic *Scathophaga stercoraria* (Linnaeus, 1758), is a good species. Figures of the male sternite 5 and surstyli of *S. soror* were given by Pont in that paper. Good differences between *S. soror* and *S. stercoraria* based on mitochondrial (COI, 12S, and 16S), nuclear (ITS2) as well as microsatellite markers were shown by Bernasconi, Berger & Blanckenhorn [2010]. The remaining 3 Afrotropical species were known only from brief descriptions [Becker, 1914; Ségué, 1966].

It became necessary to study the morphology of Afrotropical Scathophagidae and to summarize the data on their biology and distribution whilst preparing a chapter on the Scathophagidae for the forthcoming *Manual of Afrotropical Diptera*. The purpose of this paper is to report the results of these studies.

Material and methods

Material, including the type-series of *Scathophaga alata* (Becker), *S. socia* (Becker) and *S. foetulecta* (Séguy) were sent by Dr C. Daugeron from the Muséum National d'Histoire Naturelle in Paris, France (MHNP in the following text); specimens from Ethiopia, Kenya and the Republic of South Africa sent by Dr A. Freidberg from Tel-Aviv University, Israel (TAU), and specimens from Ethiopia and Republic of South Africa sent by Dr A.C. Pont from the Natural History Museum, London, UK (BMNH) have also been studied. Some specimens have been retained in the Zoological Museum of the Moscow Lomonosov State University, Russia (ZMUM).

Specimens were photographed using a Canon Power Short A640 camera attached to an Olympus SZX12 stereomicroscope. Breeze Systems PSRemote.v1.5.1 software was used to control resolution through microscope adjustments. Two to 4 photographs of the best quality were taken and stacked into one good image with Adobe Photoshop software.

Descriptions and redescriptions of Afrotropical *Scathophaga* species

Scathophaga soror (Wiedemann, 1818)

Figs 1–4.

soror Wiedemann, 1818: 46 (*Scatophaga*).

lutipes Wiedemann, 1830: 448 (*Scatophaga*). [Name proposed conditionally but available under LC.Z.N. Code.]

capensis Robineau-Desvoidy, 1830: 625 (*Scatophaga*).

merdivora Robineau-Desvoidy, 1830: 628 (*Scatophaga*).

hottentotta Macquart, 1843: 342 (185) (*Scatophaga*).

MATERIAL. REPUBLIC OF SOUTH AFRICA: 1 ♂, Cape Province, Cape Point, 4.IX.1983, A. Freidberg (TAU); 1 ♂, 1 ♀, Natal, Dargle Dis. Nhluzane, 15.X.1983, A. Freidberg (TAU, ZMUM); 1 ♀, Western Cape, Huguenot Tunnel, Rt. 1, 1000 m (33°44'S, 19°04'E), 30.VIII.2003, A. Freidberg (TAU); 1 ♂, «French Hoek. 40 mls. from Cape Town. xi–xii 1930. H.W.Simmonds» (BMNH); 2 ♂♂, Natal, Willow Grande, Mooi River, Well Brook, 9.IX. and 4.XI.1913, R.C. Wroughton (BMNH); 1 ♂, «Kloof Nek. Cape Town, 1–2.I.1972» (BMNH); 1 ♂, Cape Province, nr Outdsnoorn, 1.XI.1931, Mrs I. Ogilvie (BMNH); 1 ♂, Transvaal, Lake Chrissie, C.J. Wainwright Collection (BMNH).

REDESCRIPTION. Male, female. Length of body 6.5–9.5 mm. Length of wing 6.2–9.1 mm. Pollination on thorax, abdomen and legs varies from golden-yellow to greenish-grey in both sexes. Usually males are lighter than females. The colour, length and thickness of hairs on the body varies significantly. As a rule thorax, abdomen and legs of males are with dense golden hairs, and of females with rare greenish-yellow or black hairs. The chaetotaxy is better seen in females as black setae in males are hidden among dense hairs.

Head. Frons yellow or reddish-yellow, with greyish pollen along margin of eye. Ocellar triangle blackish. Face, parafacial and gena yellow, dusted. Postcranium blackish, dusted. 3 orbitals, 3–5 frontals, 1 ocellar, 1 postocellar, 1 inner vertical, 1 outer vertical setae present; 1 pair of strong vibrissae and several pairs of

short subvibrissae. Antenna black, with black arista. Postpedicel rounded apically, approximately 2–2.5 times as long as wide. Arista with long dorsal and ventral branches in basal half. Palpus yellow. Clypeus and proboscis black.

Thorax. Black, densely pollinose, with dark stripes and fuzzy spots on scutum and scutellum. Scutum with 2 postpronotals, 2 notopleurals, 1+2 supra-alars, 1+(2–3) intra-alars, 2 postalars, 2+3 dorsocentrals; acrostichal hairs in two rows, but prescutellar pair strong, approximately as long as ocellar or postocellar setae. Proepisternum, proepimeron, anepisternum, katepisternum and anepimeron with hairs. Anepisternum with 2–3 setae near posterior margin; katepisternum with 1 seta in upper posterior corner. Scutellum with 3 pair of strong setae (discal pair strong).

Legs. Coxae and femora (excluding apex) of all legs black, dusted; trochanters of all legs dark brown to black, shining; apex of femora, all tibiae and tarsi yellow, dusted. Male fore femur without striking setae, in female with 6–8 *d/pd*. Fore tibia in both sexes with 3–4 *d* (including apical one) and with 2 strong *p* (including apical one). Mid femur with a row of *ad* and with preapical *p* and *pd*. Mid tibia with 3 *ad*, 3–4 *pd*, 1–2 *p*, 1–2 *v* and a ring of strong apical setae. Hind femur with a row of *ad* and with preapical *pd* and *p* (preapical *p* sometimes absent). Male hind tibia with 4–5 *ad*, 3–4 *pd* and a ring of apical setae, in female additionally with 2 *av*.

