

**Redescriptions of some European species of *Atrichopogon*
(Diptera: Ceratopogonidae)**

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ABSTRACT. Nine European species of *Atrichopogon* are redescribed and interpreted. New synonyms are proposed for *A. maculatus* (STORÅ, 1939) (= *A. avastensis* REMM, 1959; *A. hamulatus* REMM, 1971) and *A. muelleri* (KIEFFER, 1905) (= *A. cornutus* NIELSEN, 1951). Neotypes are designated for *A. flaveolus* ZILÁHI-SEBESS, 1936, *A. muelleri* (KIEFFER, 1905), and *A. rostratus* (WINNERTZ, 1852). A key to the identification of Western Palaearctic species of the subgenus *Psammopogon* is presented.

KEY WORDS: Diptera, Ceratopogonidae, *Atrichopogon*, synonymy, Europe, redescriptions.

European *Atrichopogon* is still a neglected group of biting midges, mostly because so many type specimens were lost during the wars. Moreover, some European authors created additional nomenclatorial confusion when they interpreted old species descriptions for regional faunistic purposes disregarding preserved types and their terra typica.

The aim of our study was to re-examine the types of some species described by NIELSEN (1951), LUNDSTRÖM (1910) and STORÅ (1936) and to ascertain their systematic position. Detailed examination of related species known from old literature, which were freely interpreted by European dipterists, then became necessary. In order to stabilize the nomenclature for these species we designate neotypes.

The present study was based on materials from the following institutions: Zoological Museum, University of Lund (ZML); Zoologisk Museum, Copenhagen (ZMK); Zoological Museum, Helsinki (ZMH); Department of Invertebrate Zoology, University of Gdańsk (UG). The neotypes are deposited in UG. Explanation of the taxonomic characters used can be found in the paper on Ceratopogonidae by DOWNES & WIRTH (1981) and on *Atrichopogon* by WIRTH (1994) and SZADZIEWSKI et al. (1995). Specimens were mounted on slides in a mixture of Canada balsam and phenol for critical study and description.

We are grateful to Dr R. Danielsson (ZML), Dr L. Lyneborg (ZMK), and Dr B. Lindeberg (ZMH) who kindly arranged loans of the material. The late Dr Willis W. Wirth reviewed the manuscript in 1994.

Genus *Atrichopogon* KIEFFER, 1906
Subgenus *Atrichopogon* KIEFFER, 1906
***Atrichopogon alveolatus* NIELSEN, 1951**
Figs. 1 - 9

Atrichopogon alveolatus NIELSEN, 1951: 26, 55, 72 (♂, ♀, larva, pupa, Denmark -Himmerland).

Diagnosis

The only species in which females have empodial hairs with disc-like heads. Teeth of female mandible directed basally. Both sexes with 2 submedian bristles on scutellum. Males have eyes pubescent at middle, wing membrane bare, sternite IX with 3-4 long setae at each side of deep u-shaped caudomedian excavation.

Description

♀. Colour hardly preserved due to preservation in alcohol. Eyes bare. Flagellum length 705-758 µm, AR 2.03-2.23 (Fig. 1). Palpus 5-segmented. Third palpal segment relatively short, 64-70 µm; small sensory pit located at midlength (Fig. 2). Mandible armed with 16-17 teeth curved basally, median ones larger (Fig. 3). Tibial comb composed of 9 spines. Tibial spurs indistinct. TR(I) 2.6-2.8, TR(II) 2.4-2.5, TR(III) 2.4-2.6. Empodia large, each hair ending with disc-like head (Fig. 4). Claws with simple apices. Paratergite with 1 seta. Scutellum bears 2 long submedian bristles and about 15 small setae (Fig. 5). Wing length 1.31-1.44 mm, CR 0.71-0.74. Second radial cell 2.2 times longer than the first one. Macrotrichia present only at wing apex (Fig. 6). Seminal capsule single, small, symmetrical with very short neck (Fig. 7); size 100-108 x 72-88 µm. Genital armature weakly sclerotized.

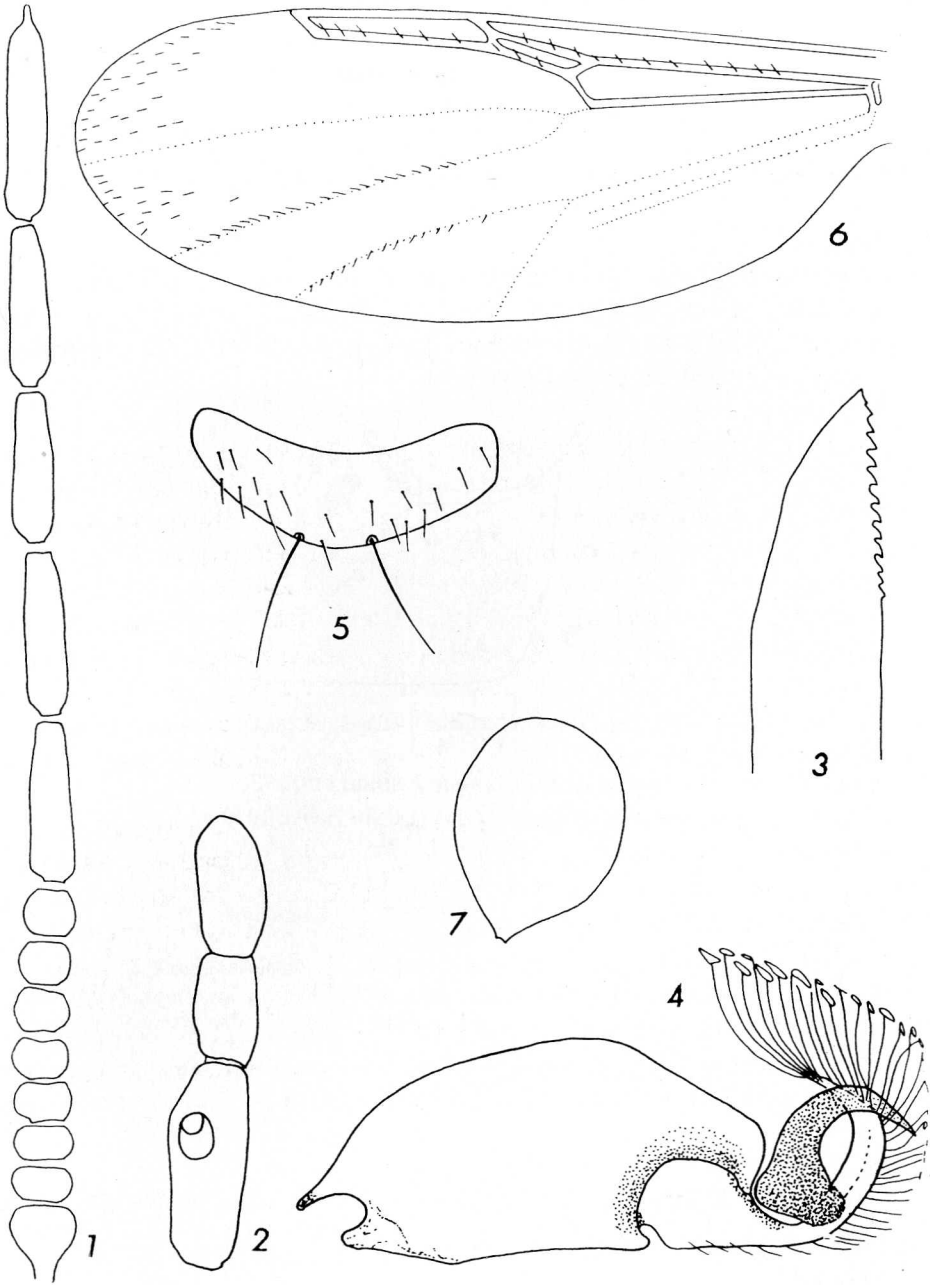
♂. Similar to female with the usual sexual differences. Eyes with a few hairs at inner middle. Flagellum 788-878 µm long, AR 0.80-0.87; flagellomere 10 long, flagellomeres 2-8 fused (Fig. 8). Third palpal segment 60-68 µm long. TR(III) 2.4-2.7. Empodial hairs simple, claws with bifid apices. Wing length 1.31-1.42 mm, CR 0.64-0.66. Second radial cell 1.6-2.2 times longer than the first one. Wing membrane bare. Genitalia (Fig. 9). Sternite IX with deep u-shaped caudomedian excavation, at each side 3-4 long setae. Tergite IX short with rounded distal margin. Gonocoxite and gonostylus normal. Aedeagus broad with two apicolateral ear-shaped lobes and a moderately long, blunt, cone-shaped caudomedian plate. Caudomedian plate with point-like dark sclerotization at the centre. Basal arch moderately high.

