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Description of a new species of *Parascatopse* Cook from Switzerland, with taxonomic notes on other European species of the genus (Diptera, Scatopsidae)

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Parascatopse distorta sp. nov. is described and figured from Bolle di Magadino (Southern Switzerland, Cantone Ticino). This is the first non-halophilous, inland species of the genus in Europe. The occurrence of four other species of Scatopsidae is reported from the same area. A lectotype is designated for *Scatopse cingulipes* Strobl, 1909 and its synonymy with *Parascatopse minutissima* (Verrall, 1886) is confirmed.

Keywords: *Parascatopse*, new species, Europe, wetland, systematics, nomenclature, faunistics

INTRODUCTION

The Bolle di Magadino, located in Ticino (Southern Switzerland) is a wetland nature reserve of 660 ha on the shore of the Lago Maggiore (Verbano), registered as a RAMSAR site since 1982. It is one of the last-remaining intact, natural deltas in Switzerland. Habitats include reedbeds, marshes with tall sedges, willow (*Salix* spp.) thickets, alder (*Alnus* spp.) carr, and other riverine woodlands. The site supports a high biodiversity of flora and fauna and is an important area for several species of breeding and migrating waterbirds. Several invertebrate monitoring surveys (Focarile 1989; Dusej *et al.* 1993; Pierallini & Patocchi 1999) have been carried out during the last three decades in this natural reserve, but in terms of Diptera, they were almost exclusively devoted to Culicidae (Fouque *et al.* 1991). The project «Non Target Diptera», supported by the Fondazione Bolle di Magadino, the Federal office for the Environment and the Museo cantonale di storia naturale, Lugano, was a six-year survey focusing on the Diptera fauna, with the aim of detecting a possible severe decrease of dipteran biodiversity due to the Bti treatments to control mosquitoes carried out for more than ten years. In the frame of this project numerous Diptera were collected with emergence traps and sorted to family level by the junior author (LP). Scatopsidae were sent to the senior author (JPH) for identification, resulting in five species present in this area. Among them, there were numerous representatives of a very small species belonging to the genus *Parascatopse* (no setae on stem of halter, antenna with eight flagellomeres, wing venation with M fork complete, elongate, narrowed medially and CuA double bent, bearing a macroseta, notum broadened, peculiar shape of male genital capsule). This species proved to be new to science and is described in this paper.

The genus *Parascatopse* was established by Cook (1955) for some species of Scatopsidae characterized by very small size (body about 1.0–1.5mm long). The genus includes only eight described species from the Nearctic (Cook 1955), Palaearctic (Cook 1969) and Afrotropical (Cook 1962; Haenni 2006) regions but others are awaiting description, for example in the Neotropical region (Huerta & Ibáñez-Bernal 2008). Only two species of *Parascatopse* are presently known from Europe, *P. litorea* (Edwards, 1925) and *P. minutissima* (Verrall, 1886) (Haenni 2013). Both species have a coastal distribution and are considered as halophilous species. However *P. litorea* is also present inland, in Thüringen, Germany (Haenni 2012) where it is restricted to salt meadows (Bellstedt & Haenni, unpubl.). This is also the case for practically all presently known species of this genus. It was thus particularly interesting to discover a non-halophilous representative of the genus in Switzerland.

MATERIAL AND METHODS

The project «Non Target Diptera»

During the years 1998–2001 and 2003–2004 different typologies of non-wooded swampland (Tab. 1 and Figs 8–9) were sampled with emergence traps. In each station three traps (50x50 cm) were placed from April to October and emptied every ten days. The Scatopsidae have been identified to species level only for the samples collected in 1998 and 1999.

Tab. 1. Bolle di Magadino: sites of emergence of Scatopsidae, 1998–1999.