Wing. Tinged with brownish. Veins yellowish, cross-vein *r-m* from slightly to visibly darkened. Calypters, their margins and halteres yellowish.

Abdomen. Black, densely pollinose, in male without striking setae, in female with a row setae on tergites 2–7 along posterior margin. Male sternite 5 as in Fig. 1. Epandrium black, dusted; surstylus with a small tubercle at base (Fig. 3). Aedeagus as in Fig. 2; paraphallus in lateral view axe-like.

NOTE. I herewith formally place all Afrotropical species which were previously considered to be synonyms of *S. stercoraria* (except *Scathophaga helenae* Thomson, 1869) as automatic synonyms of *S. soror*, though I have not examined the types of these species. *S. capensis*, *S. merdivora* and *S. hottentotta* were described from the specimens collected in South Africa, and so the probability of their identity with *S. soror* is very high.

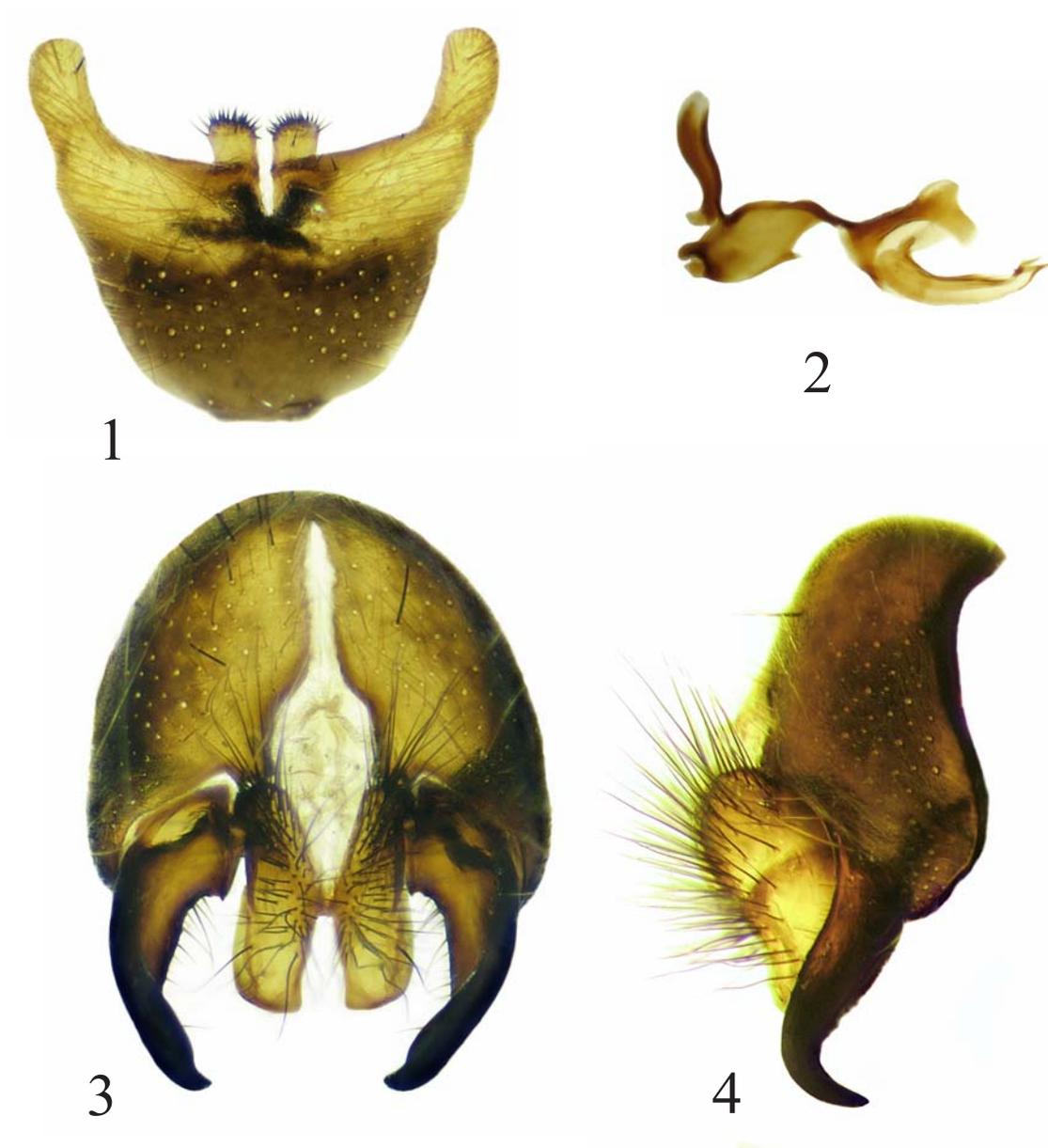
S. helenae was described by Thomson from St. Helena Island. This species has only two pairs of strong bristles on scutellum [from the description by Thomson, 1869: 563]; *soror* (as also *stercoraria*) has three pairs. *S. helenae* may be is good species, close to *S. foetulecta* (Séguy).

Scathophaga alata (Becker, 1914)

Figs 5–9.

alata Becker, 1914: 127 (*Scopeuma*).

TYPE MATERIAL. *Scopeuma alata* Becker, 1914 was described from 6 specimens of both sexes from Kenya. I studied 4 of them.



Figs 1–4. *Scathophaga soror*, ♂ from Republic of South Africa: 1 — sternite 5; 2 — aedeagus; 3 — epandrium, cercus and surstylus, dorsal view; 4 — epandrium, cercus and surstylus, lateral view.

Рис. 1–4. *Scathophaga soror*, ♂ из Южно-африканской Республики: 1 — стернит 5; 2 — эдеагус; 3 — эпандрий церки и сурстили сверху; 4 — эпандрий церки и сурстили, сбоку.