Material examined

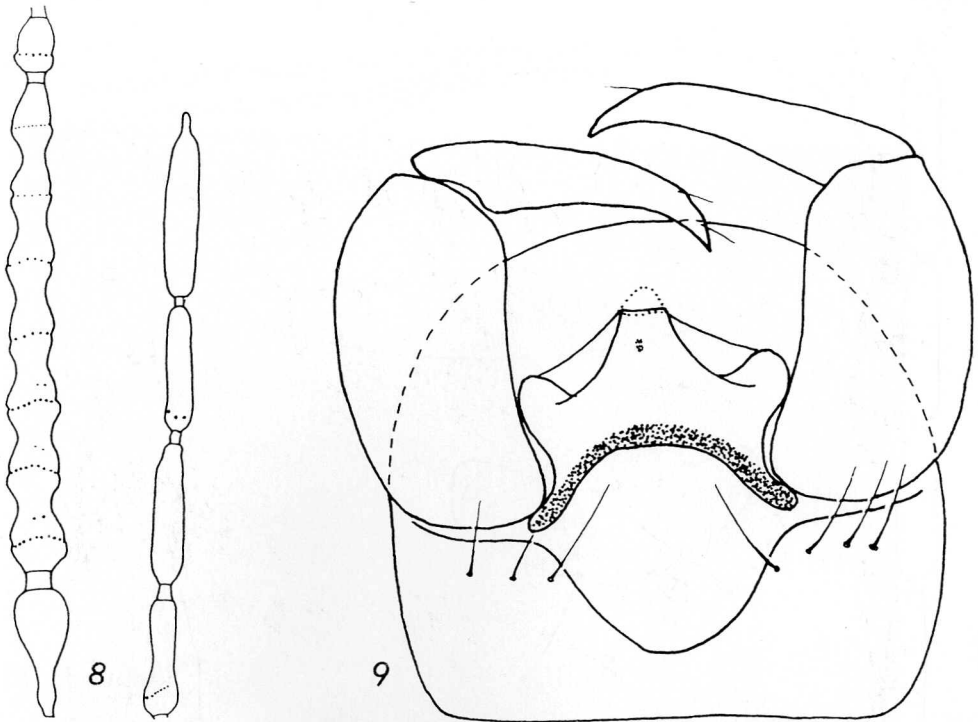
Denmark: Holotype ♀, Jutland, Klakket fra Stubberupvad, Himmerland, 1 May 1950, rearing no. XXXIX. Paratypes: same data as the holotype, rearing no. XXXVIII, 1 ♂ (allotype); rearing no. XXXI, 1 ♀ 1 ♂ (ZMK). Other specimens: XXVI, 1960, coll. A. Nielsen, 1 ♀; XI.b 1 ♂; L 21/5 47, 1 ♂. (ZMK).

Discussion

The species resembles *A. minutus* (MEIGEN) in having 2 long submedian setae on scutellum. However, the latter species is distinctly smaller, and the female has simple empodial hairs and teeth of mandible perpendicular to axis.



Figs. 1-7. *Atrichopogon (A.) alveolatus* NIELSEN, female. 1 - flagellum, 2 - distal 3 palpal segments, 3 - mandible, 4 - 5th tarsomere of fore leg, 5 - scutellum, 6 - wing, 7 - seminal capsule.



Figs. 8-9. *Atrichopogon (A.) alveolatus* NIELSEN, male. 8 - flagellum, 9 - ventral aspect of genitalia.

Subgenus *Psilokempia* ENDERLEIN, 1936
***Atrichopogon maculatus* (LUNDSTRÖM, 1910)**

Figs. 10 - 17

Ceratopogon minutus var. *maculatus* LUNDSTRÖM, 1910: 35 (♀, Finland-Kuustö).

Atrichopogon (Atrichopogon) maculatus: REMM, 1988: 89 (combination).

Atrichopogon (Psilokempia) avastensis REMM, 1959: 688 (♂, ♀, Estonia-Lavassaare nr. Parnu, Russia Petersburgskaja obl., Ukraine - Zakarpatskaja obl.); REMM, 1981: 30 (= *A. hamulatus*); REMM, 1988: 93 (Czechoslovakia, Estonia, Lithuania, Ukraine, Russia- Petersburgskaja obl., West Siberia, East Siberia, Far East); SZADZIEWSKI 1991: 106 (records from Poland). **Syn. n.**

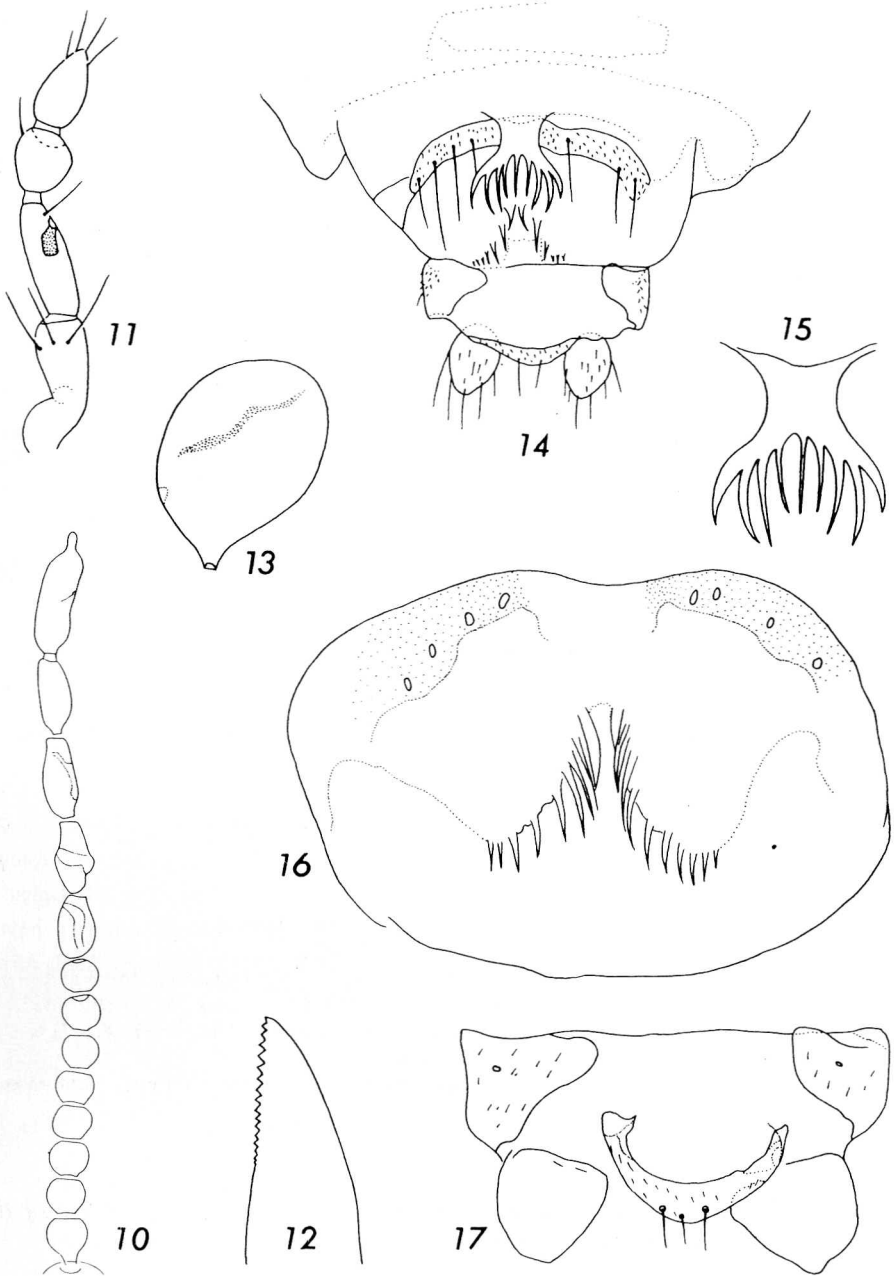
Atrichopogon (Psilokempia) hamulatus REMM, 1971: 197 (♂, ♀, Far East of Russia, Lefu river nr. (Tschernigov). **Syn. n.**

Diagnosis

Females characteristic in having caudomedian fork on abdominal sternite VII with 9-11 branches, and sternite VIII mostly membranous.

Description

♀. Body brown, scutum yellowish with 3 brown stripes, humerus, scutellum, halteres and legs yellowish. Eyes pubescent. Flagellum 580-608 µm long, AR 1.34-1.49. Proximal flagellomeres spherical (Fig. 10). Third palpal segment slender, length 60 µm, sensory pit located on distal half (Fig. 11). Proboscis short. Mandible with 17 small teeth (Fig. 12).



Figs. 10-17. *Atrichopogon (Psilokempia) maculatus* (LUNDSTRÖM), female. 10 - flagellum, 11 - palpus, 12 - mandible, 13 - seminal capsule, 14 - ventral aspect of genital segments, 15 - caudomedian fork of sternite VII, 16 - sternite VIII, 17 - segments IX and X.

Tibial spur of hind leg short. Tibial comb composed of 7-8 spines. TR(I) 2.4-2.8, TR(II) 2.5-2.7, TR(III) 2.3-2.6. Claws simple, empodial hairs simple. Wing length 1.09-1.17 mm, CR 0.62-0.66. Second radial cell 3 times longer than the first one. No macrotrichia on wing membrane; only 6-9 setae on radial veins. Scutellum pale with 2 submedian bristles and 4 short lateral setae. Seminal capsule single, small with short neck (Fig. 13); size 88-96 x 60-68 μm . Caudomedian fork of sternite VII with 9-11 branches (Figs. 14, 15). Sternite VIII mostly membranous, with some pale spines (Fig. 16). Sternite IX obsolete. Tergite X reduced (Fig. 17).

♂. Not available for the present study.

Material examined

Finland: Lectotype ♀, labelled: Kuustö, Lundström, *Ceratopogon minutus* var. *maculatus*. Paralectotypes: 3 ♀, same data (ZMH). Present designations.

Subgenus *Lophomyidium* CORDERO, 1929

Lophomyidium CORDERO, 1929: 94 (type-species *Lophomyidium uruguayense* CORDERO; WIRTH 1994: 19 (diagnosis, = *Rostropogon*).