| Station | Locality | Altitude | Swiss coordinates | Coordinates WGS84 |
|---------|------------------|----------|-------------------|-----------------------------|
| 1 | Locarno-Bolette | 194.0 | 709.850/112.250 | 46°9'9.96"N / 8°51'38.11"E |
| 2 | Locarno-Bolette | 194.0 | 709.850/112.250 | 46°9'9.96"N / 8°51'38.11"E |
| 3 | Locarno-Bolette | 194.0 | 709.850/112.250 | 46°9'9.96"N / 8°51'38.11"E |
| 4 | Locarno-Bolette | 194.0 | 709.850/112.250 | 46°9'9.96"N / 8°51'38.11"E |
| 5 | Locarno-Bolette | 194.5 | 709.850/112.250 | 46°9'9.96"N / 8°51'38.11"E |
| 6 | Locarno-Bolette | 194.5 | 709.800/112.200 | 46°9'8.37"N / 8°51'35.74"E |
| 9 | Locarno-Bolette | 194.0 | 709.900/113.300 | 46°9'43.93"N / 8°51'41.33"E |
| 13 | Locarno-Borgasso | 193.5 | 709.600/113.700 | 46°9'57.06"N / 8°51'27.69"E |
| 14 | Locarno-Borgasso | 193.5 | 709.600/113.700 | 46°9'57.06"N / 8°51'27.69"E |

Most of the material from the Bolle di Magadino is preserved in alcohol in MCSNL except for some specimens that are slide mounted. Specimens of the Strobl collection in NHMA are dry preserved.

Line drawings were made using a camera lucida.

Acronyms of collections

- MHNN Muséum d'histoire naturelle, Neuchâtel, Switzerland
 MCSNL Museo cantonale di storia naturale, Lugano, Switzerland
 NHMA Naturhistorisches Museum der Abtei Admont, Austria

DESCRIPTION OF THE NEW SPECIES

***Parascatopse distorta* sp. nov.**

(Figs 1–7)

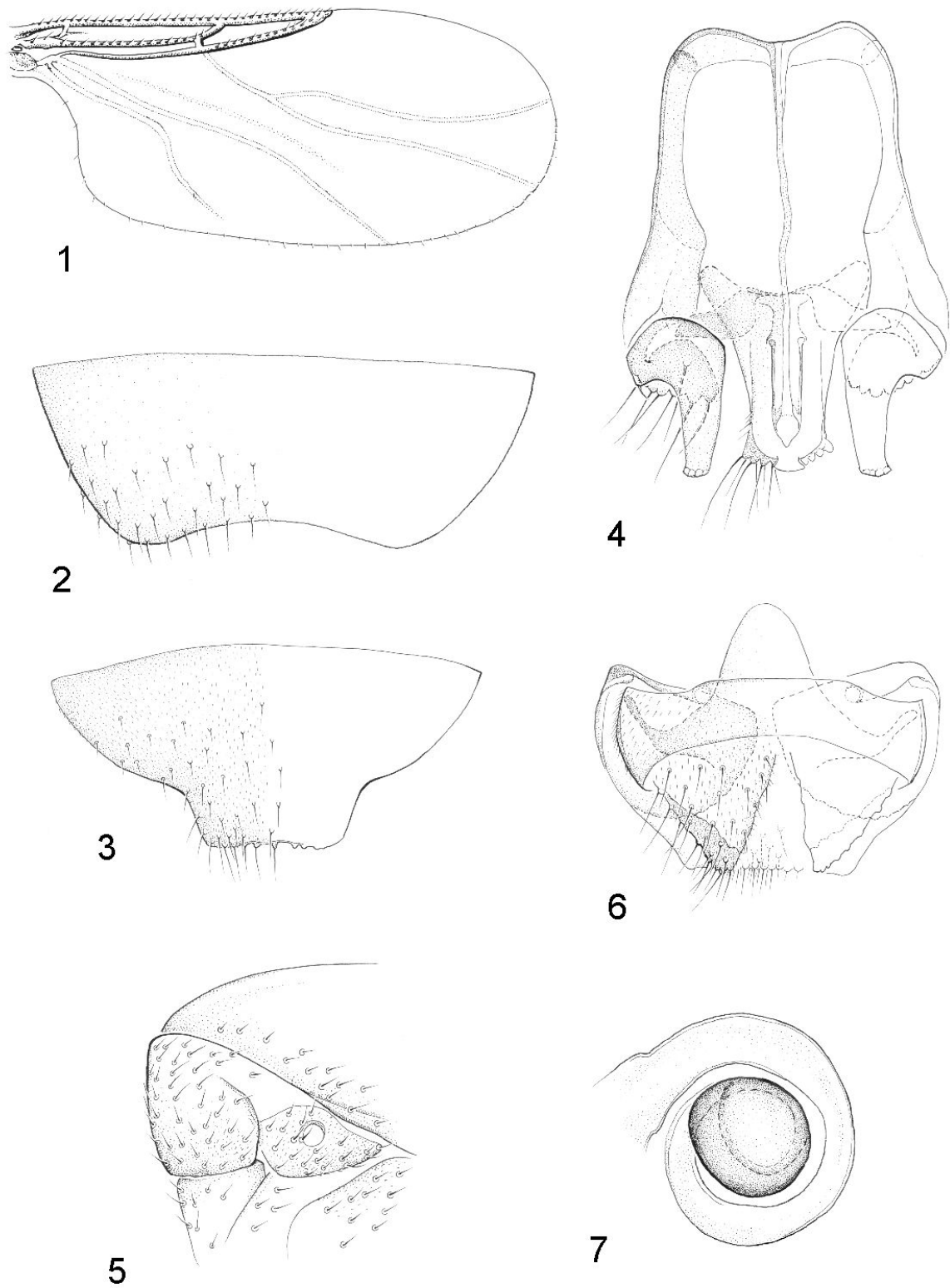
Type-locality. Switzerland, Cantone Ticino: Locarno, Bolle di Magadino.