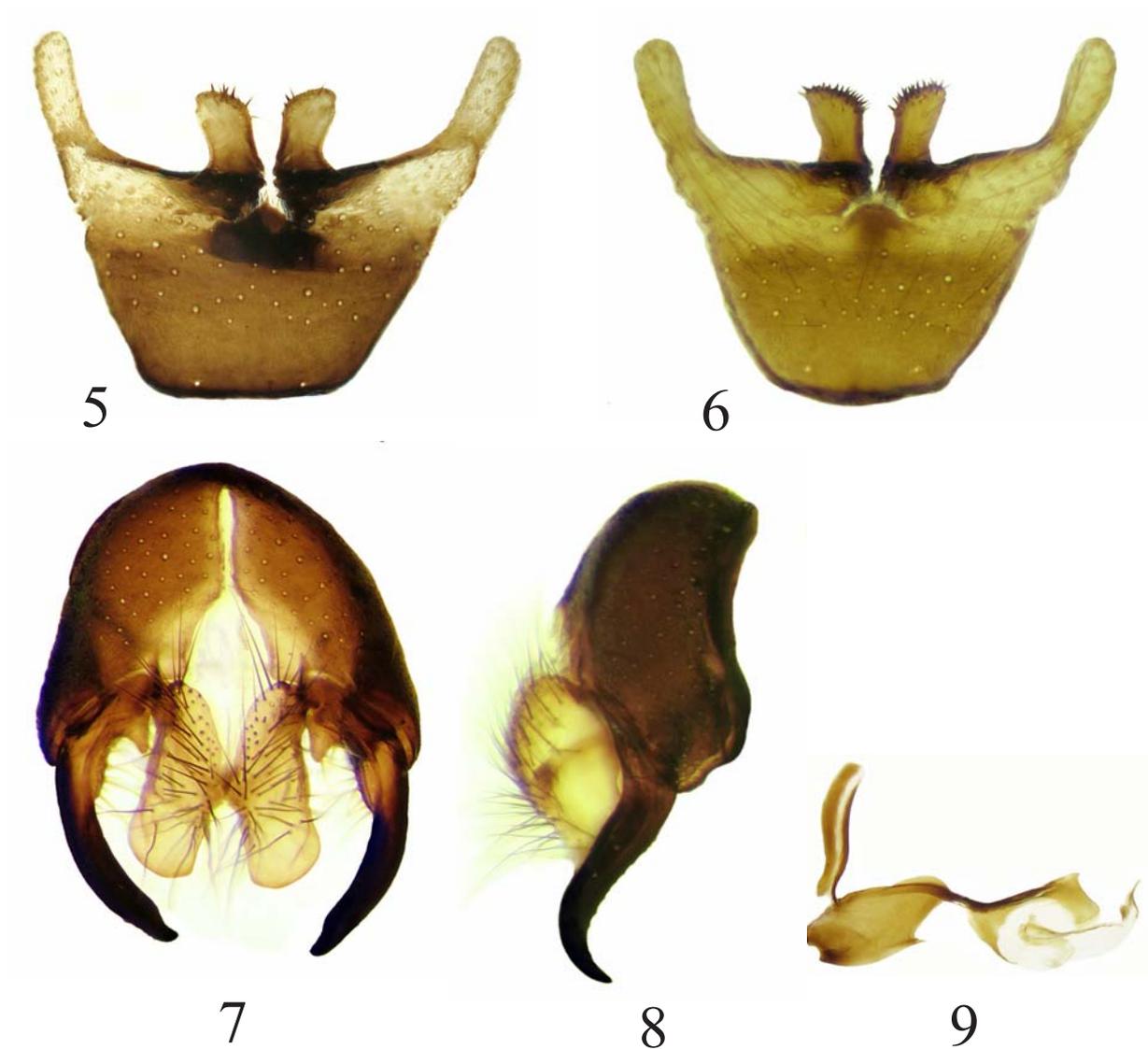
Lectotype ♂ labelled «Afrique or. anglaise[,] Mt. Kenya vers't Ouest[,] zone des forêts[,] Alluaud & Jeannel», «Forêts Moyennes Bambous supér[,] 2800–3200 m, Janv. 1912[,] St 41», «*Scopeuma alata* Beck. det. Becker», «Type», by present designation, in MHNP. The lectotype is pinned, with the abdomen dissected by me and stored in glycerine in a microvial pinned with the specimen; its condition is otherwise very good.

I have labelled the other 3 specimens as paralectotypes: 1 ♂, 1 ♀, with the same geographic labels as the lectotype; 1 ♂, «Afrique or. anglaise[,] Monts Aberdare de Nyéré à Naivasha[,] Alluaud & Jeannel», «Mt Kinangor vers't Ouest[,] Forêt de Bambous[,] 2700–3000 m, Fevr. 1912[,] St 56».

ADDITIONAL MATERIAL. 1 ♂, 1 ♀, KENYA: Mt. Kenya, 3000 m, 27.IX.1982, D. Simon (TAU, ZMUM); 3 ♂♂, 3 ♀♀, Mt. Kenya, Met. Station, 3000–3300 m, 21.VIII.1983, A. Freidberg (TAU, ZMUM); 1 ♂, Uplands, 15.XI.1986, I. Susman (TAU).

REDESCRIPTION. Male, female. Length of body 6.5–9.2 mm. Length of wing 8.0–10.4 mm. Pollination on thorax, abdomen and legs varying as in *S. soror* (see above).