Rostropogon REMM, 1979: 57 (type-species *Ceratopogon rostratus* WINNERTZ).

WIRTH (1994) revised Nearctic species of this subgenus which presently includes 9 valid species occurring in the Holarctic and Neotropical regions.

Key to the Palaearctic species of *Atrichopogon* subgenus *Lophomyidium*

1. Thoracic paratergite with single long bristle (Fig. 22). Length of larger seminal capsule less than 149 μm . Caudomedian projection of aedeagus weakly sclerotized, with narrow rooflet (Fig. 21) *A. fuscus* (COQUILLET) (Holarctic)
- Thoracic paratergite, in addition to single long bristle, with 1-6 distinct setae (Fig. 23). Length of larger seminal capsule higher than 180 μm . Caudomedian projection of aedeagus heavily sclerotized, with broad rooflet (Fig. 26) *A. rostratus* (WINNERTZ) (Europe, North Africa, Canary Isl.)

Atrichopogon fuscus (COQUILLET, 1901)

Figs. 18 - 22

Ceratopogon fuscus COQUILLET, 1901: 605 (♂, ♀, USA).

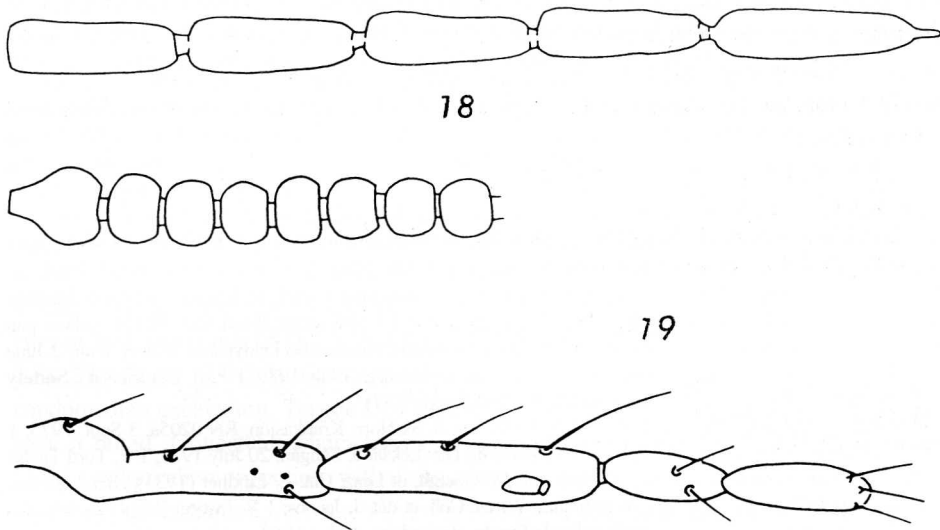
Atrichopogon fuscus: WIRTH 1994: 20 (all stages, Holarctic, = *A. polydactylus*).

Atrichopogon polydactylus NIELSEN, 1951: 27, 61, 74 (♂, ♀, larva, pupa, Denmark-Himmerland).

Diagnosis

Both sexes with long proboscis which at apex is bent backwards, paratergite of thorax bearing 1 long seta only, eyes bare, scutellum with 4 bristles, third palpal segment with sensory pit located well distad of midlength of segment. Females have 2 unequal seminal

capsules, relatively small, length of larger seminal capsule lower than 149 μm . Males with caudomedian prolongation of aedeagus weakly sclerotized and bearing relatively small rooflet.



Figs. 18-19. *Atrichopogon (Lophomyidium) fuscus* (COQUILLET), female (holotype of *A. polydactylus*). 18 - flagellum, 19 - palpus.

Description

♀. Body brown. Eyes bare. Proximal flagellomeres spherical (Fig. 18), AR 1.86 (1.69-2.23). Third palpal segment 131 (114-171) μm long; sensory pit located on distal half (Fig. 19). Proboscis very long, P/H 2.07 (1.90-2.21), tip curved backwards. Tibial comb composed of 8 spines. TR(I) 2.6 (2.5-2.9), TR(II) 2.7 (2.5-3.0), TR(III) 2.3 (2.2-2.4). Empodial hairs simple, claws with slightly forked apex. Scutellum with 2 lateral and 2 submedian bristles, and numerous short setae. Wing length 1.88 mm (1.67-2.07), CR 0.76 (0.72-0.80). Second radial cell about 3.5 times longer than the first one. Macrotrichia present in all marginal cells; number of macrotrichia in anal cell varies from 4 to 28. Two unequal seminal capsules present (Fig. 20). Length of larger seminal capsule 124 μm (109-149), of smaller one 106 μm (91-128).

♂. Similar to female with the usual sexual differences. Eyes bare. Proboscis long, at apex bent backwardly. Third palpal segment relatively slender 4.4 (4.1-5.0) times longer than greatest width. Sensory pit small, located at apex. Flagellomere X 2.0 (1.7-2.2) times shorter than flagellomere XI. Plume well developed. Thoracic paratergite bearing 1 long bristle. Scutellum with 4 long bristles and some short setae. Wing length 1.87 (1.81-1.97) mm, CR 0.70 (0.69-0.73). Wing membrane always bare. TR(I) 2.6 (2.5-2.8), TR(II) 2.6 (2.5-2.8), TR(III) 2.3 (2.1-2.4). Genitalia as in *A. rostratus* described below. Aedeagus with caudomedian projection weakly sclerotized, with relatively small rooflet (Fig. 21).

Material examined

Denmark: Types of *A. polydactylus*: Holotype ♀, Klakket fra Stubberupvad, Himmerland, rearing no. LV. Paratypes: ♀, same data, no. LIII, incomplete - only thorax and wings; ♂, allotype, same data, no. LIV, incomplete - only thorax with hind legs (ZMK).

Poland: **Southern** Baltic Coasts: Brzyno at Żarnowiec Lake, 2 June 1982, 1 ♀; 8 July 1980, 1 ♀, R. Szadziewski; Żarnowiec, 24 May 1988, 1 ♀, reared from mud, 5 July 1988, 1 ♀, reared from mud, B. Kubica (UG). **Eastern** Baltic Coasts: Krzewsk nr. Elbląg, 10 July 1983, 2 ♂, 2 ♀, at Družno Lake; Barciany nr. Kętrzyn, 12 July 1981, 2 ♂ at pond, R. Szadziewski; Wysok nr. Kętrzyn, 29 May 1993, 6 ♂, netting, J. Krzywiński. **Southern** Baltic Lakelands: Miastko, 27 July 1990, 1 ♂, on Apiaceae, A. Warzocha. **Eastern** Baltic Lakelands: Kunicha nr. Sztabin, 5-24 Aug. 1985, 23 ♂, 27 ♀, Apiaceae flowers; Sztabin, 5 Aug. 1985, 1 ♀, on *Pimpinella saxifraga*, 7 Aug. 1985, 1 ♀, on *Siium latifolium*, 17 Aug. 1985, 2 ♂, 1 ♀, on *Heracleum sibiricum*, J. Krzywiński; Silec nr. Kętrzyn, 7 Aug. 1979, 3 ♀ at lake; 15 July 1981, 1 ♀, at pond, R. Szadziewski; Olsztyn, 21 July 1991, 2 ♂, on Apiaceae, K. Podbielska. **Central** Lowlands: Puszcza Biała, 20 Oct. 1986, 1 ♀, forest sect. 34c, young pine forest, yellow pan trap; Modrzewina Res. nr. Warszawa, 3-10 Aug. 1982, 1 ♀, oak forest, yellow pan trap, IZPAN (UG); Spała n. Tomaszów Mazowiecki, 5 July 1981, 1 ♀, B. Soszyński (UG). **Podlasie:** Białowieża, 4 June 1981, 3 ♂, 3 ♀, at light; 4 June 1981, 1 ♂ sweeping in park, R. Szadziewski (UG). **Eastern** Małopolska Upland: Roztoczański Nat. Park, 17-31 Aug. 1987, 1 ♂ pine forest, forest sect. 38/155, yellow pan trap, IZPAN (UG). **Outer** West Carpathians: Pogórze Przemyskie, Nowosiółki Dydyńskie, at river Wiar, 2 June 1993, 1 ♀, J. Krzywiński. **Carpathians:** Babia Góra, Zawoja-Czatoża, 3 July 1989, 1 ♀, R. Szadziewski. **Sudety** Mts.: Sosnówka 1 Aug. 1982, 1 ♂, on Apiaceae, R. Szadziewski (UG).

Sweden: Nö, Råneå, Rörbäck, 2042, 7 July 1972, 1 ♂; S. Sk.Norr. Krankasjön, RN 0205a, 3 Sept. 1975, 1 ♀; Sk. Kullaberg, 2429, 4 Aug. 1982, 1 ♂, H. Andersson; Dir. Leksand, Sångån, 20 July 1973, 1 ♀, Tord Tjeder (ZML). **Belgium:** Locality unknown, labelled: sec. M. Goetgh. et Lenz, Cat. E. Lindner (1933), *Atrichopogon* (s. str.) *rostratus* WINN., *Ceratopogon rostratus* WINN. Coll. et dét. J. Jacobs, 1 ♀; Institut Royal des Sciences Naturelles de Belgique, Bruxelles. **Switzerland:** Strada, decombres, frides 1050m, 17 Aug. 1982, 1 ♀, J. P. Haenni (UG). **Bulgaria:** Dolni Pasarevo nr. Sofia, 6 June 1984, 1 ♀, W. Krzemiński (UG). **Spain:** Jean Sierra de Cazonia, 8 km SW Blanquillo (Mt.) Amb. Aquaderondo 1000 m, bord ruisseau St. 17, 29 Sept. 1989, 1 ♀, C. Dufour, J.P. Haenni (UG). **USA:** Garrett Co. Md., Cranesville Swamp, 6 May 1960, 1 ♂, 1 ♀; Bedford, Mass., swept, swamp, 21 July 1961, 1 ♂, 1 ♀, W. W. Wirth; Alexandria, Va, Dyke Marsh, 11 June 1952, 1 ♂, 1 ♀, W. W. Wirth.