Type-material. HOLOTYPE ♂, labelled: «SVIZZERA-TI 709.850/112.259, Locarno: Bolle di Magadino, Piattono; cariceto, 194.52m, 20.V–3.VI.1998, trap. emerg.: 5a, leg. L. Pollini» «*Parascatopse distorta* sp. nov. ♂ holotype, J.-P. Haenni & L. Pollini 2014». Paratypes: 67 ♂♂, 53 ♀♀, dates ranging from 14–20.V.1998 to 4–19.VIII.1998 and 27.V–7.VI to 15.IX–11.X.1999, all emergence trap, same general locality as holotype, but number of emergence trap, precise geographic coordinates and date of emergence different. Holotype dissected and slide mounted in coll. MHNN; paratypes preserved in alcohol, (except for some slide mounted) in coll. MCSNL Lugano and MHNN Neuchâtel.

Diagnosis. In the male the shape of sternite 7, with median posterior projection truncate apically (Fig. 3) is unique to the new species, (median posterior projection rounded in *P. minutissima*, sternite 7 broadly triangular in *P. litorea*). The shape of the genital capsule, with lateral appendages narrow, contorted, blunt apically (Fig. 4) is also characteristic (lateral appendages not contorted in *P. minutissima*, wide, rounded apically in *P. litorea*). The distinction of the European species in female is more difficult due to lack of distinctive genital characters.

Description. Male. 1.1–1.4mm. Black in general colour, legs lighter coloured. Head higher than long, antennae longer than head, with 8-segmented flagellum, flagellomeres wider than long, last flagellomere elongate, longer than two preceding flagellomeres together; eyes with a large supranantennal bridge; palpus somewhat pear-shaped, truncate apically; notum longer than wide, covered with short pubescence, a series of supraalar setae distinct from adjacent setosity; anterior spiracular sclerite in shape of more or less quadrangular plate, with anterodorsal spiracular opening; wing 1.1–1.2mm long (Fig. 1); anterior veins lightly coloured, posterior veins and membrane hyaline; radial sector extending well beyond middle of wing, second costal section much longer than apical section of R_{4+5} , stem of M fork short, M fork with branches strongly diverging towards wing margin after a medial constriction; CuA with a sigmoid curve near middle, bearing one macroseta in apical part. Halteres shortened, with stem devoid of setae, knob rounded, darker than stem; legs robust, tarsomeres thick; abdomen with tergites 1–7 developed, anterior margin of tergite 1 strongly emarginate medially, much shorter than the following sternites, tergite 7 emarginate medially on posterior margin (Fig. 2), sternite 1 not sclerotized, 2–6 developed, sternite 7 produced posteriorly into a truncate median projection (Fig. 3); genital capsule (Fig. 4) rectangular in general shape, bearing a pair of contorted, apically blunt appendages; epandrium produced into an elongate posterior process which is apically rounded and setose; aedeagus shortened; sperm pump large, as long as two abdominal segments.