Head. Frons yellow or reddish-yellow, with greyish pollen along margin of eye. Ocellar triangle blackish. Face, parafacial and gena yellow, dusted. Postcranium blackish, dusted. 3 orbitals, 3–5 frontals, 1 ocellar, 1 postocellar, 1 inner vertical, 1 outer vertical setae present; 1 pair of strong vibrissae and several pairs of short subvibrissae. Antenna black, with black arista. Postpedicel rounded apically, approximately 2–2.5 times as long as wide. Arista with long dorsal and



Figs 5–9. *Scathophaga alata*, lectotype (5, 7, 8), ♂ from Kenya (6, 9): 5, 6 — sternite 5; 7 — epandrium, cercus and surstylus, dorsal view; 8 — epandrium, cercus and surstylus, lateral view; 9 — aedeagus.

Рис. 5–9. *Scathophaga alata*, лектотип (5, 7, 8), ♂ из Кении (6, 9): 5, 6 — стернит 5; 7 — эпандрий церки и сурстили сверху; 8 — эпандрий церки и сурстили, сбоку; 9 — эдеагус.

ventral branches in basal half. Palpus yellow. Clypeus and proboscis black.

Thorax. Black, densely pollinose, with dark stripes and fuzzy spots on scutum and scutellum. Scutum with 2 postpronotals, 2 notopleurals, 1+2 supra-alars, 0+(1–2) intra-alars (posterior may be absent), 2 postalars, 2+3 dorsocentrals; acrostichal hairs in two rows, prescutellar pair not differentiated or only slightly longer than the other hairs on scutum. Proepisternum, proepimeron, anepisternum, katepisternum and anepimeron with hairs. Anepisternum with 2–3 setae near posterior margin; katepisternum with 1 seta in upper posterior corner. Scutellum with 2 pairs of strong setae (discal pair hair-like).

Legs. Coxae and femora (excluding apex) of all legs black, dusted; trochanters of all legs shining; in

male from yellow to dark brown, in female usually dark brown or blackish; apex of femora, all tibiae and tarsi yellow, dusted. Male fore femur without striking setae, in female with 4–7 *d/pd*. Fore tibia in both sexes with 3–4 *d* (including apical one) and with 2 strong *p* (including apical one). Mid femur with a row of *ad* and with preapical *p* and *pd*. Mid tibia with 3 *ad*, 3–4 *pd*, 1 *p*, 1 *v* and a ring of strong apical setae. Hind femur with a row of *ad*, without preapical *pd* and *p*. Male hind tibia with 4–5 *ad*, 3–4 *pd* and a ring of apical setae, in female additionally with 2 *av*.

Wing. Tinged with brownish, in some males strongly so. Veins yellowish, crossvein *r-m* slightly darkened. Calypters, their margins and halteres yellowish.

Abdomen. Black, densely pollinose, in male without striking setae, in female with a row of setae on



Figs 10–13. *Scathophaga socia*, lectotype: 10 — sternite 5; 11 — aedeagus; 12 — epandrium, cercus and surstylus, dorsal view; 13 — epandrium, cercus and surstylus, lateral view.

Рис. 10–13. *Scathophaga socia*, лектотип: 10 — стернит 5; 11 — эдеагус; 12 — эпандрий церки и сурстили сверху; 13 — эпандрий церки и сурстили, сбоку.

tergites 2–7 along posterior margin. Female tergite 7 yellow along posterior margin. Male sternite 5 as in Figs 5–6. Epandrium black, dusted; surstylus with a moderate process near base (Fig. 7). Aedeagus as in Fig. 9.

Scathophaga socia (Becker, 1914)
Figs 10–13.

socia Becker, 1914: 127 (*Scopeuma*).

TYPE MATERIAL. *Scopeuma socia* Becker, 1914 was described from 1 ♂ and 1 ♀ from «Bismarckhugel» [now in Tanzania].

Lectotype ♂, labelled «Afrique or. allemande[,] Kilimandjaro[,] versant Sud-Est[,] Alluaud & Jeannel», «Lisière supér. des forêts Bismarck-Hügel[,] 2700–2800 m, Avril. 1912[,] St 71», «socium Beck.», by present designation, in MHNP. The lectotype is pinned; I have dissected the abdomen, which is stored in glycerine in a microvial together with the specimen; the condition is otherwise good.

I have labelled the ♀ as paralectotype; it has the same geographic labels as the lectotype.

REDESCRIPTION. Male, female. Length of body 6.4–6.7 mm. Length of wing 6.5–6.8 mm. Dust on

thorax, abdomen and legs grey, thin. Body and leg hairs comparatively short and not dense, not differing between the sexes.

Head. Frons reddish-yellow, matt, along margin of eye black, dusted. Ocellar triangle blackish. Face, parafacial and gena reddish-yellow, dusted. Postcranium blackish, dusted. 3 orbitals, 4 frontals, 1 ocellar, 1 postocellar, 1 inner vertical, 1 outer vertical setae present; 1 pair of strong vibrissae and 2 pairs of short subvibrissae. Antenna black, with black arista. Postpedicel rounded apically, approximately 2–2.5 times as long as wide. Arista with long dorsal and ventral branches in basal half. Palpus yellow. Clypeus and proboscis dark brown.

Thorax. Black, grey pollinose, with dark stripes and fuzzy spots on scutum and scutellum. Scutum with 2 postpronotals, 2 notopleurals, 1+2 supra-alars, 0+2 intra-alars, 2 postalars, 2+3 dorsocentrals; acrostichal hairs in two rows, prescutellar pair slightly longer than other hairs on scutum. Proepisternum, proepimeron, anepisternum, katepisternum and anepimeron with hairs.



Figs 14–17. *Scathophaga foetulecta*, paratype ♂: 14 — sternite 5; 15 — aedeagus; 16 — epandrium, cercus and surstylus, dorsal view; 17 — epandrium, cercus and surstylus, lateral view.

Рис. 14–17. *Scathophaga foetulecta*, паратип ♂: 14 — стернит 5; 15 — эдеагус; 16 — эпандрий церки и сурстили сверху; 17 — эпандрий церки и сурстили, сбоку.