Distribution

North America, Central and South America to Brazil and Bolivia (WIRTH 1994). In Palaearctic recorded from Japan (WIRTH 1994), Turkey (WIRTH 1994), Bulgaria, Spain, Switzerland, Belgium (WIRTH 1994, present records), Great Britain (WIRTH 1994), Sweden, Denmark, Poland (WIRTH 1994, present records).

Atrichopogon rostratus (WINNERTZ, 1852)

Figs. 23 - 26, 27 - 28

Ceratopogon rostratus WINNERTZ, 1852: 31 (♀, ♂, Krefeld, Germany).

Atrichopogon putredinis KIEFFER, 1922: 233 (Schleswig-Holstein, Germany).

Diagnosis

Both sexes with thoracic paratergite bearing 1-6 setae in addition to single strong bristle. Females with 2 large unequal seminal capsules, length of larger one exceeding 180 µm. Aedeagus with heavily sclerotized caudomedian projection bearing broad rooflet.

Description

♀. Body brown or dark brown. Eyes bare. Antennal ratio 1.90 (1.72-2.23). Proboscis

long with apex bent backwards. P/H index 1.90 (1.77-2.22). Third palpal segment 121 (103-137) μm long, relatively short, 3.8 (3.2-4.2) times longer than greatest width, sensory pit located at apex. Thoracic paratergite with 2-6 long setae in addition to a single bristle (Fig. 23). Scutellum brown to yellow, bearing 4 marginal bristles and some short setae. Wing length 1.73 (1.58-1.89) mm, CR 0.75 (0.72-0.85). Wing membrane with macrotrichia usually in all marginal cells (Fig. 27); anal cell with 0-13 macrotrichia. TR(I) 2.4 (2.3-2.6), TR(II) 2.4 (2.3-2.5), TR(III) 2.2 (2.1-2.4). Two heavily sclerotized unequal seminal capsules present (Fig. 24). Length of larger seminal capsule 191 (180-209) μm , of smaller one 173 (154-200) μm .

♂. Similar to female but usually darker. Flagellomere X 1.8-2.1 times shorter than flagellomere XI. Third palpal segment relatively short, 3.6 (3.1-4.3) times as long as greatest width. Thoracic paratergite bearing 1-4 setae in addition to a single bristle. Scutellum with 4 long bristles. Wing length 1.68 (1.58-1.81) mm, CR 0.68 (0.66-0.69). Wing membrane bare or with some macrotrichia in cell r4+5 (Fig. 28). TR(I) 2.4 (2.3-2.4), TR(II) 2.3 (2.2-2.3), TR(III) 2.1 (2.0-2.2). Genitalia (Figs. 25-26). Sternite IX with more or less shallow caudomedian excavation. Tergite IX with evenly rounded apex. Gonocoxite 2.0-2.7 times as long as broad. Gonostylus characteristic of the subgenus. Aedeagus with well sclerotized broad caudomedian projection, with distinct broad rooflet.

Material examined

Neotype ♀, Poland, Kunicha near Sztabin, Apiaceae flowers, 5-24 Aug. 1985, J. Krzywiński (UG).

Other specimens:

Poland: Southern Baltic Coasts: Gdańsk, 19 Aug. 1979, 1 ♀ at light, R. Szadziewski. Eastern Baltic Coasts: Barciany nr. Kętrzyn, 11 July 1981, 1 ♀ at light; Łęknica nr. Kętrzyn, 16 July 1981, 1 ♀, sweeping at forest, R. Szadziewski (UG). Southern Baltic Lakelands: Inowrocław-Małtwy, 4 Aug. 1973, 1 ♀, saline wet meadow; Aleksandrów Kujawski, 4 Aug. 1974, 1 ♂, 1 ♀, saline wet meadow, R. Szadziewski (UG). Eastern Baltic Lakelands: Kunicha n. Sztabin, 5-24 Aug. 1985, 13 ♂, 11 ♀, Apiaceae flowers; 7 Aug. 1992, 2 ♂ at light; Sztabin, 9 Aug. 1985, 1 ♂, 1 ♀, on *Angelica silvestris*, 5 Aug. 1985, 1 ♂, on *Pimpinella saxifraga*, J. Krzywiński; Poszeszupie nr. Suwałki, 3 July 1993, 1 ♂, on *Chaerophyllum aromaticum* flowers in a ravine along stream, J. Krzywiński; Silec distr. Kętrzyn, 2-14 Aug. 79, 1 ♀, at light; 1 Aug. 1979, 1 ♀, at light; 1 Aug. 1979, 2 ♂, garden; 7 Aug. 1979, 4 ♀, at lake; 5 July 1981, 1 ♀, deciduous forest; Solanka, nr. Kętrzyn, 15 Aug. 1980, 1 ♂, on Apiaceae near lake, R. Szadziewski (UG). Central Lowlands: Warszawa, 28 July to 2 Aug. 1977, 1 ♀ deciduous forest, yellow pan trap, IZPAN (UG).

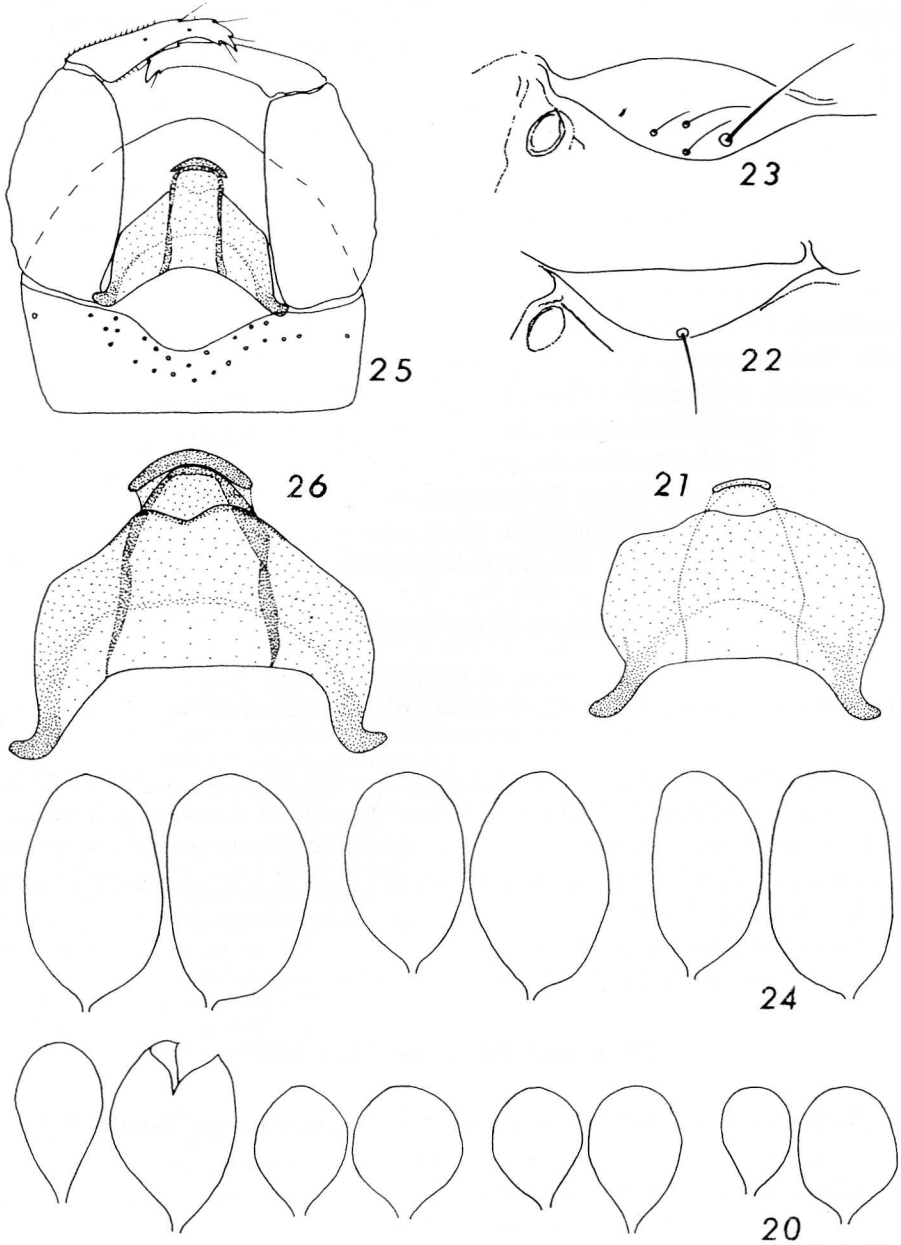
Canary Islands: La Palma, La Caidera, 7 Aug., 3047, R. Frey - 1 ♀; La Palma, Los Lianos, R. Frey, 1 ♀; Gomera Hermigua, R. Frey, 4731, 1 ♀. (ZMH). Determined by R. STORÅ as *A. rostratus*. **Algeria:** Kabylie: Souk El Tenine, 14 April 1981, 1 ♂; Aokas nr. Bejaja, 6 May 1981, 2 ♂, 2 ♀; Tichi nr. Bejaja, 8 May 1981, 1 ♀; Akbou, 12 May 1981, 2 ♀; Tazmalt, 14 May 1981, 1 ♀, steppean hill, R. Szadziewski (UG).