Female. 1.3–1.4mm. Similar to male in general colour and morphology. Last antennal flagellomere nearly as long as three preceding flagellomeres together; anterior thoracic spiracular sclerite (Fig. 5) less rectangular than in male; wing 1.1–1.2 mm; pregenital segment 7 unremarkable, both tergite and sternite slightly



Figs 1–7: *Parascatopse distorta* sp. nov.: 1. Wing, ♂. — 2. Tergite 7, ♂. — 3. Sternite 7, ♂. — 4. Genital capsule, ♂, ventral view. — 5. Anterior spiracular sclerite, ♀. — 6. Terminalia, ♀, dorsal view. — 7. Spermatheca, ♀ (drawings Mathieu Rapp).

emarginate posteriorly; tergite 8 a wide shortened plate, with spiracles close to anterior margin (Fig. 6); cerci broadly triangular; spermatheca with apical part of sperm-duct enlarged, contorted (Fig. 7).

Distribution. *P. distorta* sp. nov. is known to date only from the marshy area of Bolle di Magadino in Ticino, Southern Switzerland.

Ecology. *P. distorta* sp. nov. was caught in Bolle di Magadino, a marshy area formed by deltas of the river Ticino (neutral sandy substratum) and the river Verzasca (acid gravel substratum) in lake Verbano (lake Maggiore). The new species emerged in numbers in various marshy meadows (Figs 8–9 and Tab. 2) dominated by the sedge *Carex acuta*, with presence of the reed *Phalaris arundinacea* and in one station tufted hair-grass *Deschampsia caespitosa*. The main period of emergence of *P. distorta* sp. nov. extends through last decad of May until end of June. There is a second emergence period corresponding possibly to a much less numerous second generation which extends from last decad of July until end of August.

Derivation of name. The name is derived from the latin adjective *distortus*, (feminine *distorta*) meaning contorted, in reference to the shape of the male genital appendages.

Discussion. The immature stages of *P. minutissima* have been described by Szadziewki (1979) from littoral salted soils in Poland. The larvae of *P. distorta* sp. nov. very probably develop in a similar way in the soil of sedge meadows from where adults emerged in numbers. These habitats are regularly flooded, normally a few weeks a year in Bolle di Magadino (altitudes ranging from -10 to +80 cm of mean altitude of lake Verbano).

Other species of Scatopsidae from the Bolle di Magadino

During this survey, only four other species of Scatopsidae were caught from the same stations where *P. distorta* sp. nov. emerged (Tab. 2). These are *Anapausis baueri* Fritz, 1983, *A. talpae* (Verrall, 1912), *Thripomorpha verralli* (Edwards,

Tab. 2. Scatopsidae from the Bolle di Magadino: cumulated number of specimens emerged in each station in 1998–1999 (highlighted in grey: *Parascatopse distorta* sp. nov.).

| | year | | 1998 | | | | 1999 | | | |
|---|---------|---|---|---|---|---|---|---|--|--------------------------------|
| | station | st. 1 | st. 2 | st. 3 | st. 4 | st. 5 | st. 6 | st. 9 | st. 13 | st. 14 |
| <i>Anapausis baueri</i> Fritz, 1983 | | 3 | 1 | 12 | 3 | | | | | |
| <i>Anapausis talpae</i> (Verr., 1912) | | 4 | 2 | 5 | 23 | 4 | 20 | | | 4 |
| <i>Parascatopse distorta</i> sp. nov. | | 1 | | | 32 | 27 | 8 | 52 | 1 | |
| <i>Thripomorpha verralli</i> (Edw., 1934) | | 17 | 13 | 13 | 10 | 50 | 8 | | | |
| <i>Reichertella nigra</i> (Meig., 1804) | | | 1 | | | 17 | 1 | | | |
| habitat/structure | | Dense Magnocaricetum (<i>Carex</i> spp. + <i>Phragmites</i>) | Dense terrestrial reedmarsh (<i>Phragmition</i>) | Dense Magnocaricetum (<i>Carex</i> spp. + <i>Phragmites</i>) | Magnocaricetum (<i>Carex</i> spp. + <i>Phragmites</i>) | Dense Filipendulion (hydrophilous tall herb fringe community) | Marshland with sparse <i>Deschampsia</i> | Dense Phalaridietum (<i>Carex</i> + <i>Phalaris arundinacea</i>) | Dense Filipendulion (<i>Carex</i> spp. + <i>Phragmites</i>) | Sparse <i>Carex</i> and mosses |



Figs. 8–9: Habitat of *Parascatopse distorta* sp. nov. in the Bolle di Magadino, lake Verbano, Ticino, southern Switzerland: — 8. Magnocaricetum and Filipendulion (stations 4–5). — 9. Phalaridietum (station 9) (Photographs Fondazione Bolle di Magadino).