Anepisternum with 3 setae near posterior margin; katapisternum with 1 seta in upper posterior corner. Scutellum with 2 pairs of strong setae (discal pair hair-like).

Legs. Coxae and femora (excluding apex) of all legs black, dusted; trochanters of all legs shining, fore and mid yellow, hind yellow or brown; apex of femora, all tibiae and tarsi yellow, dusted. Fore femur in both sexes with 4–5 *d/pd*. Fore tibia with 3–4 *d* (including apical one) and with 2 strong *p* (including apical one). Mid femur with a row of *ad* and with preapical *p* and *pd*. Mid tibia with 3 *ad*, 2–3 *pd*, 1 *p*, 1 *v* and a ring of strong apical setae. Hind femur with a row of *ad* and with preapical *pd* and *p* (preapical *p* sometimes absent). Male hind tibia with 3–4 *ad*, 3–4 *pd*, \bar{n} 2–3 *av* and a ring of apical setae; *av* very slender in male and strong in female.

Wing. Tinged with brownish. Veins yellowish, cross-vein *r-m* slightly darkened. Calypters, their margins and halteres yellowish.

Abdomen. Black, grey pollinose, in male without striking setae, in female with a row of setae on tergites 2–7 along posterior margin. Male sternite 5 shirt-like, with very broad median lobes (Fig. 10). Epandrium black, dusted; surstylus with a very small process near base (Fig. 12). Aedeagus as in Fig. 11.

Scathophaga foetulecta (Séguy, 1966)
Figs 14–17.

foetulecta Séguy, 1966: 610 (*Scopeuma*).

TYPE MATERIAL. *Scopeuma foetulecta* was described by Séguy from both sexes from Cameroun: «Camerunum: Bamboutonis montes, februarius MCMXLVII, in turmis congregatam super faecis Uri. Dom Dri Iacobus Carayon invenit et observavit».

Lectotype ♂ labelled «Cameroun mt. Bamboutos», «Scatophaga foetulecta E. Séguy vid. 55[,] Type ♂», «Type ♂», «Type», by present designation, in MHNP. The lectotype is pinned, left postpedicel missing, abdomen dissected by me and stored in glycerine in a microvial pinned with the specimen; the condition is otherwise good.

The remaining 5 ♂♂ and 3 ♀♀, with the same geographic labels as the lectotype, have been labelled as paralectotypes.

REDESCRIPTION. Male, female. Length of body 5.3–7.5 mm. Length of wing 6.6–8.2 mm. Pollination on thorax, abdomen and legs varying as in *S. soror* (see above).

Head. Frons yellow or reddish-yellow, with greyish pollen along margin of eye. Ocellar triangle blackish. Face, parafacial and gena yellow, dusted. Postcranium blackish, dusted. 3 orbitals, 3–5 frontals, 1 ocellar, 1 postocellar, 1 inner vertical, 1 outer vertical setae present; 1 pair of strong vibrissae and several pairs of short subvibrissae. Antenna black, with black arista. Postpedicel rounded apically, approximately 2–2.5 times as long as wide. Arista with long dorsal and ventral branches in basal half. Palpus yellow. Clypeus and proboscis black.

Thorax. Black, densely pollinose, with dark stripes and fuzzy spots on scutum and scutellum. Scutum with 2 postpronotals, 2 notopleurals, 1+2 supra-alars, 0+(1–2) intra-alars (posterior may be absent), 2 postalars, 2+3 dorsocentrals; acrostichal hairs in two rows, prescutellar pair not differentiated or only slightly longer than the other hairs on scutum. Proepisternum, proepimeron, anepisternum, katepisternum and anepimeron with hairs. Anepisternum with 2–3 setae near posterior margin; katepisternum with 1 seta in upper posterior corner. Scutellum with 2 pairs of strong setae (discal pair hair-like).

Legs. Coxae and femora (excluding apex) of all legs black, dusted; trochanters of all legs shining, from yellow to blackish; apex of femora, all tibiae and tarsi yellow, dusted. Male fore femur without striking setae, in female with 4–7 *d/pd*. Fore tibia in both sexes with 3–4 *d* (including apical one) and with 2 strong *p* (including apical one). Mid femur with a row of *ad* and with preapical *p* and *pd*. Mid tibia with 3 *ad*, 3–4 *pd*, 1 *p*, 1 *v* and a ring of strong apical setae. Hind femur with a row of *ad*, without preapical *pd* and *p*. Male hind tibia with 4–5 *ad*, 3–4 *pd* and a ring of apical setae, in female additionally with 2 *av*.

Wing. Tinged with brownish, in some males strongly so. Veins yellowish, crossvein *r-m* slightly darkened. Calypters, their margins and halteres yellowish.

Abdomen. Black, densely pollinose, in male without striking setae, in female with a row of setae on tergites 2–7 along posterior margin. Female tergite 7 yellow along posterior margin. Male sternite 5 as in Fig. 14. Epandrium black, dusted; surstylus with a long process near base (Fig. 16). Aedeagus as in Fig. 15.

Scathophaga longiaculeata sp.n.

Figs 18–22.

MATERIAL. Holotype ♂, ETHIOPIA: Shewa, Menagesha forest, 3050 m (9°02'N, 38°35'E), 11.X.2005, A. Freidberg (TAU). The holotype is pinned; abdomen dissected by me and stored in glycerine in a microvial pinned with the specimen; its condition is otherwise very good.