Distribution

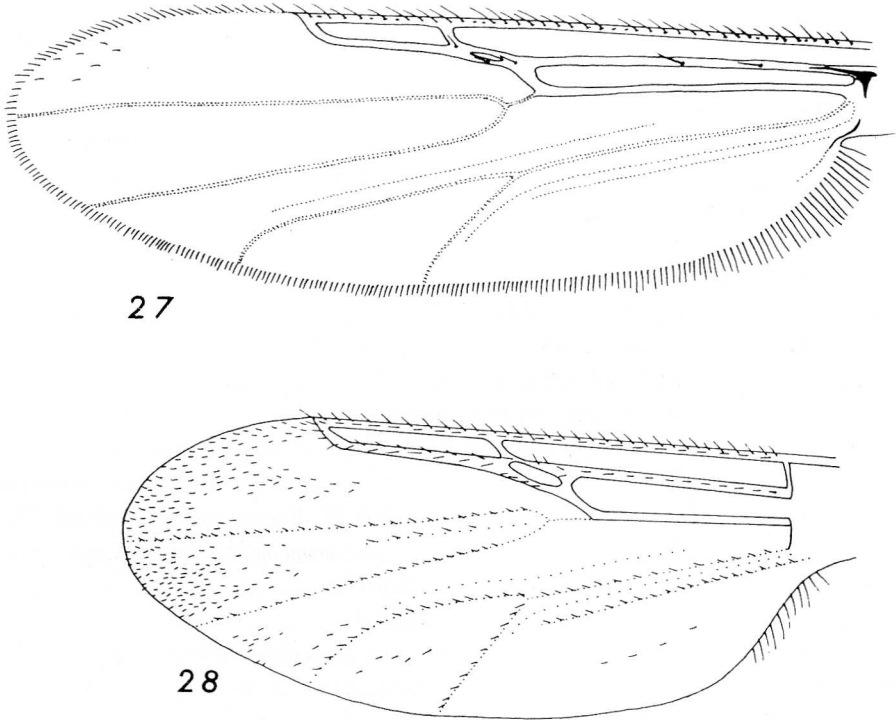
West Palaearctic species recorded from the Canary Islands, Algeria, Macedonia (WIRTH 1994), Poland (WIRTH 1994, present records). In Poland less common than *A. fuscus*, absent in mountains.

Discussion

Atrichopogon rostratus with an elongate proboscis was for many years the only known species of this group in Europe. In 1951 NIELSEN described *Atrichopogon polydactylus*, the second European species of the group. However, NIELSEN did not indicate how to separate it from *A. rostratus*. As a result the latter species was not determined by European entomolo-



Figs. 20-26. *Atrichopogon (Lophomyidium) fuscus* (COQUILLET) (20-22), and *A. (L.) rostratus* (WINNERTZ)(23- 26). 20, 24 - seminal capsules; 21, 25 - aedeagus; 22, 23 - paratergite, 25 - male genitalia.



Figs. 27-28. *Atrichopogon (Lophomyidium) rostratus* (WINNERTZ). 27 - male wing, 28 - female wing.

gists. We suspected the presence of two species among Palaearctic specimens with long proboscis are two species and tried to separate them for some years without positive results. Finally we discovered a difference in the number of setae on the thoracic paratergite which was an excellent character for diagnostic purposes. Our results in separation of both species were used by WIRTH (1994).

At present old faunistic records of *A. rostratus* in the Palaearctic region are worthless, and may only indicate the range of the distribution of the subgenus.

Subgenus *Psammopogon* REMM, 1979

Key to the West Palaearctic species of *Atrichopogon* subgenus *Psammopogon*

Males

1. Tergite IX with evenly rounded caudal margin 2
- Tergite IX with apicolateral, median or submedian processes 5
2. Gonostylus stout, with broad, blunt and simple apex 3
- Gonostylus slender, with pointed bilobed apex 4
3. Aedeagus long, with broad, rounded distal portion. Submedian sclerotizations very short, fused, at the level of basal arch *A. petrosus* REMM, 1980 (Kirghizia)

- Aedeagus short. Submedian sclerotizations longer than lateral portions, each apex with some lateral portions, each apex with some lateral teeth *A. edentatus* REMM, 1972 (Kazakhstan, Kirghizia, Tajikistan)
- 4. Aedeagus short and broad. Sternite IX with slender pointed caudomedian process bearing few long setae..... *A. flaveolus* Z.-S., 1936 (Hungary, Poland, Slovakia, Austria?, Switzerland, Caucasus)
- Aedeagus long, slender. Sternite IX with square-shaped caudomedian plate covered with many long setae *A. albicapula* KIEFFER, 1918 (Algeria, Tunisia)
- 5. Gonostylus with greatly expanded apex, hammer-shaped. Tergite IX with single blunt apicomedian process *A. luteicollis* (BECKER, 1902) (Africa, incl. Egypt and Algeria)
- Gonostylus with slender apex. Tergite IX with a pair of apical processes 6
- 6. Tergite IX with 2 close apicosubmedian processes 7
- Tergite IX with 2 widely separated apicolateral processes 8
- 7. Aedeagus long. Apicosubmedian processes of tergite IX directed caudally, broad and blunt. Tip of aedeagus with 3 teeth *A. hispaniae* HAVELKA, 1979 (Spain)
- Aedeagus short. Apicosubmedian processes of tergite IX directed ventrally, pointed. Tip of aedeagus simple *A. montium* STORÅ, 1936 (Canary Islands)
- 8. Apicolateral processes of tergite IX, triangular and pointed 9
- Apicolateral processes of tergite IX blunt, evenly rounded 12
- 9. Gonostylus unusually large, as broad but longer than gonocoxite. Aedeagus long and slender *A. bai* REMM, 1980 (Turkmenia)
- Gonostylus more or less slender. Aedeagus broad 10
- 10. Aedeagus large, with broad evenly rounded distal portion ... *A. nemestrinus* (SANTOS ABREU, 1918) (Canary Islands)
- Aedeagus smaller, with slender distal portion 11
- 11. Aedeagus with long submedian sclerites. Sternite IX with broad caudomedian excavation. Gonostylus slender, long *A. alaimus* REMM, 1980 (Kirghizia)
- Aedeagus with very short apicomedian pointed prolongation. Sternite IX with very narrow U-shaped caudomedian excavation. Gonostylus broad, short..... *A. bulla* REMM, 1980 (Turkmenia)
- 12. Apicolateral processes of tergite IX smooth. Tip of submedian aedeagal sclerite with numerous small lateral teeth.....*A. muelleri* (KIEFFER, 1905)(Germany, France, Poland Denmark, Sweden, Estonia, Caucasus)
- Apicolateral processes of tergite IX covered with tubercles, each of them with apical seta. Tip of submedian aedeagal sclerite with 1 or few distinct lateral teeth 13
- 13. Aedeagus as long as broad. Sternite IX with broad and short caudomedian plate covered with 3-4 rows of long setae *A. flavolineatus* (STROBL, 1880)(Austria, Bulgaria)
- Aedeagus much longer than broad. Sternite IX with narrow, long caudomedian plate covered with many rows of long setae.....*A. latipygus* VAILLANT, 1957 (Algeria, France, Spain)

Females

- 1. Two seminal capsules with long neck *A. luteicollis*, *A. bulla*
- One seminal capsule without neck other species

Note. Species described by SANTOS ABREU (1918) from the Canary Islands as varieties of *A. nemestrinus* (*albipedes*, *distinctus*, *flavicans*, *flavihalteratus*, and *fulviventris*) which probably are conspecific with *A. nemestrinus* are not included in the key. Types of these species will be revised by BORKENT (personal comm.). *Ceratopogon flavoscutellatus* BECKER from the Canary Islands (preoccupied by *Ceratopogon flavoscutellatus* ZETTERSTEDT) was synonymized by SANTOS ABREU (1918) with *A. nemestrinus*. However, the type materials were not studied and in future an examination of the types may show that it is conspecific with another member of the subgenus. *A. callipotami* MACFIE described from Egypt (only female) is not included in the key either.

Atrichopogon flaveolus ZILAHİ-SEBESS, 1936

Figs. 29 - 32

Atrichopogon (Kempia) flaveolus ZILAHİ-SEBESS, 1936: 201 [204] (♂, ♀, Hungary-at Balaton: Révfülöp, Tihany); ZILAHİ-SEBESS 1940: 37 (in key, redescription, fig. male genitalia).

Atrichopogon (Psammopogon) flaveolus: REMM 1988: 91 (subgeneric position, Hungary, Switzerland).

Atrichopogon albiscapula of authors, misidentified: REMM 1967: 9 (fig. male genitalia, Caucasus; REMM 1973: 355 (records from Hungary, and Slovakia - Tatra Mts).

Diagnosis

Males are characteristic in having tergite IX simple, without processes; sternite IX with slender, pointed caudomedian process bearing some setae; and slender tip of gonostylus ending with 2 teeth.