1934) and *Reichertella nigra* (Meigen, 1804). *R. nigra* is a lowland species with wide ecological valence, inhabiting both open and wooded damp habitats; *A. talpae* and *Th. verralli* are regular species of various damp habitats, while *A. baueri* is restricted to temporarily flooded reed marshes of Central Europe, especially at low altitudes (Fritz 1983).

NOMENCLATORIAL NOTE ON EUROPEAN SPECIES OF *PARASCATOPSE*

***Parascatopse minutissima* (Verrall, 1886)**

= *Scatopse cingulipes* Strobl, 1909, junior synonym

This synonymy was established by Cook (1969) who examined in 1965 the type series of *S. cingulipes* from the Strobl collection in Admont (NHMA). The type series was made available in 2004 to the first author (JPH) by Dr. Jürgen Götze who was then in charge of the Strobl collection. It consists of 4 pins bearing labels and/or specimens which are numbered 285-1 to 285-4 as follows: 285-1: 2 labels only: «Scat. annuli- / pes m. ♀ [?] / Monfalcone / [illegible symbol] Strobl» [in G. Strobl's handwriting], «Parascatopse / minutissima / (Verrall) / Det. E.F. Cook '68» [in E. F. Cook's handwriting]; 285-2: 4 labels and one male specimen double mounted, glued on minutien: «Sc. recurva [cancelled] Lw. / ? [illegible symbols] / [illegible cancelled word] / [illegible symbols] 27/7 [or 17/7?] ♂» [green label in G. Strobl's handwriting], «Typen-Exemplar / rev. G. Morge 19» [red type label] / «Lectotype / *S. cingulipes*» [in E. F. Cook's handwriting], «Parascatopse / minutissima / (Verrall) / Det. E. F. Cook '68» [in E.F. Cook's handwriting]; 285-3: 3 labels only, no specimen: «Algeciras / Andalusien / Prof. G. Strobl » [printed label], «Typen-Exemplar / rev. G. Morge 19» [red type label] / «Parascatopse / minutissima / (Verrall) / Det. Cook '68» [in E. F. Cook's handwriting] ; 285-4, 3 labels, one female specimen: «Scatopse / ~ recurva / ♀ [illegible symbol]» [in G. Strobl's handwriting], «Typen-Exemplar / rev. G. Morge 19» [red type label] / «Parascatopse / minutissima / (Verrall) / Det. E. F. Cook '68» [in E.F. Cook's handwriting].

Cook (1969) did not mention the selection of a lectotype from the type series of *Scatopse cingulipes*, although he labelled specimen 285-2 accordingly. This specimen is formally confirmed here as lectotype, designated by Cook.

Strobl himself tentatively attributed first (with a question mark) these specimens to *Scatopse recurva* Loew, 1846 (which is a junior synonym of *Coboldia fusipes* (Meigen, 1830) and a very different species), and only later described them as new as *cingulipes* in part III of his work 'Spanische Dipteren' (Strobl 1909). The name *annulipes* on label of 285-1 is only a working name which was never published.

Obviously at least one more specimen than the two remaining ones had been seen by E. F. Cook, since an identification label is attached to pin 285-4. However, this specimen was no longer present in 2004 as specified on the loan form sent on 6.II.2004 by Dr. Götze to the first author : «285 - 1: Etikett / 2: 1 Tier auf Minutie / 3: ? nur Minutie / 4: 1 Tier auf Minutie». The lacking specimen from Southern Spain 285-3 has possibly been slide mounted by E. F. Cook but is apparently not present in Admont, as specified in a letter to the first author (JPH) by J. Götze dated 16.02.2004 and answering to this question: «Das von Cook bearbeitete Material war nicht an dem angestammten Platz in der Sammlung und an einer Minutie fehlt das

Tier!! Ein mikroskopisches Präparat fand ich nicht! Also Verlust!?» [«The material studied by Cook was not in the ancestral place in the collection and one specimen was missing on one minutien!! I have not found a microscopic preparation! So, lost!?»].

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