Paratypes: 1 ♂, with same labels as holotype (ZMUM); 4 ♂♂, 2 ♀♀, ETHIOPIA: Menagesh forest, 30 km NW Addis,

1.I.1972, J. Kugler (TAU, ZMUM); 1 ♂, ETHIOPIA: Addis Abeba, 3.I.1972, A. Freidberg (TAU); 2 ♀♀, ETHIOPIA: Bale Mts. 3800–4000 m, 15.XII.1989, A. Freidberg & F. Kaplan (TAU); 1 ♂, Abyssinia [=ETHIOPIA]: Addis Abeba, over 8.000 ft, 8.IX.1926, Dr H. Scott, swept in field of Imperial Hotel, Brit. Mus. 1927-127 (BMNH); 1 ♂, UGANDA: Ruwenzori Range, Nyamgasani Valley, 12–13.000 ft, D.R. Buxton, XII.1934–I.1935, B.M.E.Afr. Exp. B.M. 1935–203 (BMNH).

DESCRIPTION. Male. Length of body 6.8–7.2 mm. Length of wing 7.9–8.3 mm. Pollination on thorax, abdomen and legs varying as in *S. soror* (see above).

Head. Frons yellow or reddish-yellow, with greyish pollen along margin of eye. Ocellar triangle black. Face, parafacial and gena yellow, dusted. Postcranium blackish, dusted. 3 orbitals (anterior proclinate, two posterior reclinate), 3–5 frontals, 1 ocellar, 1 postocellar, 1 inner vertical, 1 outer vertical setae present; 1 pair of strong vibrissae and several pairs of short subvibrissae. Antenna black, with black arista. Postpedicel rounded apically, approximately 2–2.5 times as long as wide. Arista with long dorsal and ventral branches in basal half. Palpus yellow. Clypeus and proboscis black.

Thorax. Black, densely pollinose, with dark stripes and fuzzy spots on scutum and scutellum. Scutum with 2 postpronotals, 2 notopleurals, 1+2 supra-alars, 1+2 intra-alars, 2 postalars, 2+3 dorsocentrals; acrostichal hairs in two rows, prescutellar pair not differentiated or only slightly longer than the other hairs on scutum. Proepisternum, proepimeron, anepisternum, katepisternum and anepimeron with hairs. Anepisternum with 2–3 setae near posterior margin; katepisternum with 1 seta in upper posterior corner. Postmetacoxal bridge absent. Scutellum with 2 pairs of strong setae (discal pair hair-like).

Legs. Coxae and femora (excluding apex) of all legs black, dusted; trochanters of all legs dark brown to black, shining; apex of femora, all tibiae and tarsi yellow, dusted. Fore femur without striking setae. Fore tibia with 3–4 *d* (including apical one) and with 2 strong *p* (including apical one). Mid femur with a row of *ad* and with preapicals *p* and *pd*. Mid tibia with 3 *ad*, 3–4 *pd*, 1 *p*, 1 *v* and a ring of strong apical setae. Hind femur with a row of *ad* and with 0–1 preapicals *pd* and *p*. Hind tibia with 3–5 *ad*, 3–4 *pd* and a ring of apical setae.

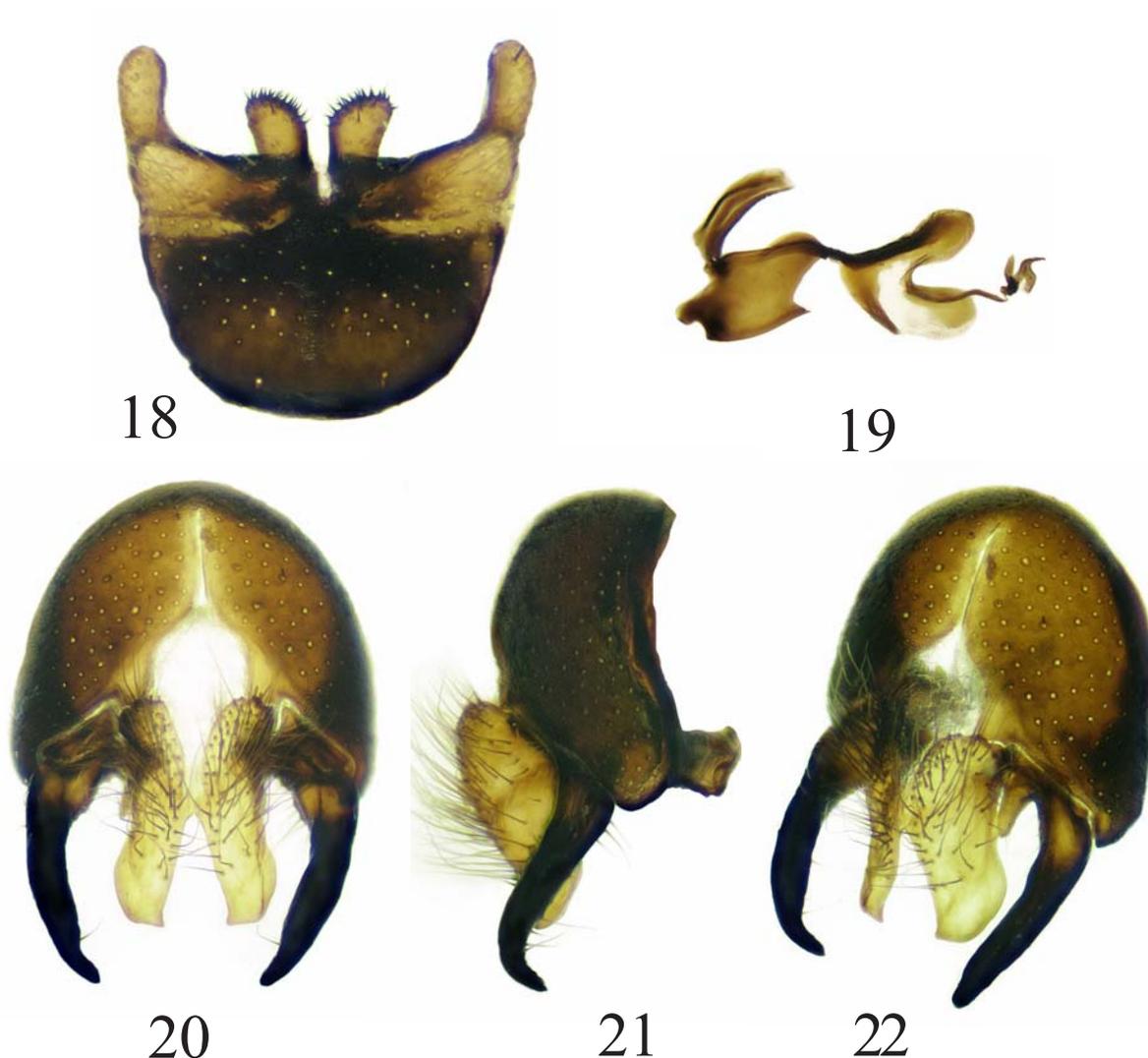
Wing. Tinged with brownish. Veins yellowish, crossvein *r-m* visibly darkened. Calypters, their margins and halteres yellowish.