Description

♀. Paratergite with 1 bristle and 3 setae. Scutellum with 4 bristles and some smaller setae. Wing length 1.79 mm, CR 0.71. Seminal capsule 192 x 160 µm.

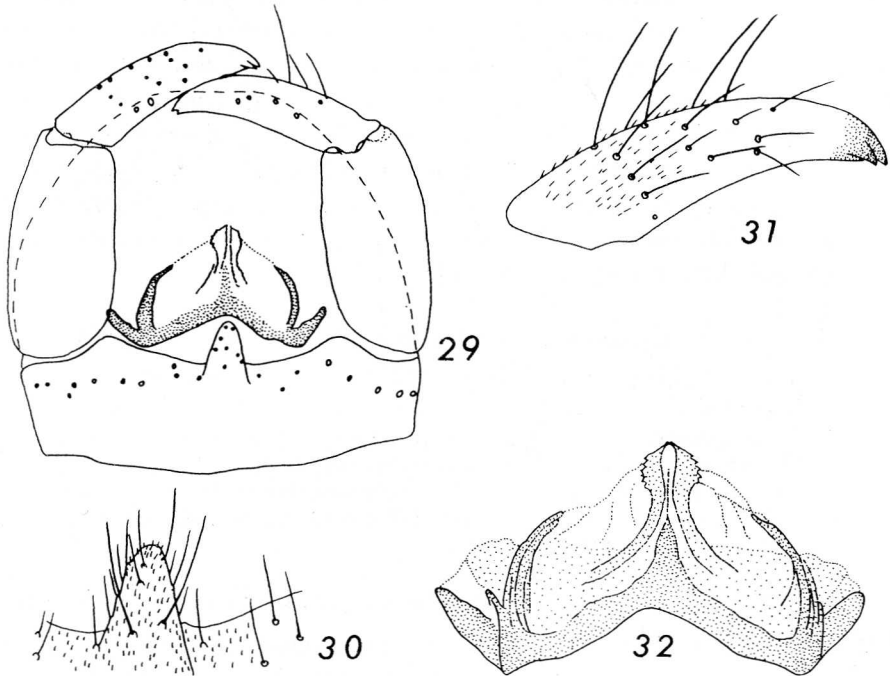
♂. Colour as in other species of the subgenus. Flagellum brown except for yellow base of 1st flagellomere. Plume developed on 2-5 flagellomeres. Face yellow incl. scape and pedicel. Proximal half of palpus yellow, distal half brownish. Third palpal segment slender, length 88-92 µm, palpal ratio 3.1-3.8. Scutellum with 4 strong bristles and some long setae. Paratergite with 1 bristle and 3-4 setae. Wing length 1.58-1.71 mm, CR 0.64-0.69. Wing membrane with macrotrichia in all marginal cells except for cubital or cubital and anal cells. TR(I) 2.1, TR(II) 2.0-2.1, TR(III) 2.0-2.2. Abdomen with dorsal surface dark. Genitalia brown, tip of gonostylus almost black. Genitalia (Figs. 29-32). Tergite IX with long, pointed caudomedian process bearing some long setae. Tergite IX with rounded simple apex. Gonocoxite normal. Gonostylus moderately long, tapering to pointed tip bearing 2 apical teeth. Aedeagus short and broad; caudosubmedian projections enlarged at apex, with small lateral teeth.

Material examined

Neotype ♂, Poland, Tatra Mts, Wąwóz Kraków, flowers of *Chaerophyllum*, 21 July 1993, J. Krzywiński.

Other materials:

Poland: 1 ♂, Pieniny Mts., Wąwóz Sobczański, 22 June 1988, 1 ♂, R. Szadziewski. **Bulgaria:** Rila Mts., Rilski Monastery, 22 June 1982, 1 ♂, W. Krzemiński. **France:** Alps nr. Geneva, Sixt Fer a' Cheval, about 1000 m, 1 ♂, 1 ♀, R. Szadziewski.



Figs. 29-32. *Atrichopogon (Psammopogon) flaveolus* ZILAHİ-SEBESS, male. 29 - ventral aspect of genitalia, 30 - caudomedian process of sternite IX, 31 - gonostylus, 32 - aedeagus.

Distribution

Hungary, Switzerland, Slovakia, Poland, Bulgaria, France.

Discussion

In 1940 ZILAHİ-SEBESS published a figure of male genitalia of *A. flaveolus* which was first described time in 1936 from Hungary. The species was ignored by REMM who in his papers used for it the name *A. albiscapula* originally described by KIEFFER from North Africa. SZADZIEWSKI (1986) redescribed the latter species from Algeria, designated a neotype, however he ascribed old records of *albiscapula* to that species. At present we found that these two species were different and old faunistic records without illustrations should be treated as doubtful. Females do not differ from females of many other species of the subgenus.

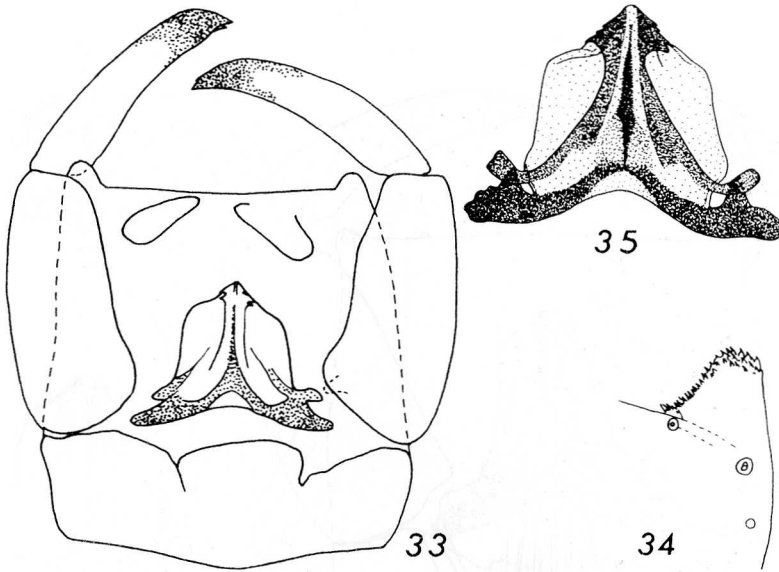
Atrichopogon flavolineatus (STROBL, 1880)

Figs. 33 - 35

Ceratopogon flavolineatus STROBL, 1880: 52 (♀, Austria-Seitenstetten).

Atrichopogon flavolineatus: ZILAHİ-SEBESS, 1940: 39 (combination, record from Hungary); SZADZIEWSKI 1986: 24 (♀, synonymy, distribution).

Atrichopogon trifasciatus KIEFFER, 1918: 90 (♂, ♀, Hungary, Turkey, Greece-Korfu?).



Figs. 33-35. *Atrichopogon (Psammopogon) flavolineatus* (STROBL), male. 33 - ventral aspect of genitalia, 34 - tip of tergite IX, 35 - aedeagus.

Diagnosis

Similar to *A. latipygus* and *A. muelleri* from which it may be distinguished by the following combination of male characters: apicolateral processes of tergite IX covered with tubercles, sternite IX with broad caudomedian plate covered with long setae, aedeagus short with some broad lateral teeth at apex of caudosubmedian sclerites (Figs. 33-35).

Material examined

Bulgaria: Pasarevo and Pončarevo nr. Sofia, 6, 7 June 1984, 2 ♂, W. Krzemiński.

Distribution

Austria, Hungary, Bulgaria. Other records are doubtful.

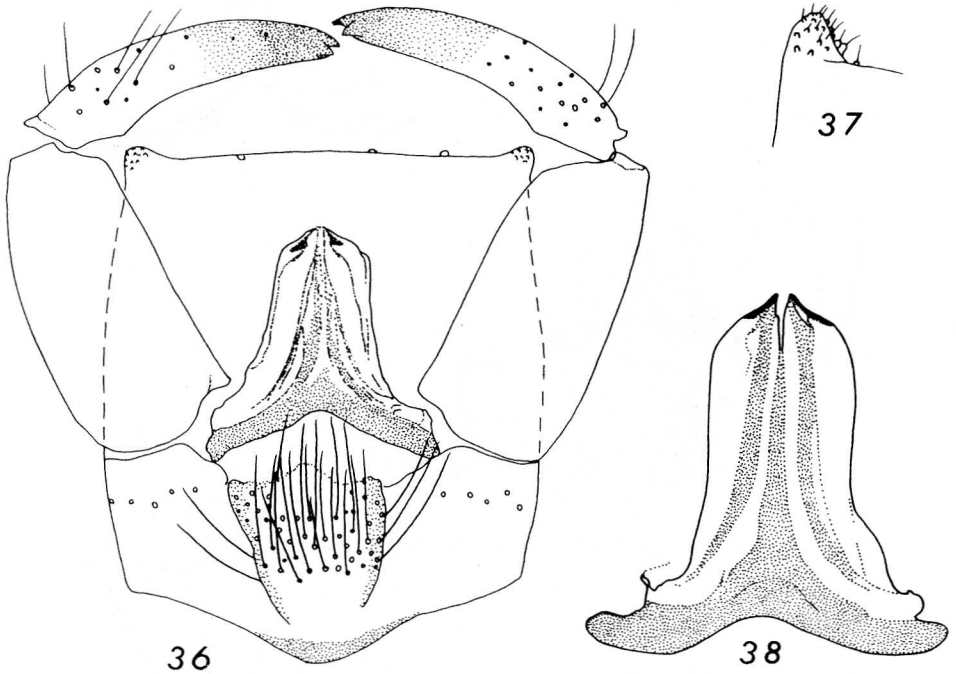
Atrichopogon latipygus VAILLANT, 1958

Figs. 36 - 38

Atrichopogon latipygus VAILLANT, 1958: 270 (♂, ♀, larva, Corsica-Bastia, Algeria-Mazafran, France-Alps); SZADZIEWSKI 1986: 26 (records from Algeria and Spain).