Abdomen. Black, densely pollinose, without striking setae. Male sternite 5 as in Fig. 18. Epandrium black, dusted; surstylus with a long process near base (Fig. 22). Aedeagus as in Fig. 19; paraphallus in lateral view oval.

Female unknown.

Discussion

Morphology. All Afrotropical Scathophagidae species can be referred to the *stercoraria* group of *Scathophaga*, characterized by the aggregate of two characters: plumose arista and hairs present on anepisternum. The species within this group differ by their chaetot-



Figs 18–22. *Scathophaga longiaculeata*, holotype: 18 — sternite 5; 19 — aedeagus; 20 — epandrium, cercus and surstylus, dorsal view; 21 — epandrium, cercus and surstylus, lateral view; 22 — epandrium, cercus and surstylus, dorso-lateral view.

Рис. 18–22. *Scathophaga longiaculeata*, голотип: 18 — стернит 5; 19 — эдеагус; 20 — эпандрий церки и сурстили сверху; 21 — эпандрий церки и сурстили, сбоку; 22 — эпандрий церки и сурстили, дорсо-латерально.

axy, structure of the male sternite 5 and the male genitalia.

S. soror is the closest species to *S. stercoraria*. I would like to add the following differences additional to those given by Pont [in Werner et al., 2006: 149] (sternite 5 in *soror* more triangular in form and cercal plate more angular at lower inner corner and also on upper outer edge) with which I agree: in *soror*, hind femur with preapical *pd*, and surstylus (dorsal view) wider in basal half (Figs 3–4 and 25–26).

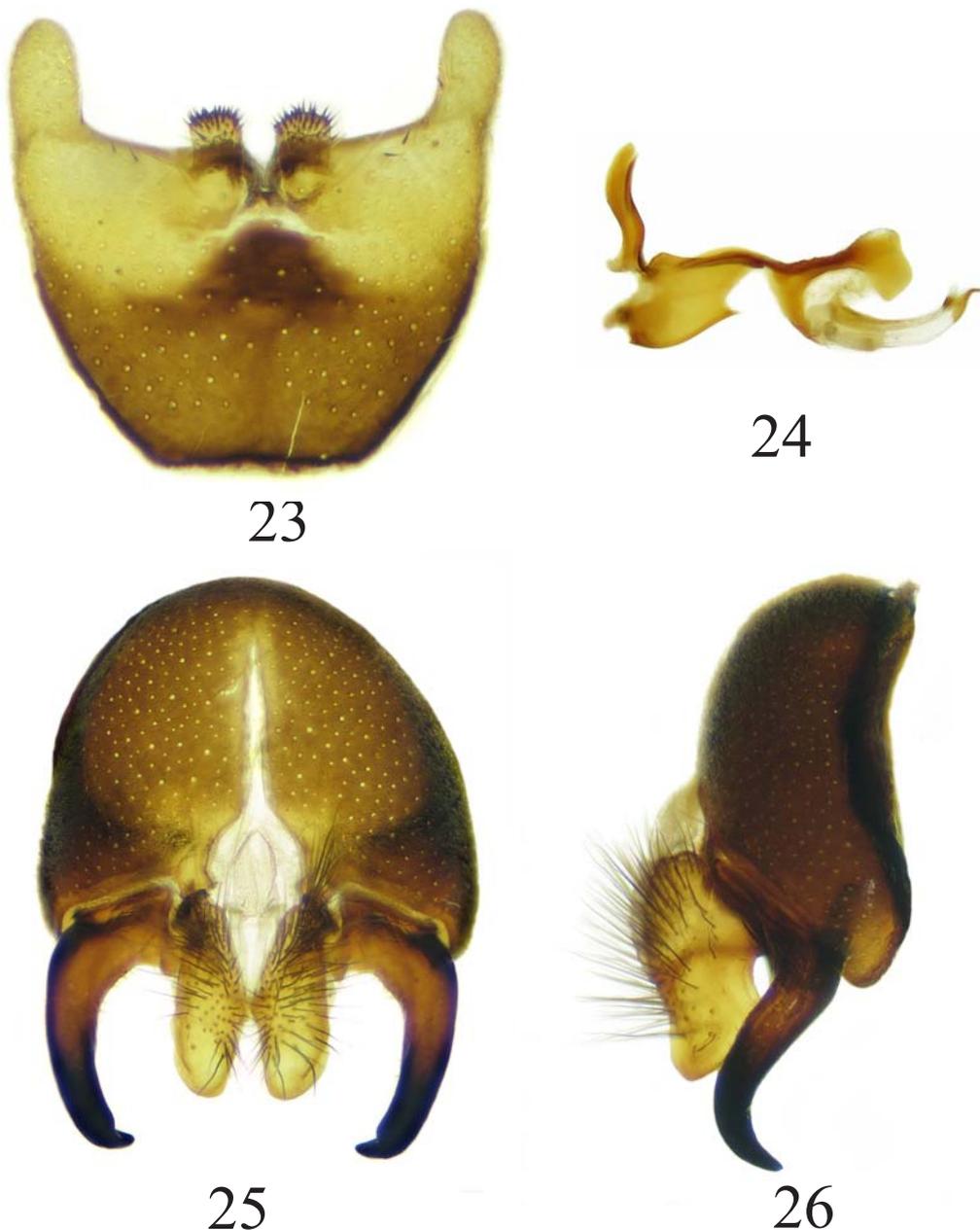
S. longiaculeata also has a presutural intra-alar seta, but differs from *S. soror* as follows: scutellum in *longiaculeata* with 2 pairs of strong setae (discal pair hair-like); prescutellar pair of *ac* not differentiated or only slightly longer than the other hairs on scutum. In addition, the surstylus in *longiaculeata* has a long process near base (Fig. 22), and the paraphallus in

lateral view is oval (Fig. 19), not axe-like as in *soror* (Fig. 2).

S. alata, *S. foetulecta* and *S. socia* are without a presutural intra-alar seta.

S. alata and *S. foetulecta* both have hind femur without preapical *pd*, a thin surstylus with a moderate or long process near base, and cercal plate more oval at lower inner corner (Figs 7, 16). The paraphallus of *alata* is axe-like in lateral view (Fig. 9), whilst in *foetulecta* it is more oval in form (Fig. 15). The male sternite 5 in *alata* is more triangular in form, and in *foetulecta* more square in form; the median lobes are long, but in *alata* the distance between the median and lateral lobes is greater than in *foetulecta* (Figs 5–6 and 14).

S. socia has the hind femur with a preapical *pd*. The form of the male sternite 5 and surstylus (laterally) of this species is unique (Figs 10, 13).



Figs 23–26. *Scathophaga stercoraria*, ♂ from Moscow area, Russia: 23 — sternite 5; 24 — aedeagus; 25 — epandrium, cercus and surstylus, dorsal view; 26 — epandrium, cercus and surstylus, lateral view.

Рис. 23–26. *Scathophaga stercoraria*, ♂ из Московской области, Россия: 23 — стернит 5; 24 — эдеагус; 25 — эпандрий церки и сурстили сверху; 26 — эпандрий церки и сурстили, сбоку.

IDENTIFICATION. Séguy [1966] has given a key to the species of the Afrotropical Region which includes 7 species, among them *stercoraria*, *merdivora* and *hottentotta*, but without *soror*. He used such variable characters as the colour of the scutum, legs and wing, as well as the structure of the male sternite 5, but without figures.

The Afrotropical *Scathophaga* species (excluding *S. helenae*) may be distinguished by the following key:

1. 0+(1–2) *ial*: presutural absent 2
- 1+2 *ial*: presutural present 4
2. Hind femur without preapical *pd*. Width of median lobes of male sternite 5 approximately equal to width of lateral lobes (Figs 5–6, 14) 3
- Hind femur with preapical *pd*. Median lobes of male sternite 5 very broad, their width approximately 2 times the width of the lateral lobes (Fig. 10). Epandrium, cerci and surstyli as in Figs 12, 13 *S. socia* (Becker)
3. Male sternite 5 more triangular in form (Figs 5, 6). Paraphallus axe-like in lateral view (Fig. 9). If only 1 *ial*

- is present, the posterior one is absent. Epandrium, cerci and surstyli as in Figs 7, 8 *S. alata* (Becker)
- Male sternite 5 more square in form (Fig. 14). Paraphallus more oval in form in lateral view (Fig. 15). If only 1 *ial* is present, the anterior one is absent. Epandrium, cerci and surstyli as in Figs 16, 17 *S. foetulecta* (Séguy)
4. Prescutellar *ac* strong, approximately as long as ocellar or postocellar setae. Scutellum with 3 pairs of strong setae, but discals slightly shorter than basals and apicals. Male sternite 5 as in Fig. 1. Surstylus with a small tubercle near base (Fig. 3); paraphallus in lateral view axe-like (Fig. 2) *S. soror* (Wiedemann)
- Prescutellar *ac* hair-like, not differentiated or only slightly longer than the other hairs on scutum. Scutellum, as a rule, with 2 pairs of strong setae: discal pair hair-like, seldom present as short setulae. Male sternite 5 as in Fig. 18. Surstylus with a long process near base (Fig. 22); paraphallus in lateral view oval (Fig. 19) *S. longiaculeata* sp.n.

DISTRIBUTION. Most of the Scathophagidae species from continental Africa were collected in mountains at 2500–3900 m a.s.l. Only *S. longiaculeata* and *S. soror* were found on plains and lower than 1000 m.

In fact, each species is known from the type territory only: *S. alata* (Becker) — Kenya (2700–3300 m); *S. foetulecta* (Séguy) — Cameroun (mountains); *S. longiaculeata* sp.n. — Ethiopia (2500–3900 m), Uganda (365–400 m); *S. socia* (Becker) — Tanzania (2700–2800 m); *S. soror* (Wiedemann) — Republic of South Africa (50–1000 m). *S. helenae* (Thomson) was described from St. Helena Island.

S. stercoraria is recorded from Africa but only from the Palaearctic part (Algeria, Morocco, Egypt).

BIOLOGY. The Holarctic species of *Scathophaga* breed in dung of various origins or in rotten seaweed on coasts, and *Scathophaga* larvae are carnivorous in these substrates. It seems that it is possible to say the same about the biology of Afrotropical *Scathophaga* species, although data on their biology are very poor and are taken mainly from the labels below the specimens.

Adults of *S. foetulecta* were recorded «in turmis congregatam super faecis Uri» [Séguy, 1966, = "congregating in troops above the faeces of wild ox"].

The adults of *S. soror* were observed feeding on adult *Simulium nigrirarse* Coquillett [Werner et al., 2006].

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