Diagnosis

Males are characteristic in having widely separated apicolateral processes of tergite IX covered with small tubercles, long slender aedeagus, and sternite IX with long, narrow caudomedian plate covered with many rows of long setae, apex of submedian sclerite of aedeagus with 1 lateral tooth (Figs. 36-38).



Figs. 36-38. *Atrichopogon (Psammopogon) latipygus* VAILLANT, male. 36 - ventral aspect of genitalia, 37 - apicolateral process of tergite IX, 38 - aedeagus.

Material examined

Spain: Reserva Nat. de Caza, 21 April 1984, 1 ♂, P. Sura (UG). Algeria: Bejaia, 10 May 1981, makia at sea, 1 ♂, R. Szadziewski (UG).

Distribution

France, Algeria, Spain.

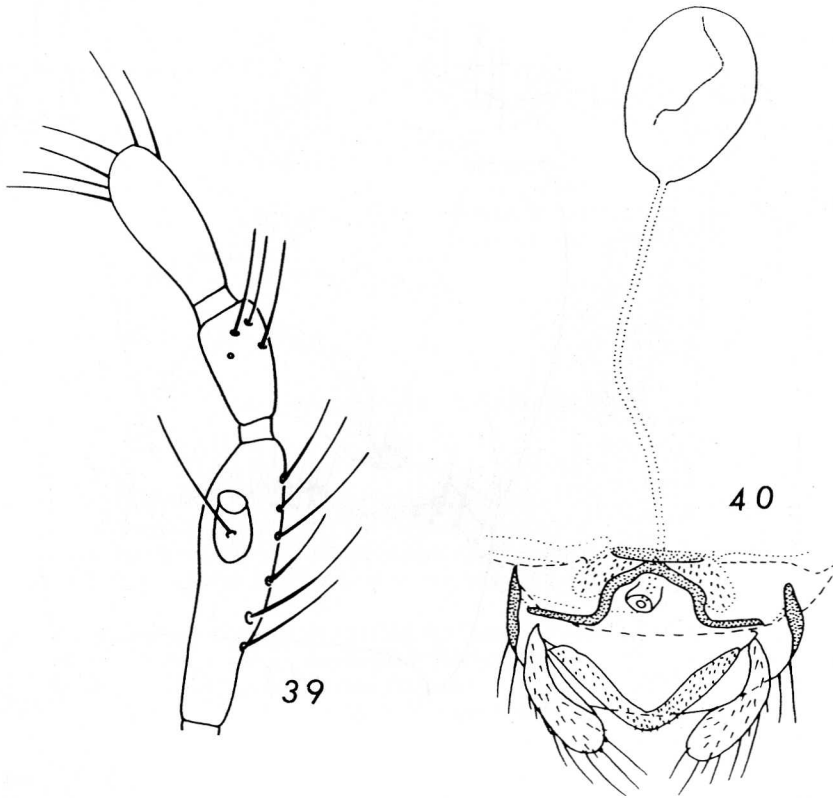
Atrichopogon montium STORÅ, 1936

Figs. 39 - 43

Atrichopogon montium STORÅ, 1936: 34 (♂, ♀, Canary Isl.-Los Lagunetas).

Diagnosis

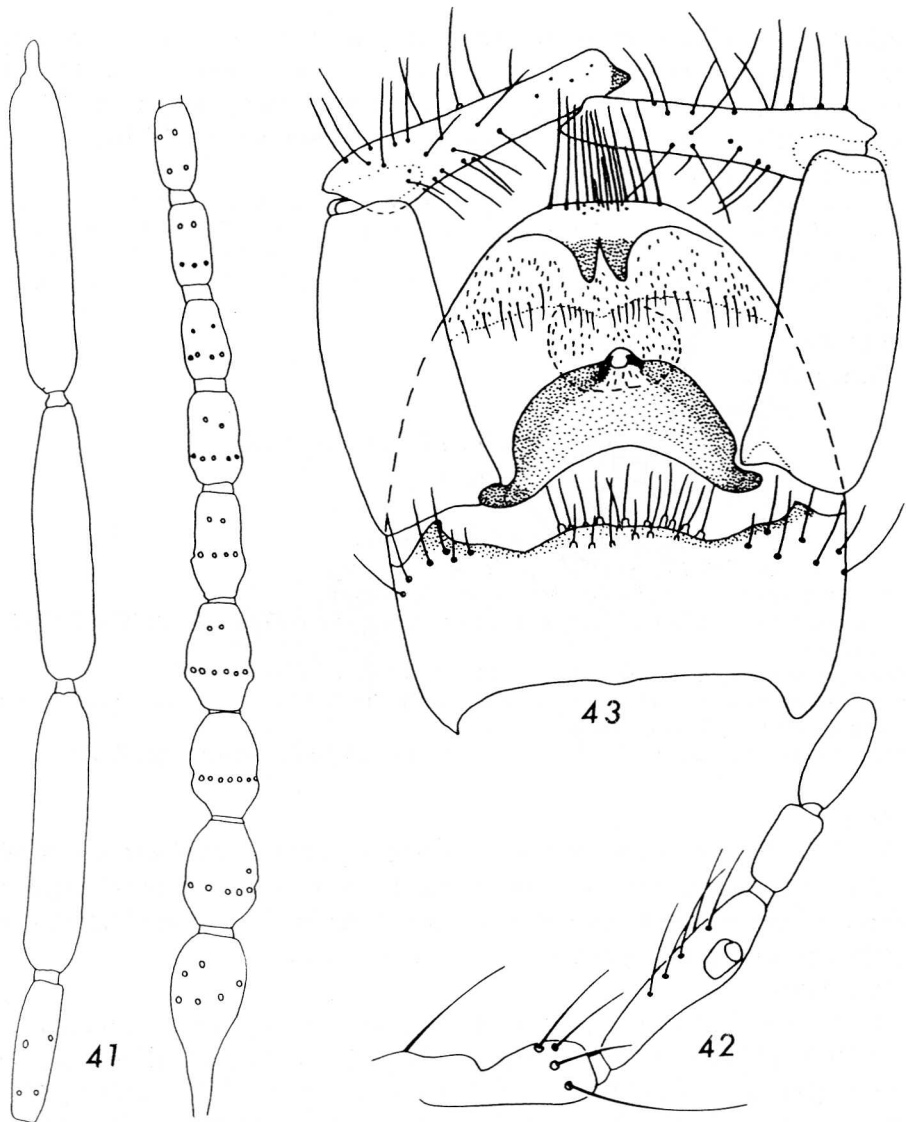
The species can be easily distinguished by the characteristic shape of tergite IX in male genitalia bearing 2 pointed long submedian processes curved ventrally, and by having stout, straight gonostyli with sharply pointed simple apex.



Figs. 39-40. *Atrichopogon (Psammopogon) montium* STORÅ, female. 39 - distal 3 palpal segments, 40 - genitalia.

Description

♀. Head brown; face, scapus, pedicel and proximal half of first flagellomere yellow. Scutum yellow with 3 brown stripes, scutellum yellow. Legs yellow, hind femur brown on apical third. Haltere yellow. Abdomen dark with ventral surface, tergite IX and cerci yellow. Eyes contiguous, bare. Flagellum length 870-960 μm , AR 1.70-1.84. Third palpal segment slender, length 100-112 μm , sensory pit located on distal half (Fig. 39). Mandible broad, armed with 23-25 teeth. Maxilla armed with 10 teeth. Scutellum bears 6 long bristles and few short setae. Hind tibial spur indistinct. Tibial comb composed of 10-11 spines. TR(I) 2.4, TR(II) 2.4, TR(III) 2.3-2.5. Claws with bifid apices, empodial hairs simple. Wing length 1.81-1.90 mm, CR 0.74. Second radial cell 3.7 times longer than the first one. Wing membrane covered with macrotrichia in all marginal cells. Seminal capsule single, symmetrical, size 136-148 x 96-104 μm . Sternite IX or subgenital plate well sclerotized into v-shaped structure separated from tergite IX (Fig. 40).



Figs. 41-43. *Atrichopogon (Psammopogon) montium* STORÅ, male. 41 - flagellum, 42 - palpus, 43 - ventral aspect of genitalia.

♂. Similar to female with usual sexual differences. Flagellum 1012 μm long, AR 1.08 (Fig. 41). Third palpal segment 100-112 μm long, sensory pit located on distal half (Fig. 42). Scutellum bears 6 long bristles and few short setae. Tibial comb composed of 11 spines. TR(I) 2.3, TR(II) 2.1-2.2, TR(III) 2.2. Wing length 1.90 mm, CR 0.70. Second radial cell 2.9-3.3 times longer than the first one. Macrotrichia at wing tip in cell r4+5 and m1 present. Genitalia (Fig. 43) yellow with dark gonostyli. Sternite IX short with almost straight caudal

margin; median portion somewhat evenly extended and covered with 2 rows of strong setae. Tergite IX greatly tapered into forked tip curved ventrally. Gonocoxite slender, long. Gonostylus long, stout, almost rectangular, with sharply pointed tip; on proximal 2/3 with long setae. Aedeagus short, almost evenly sclerotized, moon-shaped or ravioli like.

Material examined

Spain, Canary Islands, Gr. Canaria, Los Lagunetas: Lectotype ♂, 2361, R. Stora, Mus. Zool. H:fors, spec. typ. No. 4885; paralectotype ♀, 3700, R. Frey, Mus. Zool. H:fors, spec. typ. No. 4884. Present designation.

Not included into the type series: Gr. Canaria, Los Lagunetas, R. Frey: No. 2620, 1 ♀; No. 2591, 1 ♀; No. 2606, 1 ♂; No. 2584, 1 ♀; Gr. Canaria, Los Lagunetas, R. Stora, No. 1965, 1 ♂; No. 1937, 1 ♀; No. 1821, 1 ♀. (ZMH).

Distribution

Canary Islands.

Atrichopogon muelleri (KIEFFER, 1905)

Figs. 44 - 48

Ceratopogon mülleri KIEFFER, in MÜLLER, 1905 (larva, Thuringia).

Ceratopogon Mülleri KIEFFER, 1906: 336 (♂, ♀, Thuringia, Germany).

Forcipomyia muelleri: Rieth 1915: 435, 438 (larva, pupa, figs., Germany).

Atrichopogon Müller: KIEFFER 1925: 56 (combination, notes on larva); GOETGHEBUER 1934: 21 (in key, Germany).

Atrichopogon (Psammopogon) muelleri: REMM 1988: 92 (Germany, subgeneric position).

Atrichopogon trifasciatus of authors, misidentified: KIEFFER 1925: 52 (♂, ♀, northern France, fig. male genitalia); REMM 1967: 9 (fig. male genitalia, Caucasus).

Atrichopogon cornutus NIELSEN, 1951: 25, 53, 70 (♂, ♀, larva, pupa, Denmark-Himmerland). **Syn. n.**

Diagnosis

Tergite IX in male genitalia with long apicolateral processes void of tubercles, sternite IX with broad almost rectangular caudomedian plate covered with some rows of long setae; aedeagus as long as broad, apices of submedian sclerites with some small lateral teeth. Females with single seminal capsule without diagnostic features.

Description

♀. Colour as in other species of the subgenus. Length of flagellum about 0.9 mm, AR 1.93-2.00. Third palpal segment relatively slender, 98-112 μm long. Mandible armed with about 24 sharp teeth perpendicular to axis. Paratergite with some long setae. Scutellum yellow with 4 bristles and some long setae. Wing length 2.00-2.07 mm, CR 0.71-0.74. Macrotrichia in all marginal cells. TR(I) 2.0-2.2, TR(II) 2.0-2.1, TR(III) 2.2-2.3. Claws with bifid apices, empodium with simple hairs. Genitalia without special armature. Seminal capsule single, ovoid, measuring 236-292 x 160-176 μm.

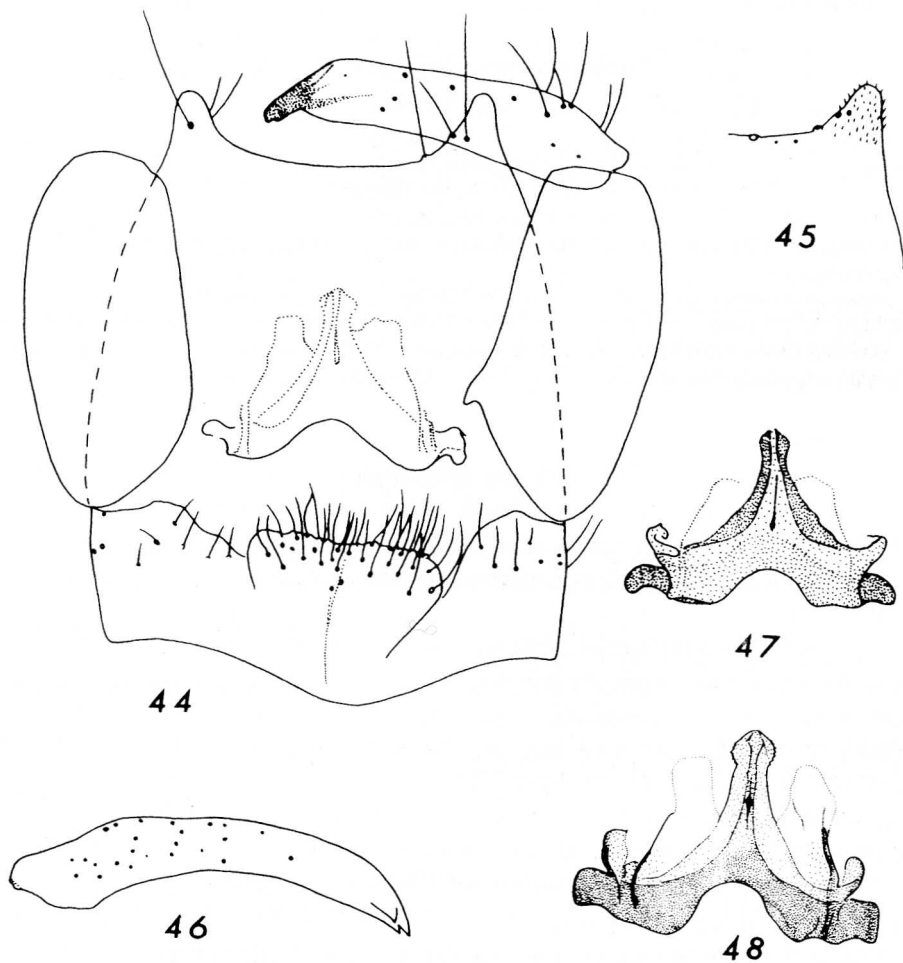
♂. Similar to female with the usual sexual differences. Flagellum 989-1030 μm long, AR 1.02-1.15. Third palpal segment slender, 92-98 μm long. Wing length 1.87-2.07 mm, CR 0.67-0.70. Wing membrane with macrotrichia at wing apex. Paratergite with some strong setae. TR(I) 2.0-2.2, TR(II) 1.9-2.1, TR(III) 2.0-2.3. Genitalia (Fig. 44). Sternite IX with broad caudomedian plate covered with 2-4 rows of long setae. Tergite IX with distinct, blunt smooth caudomedian processes (Fig. 45). Gonostylus long, slender, with 3 apical teeth

(Fig. 46). Aedeagus relatively broad and short, with apices of caudosubmedian projections bearing some small lateral teeth (Figs. 47, 48).

Material examined

Types: Holotype ♀ of *Atrichopogon cornutus* NIELSEN, Denmark, Jutland, Himmerland, Klakket fra Stubberupvad, rearing XI.A; paratypes of *Atrichopogon cornutus*, same data as the holotype, rearing No. XIV, 1 ♀ complete plus 2 pupae; rearing no. XVI, 1 ♂ without head and abdomen; rearing no. XX, 1 ♀ without head and distal end of abdomen (ZMK); Neotype ♂ of *Ceratopogon muelleri*, present designation, Tatra Mts., Poland, Zakopane-Huty, 850 m, 8 Aug. 1981, R. Szadziewski (UG).

Other specimens: **Sweden:** S. Sk.: Kullaberg, 8. Aug. 1975, 2 ♂ 1 ♀; 21 July 1977, 1 ♀; 22 Aug. 1983, 1 ♂, H. Andersson. Kullaberg, Ransviksbäcken, 18 June 1973, 1 ♀, H. Andersson; Forsakar, 9 July 1982, 1 ♀, Hugo Andersson. **Poland:** Babia Góra Mts., Zawoja-Markowa, about 700 m, 1 July 1989, 1 ♂, R. Szadziewski.



Figs. 44-48. *Atrichopogon (Psammopogon) muelleri* (KIEFFER), male. 44 - ventral aspect of genitalia, 45 - apex of tergite IX, 46 - gonostylus, 47, 48 - aedeagus.

Distribution

Europe: Denmark, Sweden, Poland, Germany, northern France, Caucasus.

Discussion

We can not decide if the male genitalia presented by ZILAHİ-SEBESS (1940) belong to *flavolineatus* or *muelleri*.

MÜLLER (1905) found and described larvae of this species from Germany under the name *mülleri*, while adults reared from that material were described a year later in 1906 by KIEFFER. No doubts *Ceratopogon muelleri* is a member of the subgenus *Psammopogon* with males which always have macrotrichia at wing tip, but it was misinterpreted by KIEFFER (1906), who stated in the description that the male had bare wing, and later he did not correct the mistake. In the original description of the male, the characteristic gonostylus with 3 apical teeth was figured. In 1918 KIEFFER described another species of the subgenus: *trifasciatus* from specimens collected in Hungary, Greece and Turkey but did not designate the holotype. Consequently, that name was in common use by students of adults in Europe. At present the situation becomes clear: 3 species with slender gonostylus ending with 3 teeth are present in Europe; in northern, western and central Europe there is only one, i.e. *A. muelleri*.

In southern and southeastern Europe there occur *A. latipygus*, *A. flavolineatus*, and *A. muelleri*. In 1986 SZADZIEWSKI placed *A. cornutus* amongst synonyms of *A. flavolineatus* together with *A. trifasciatus*. Now we treat it as a junior synonym of *A. muelleri*. Types of the latter species do not exist, so in order to stabilize the nomenclature of the species we designate a neotype from Poland.

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