European *Atrichopogon* of the *pavidus* group  
(Diptera: Ceratopogonidae)

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**ABSTRACT.** The European pollen feeding *Atrichopogon pavidus* (WINNERTZ) and *A. aethiops* (GOETGHIEBTER) are revised, interpreted and illustrated. *A. pollinivorus* DOWNES, 1955 is recognised as a junior synonym of *A. pavidus* (WINNERTZ, 1852).

**KEY WORDS:** Diptera, Ceratopogonidae, *Atrichopogon*.

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**INTRODUCTION**

Adults of *Atrichopogon* KIEFFER can be easily separated from related *Forcipomyia* MEIGEN by the thoracic paratergite bearing at least 1 seta (SZADZIEWSKI et al. 1995). They are common in all moist terrestrial habitats throughout the world including oceanic islands. The oldest fossils were reported from Eocene Baltic amber (SZADZIEWSKI 1988, 1996). The genus is a young group of Tertiary origin, which probably still is in the radiation stage of its evolution, which makes troubles in understanding the infraspecific variation and relationships between the species.

The species described below are included in the subgenus *Atrichopogon* s. str. that is the most difficult and neglected group within the genus. A key to subgenera is presented by SZADZIEWSKI et al. (1995). Species of the subgenus are very similar and the characters which can be used for their determination are limited and highly variable.

*Atrichopogon pavidus* was originally described from Germany in the genus *Ceratopogon* MEIGEN by WINNERTZ (1852). Both sexes were reared from bark of a rotting tree. Subsequently GOETGHIEBTER (1920) described a related species *A. aethiops* from Belgium. GOETGHIEBTER (l.c.) showed that they differed in the shape of male genitalia, colour of halteres, distribution of macrotrichia on wing membrane and in the female
antennae. Edwards (1926) reported both species from Britain and commented on *A. aethiops* "Very similar to *A. pavidus*, differing almost solely in the hypopygium...". Goetghebuer (1934) in a key used the colour of a halter (blackish brown in *A. aethiops*, white on apex in *A. pavidus*), male genitalia (tergite IX blunt in *A. pavidus* and pointed in *A. aethiops*), and distribution of macrotrichia on wing membrane (few in *A. aethiops*, numerous in *A. pavidus*). Downes (1955) described in detail pollen eating *A. pollinivorus* from Scotland. He noticed a considerable range of variation between forms associated with different flowers and concluded they are local populations of a species of sedentary habits. Remm (1961) in a key to the determination of *A. pavidus* and *A. aethiops* applied colour of halteres, proportions of female flagellomeres, shapes of female abdominal sternite VII and male tergite IX. In the Polish fauna Krzywiński (1987) recognized three species (*pavidus*, *aethiops* and *pollinivorus*) and presented diagnostic figures of male genitalia. Krzywiński (l.c.) stated that *A. pavidus* reported from Germany by Havelka & Caspers (1981) is *A. aethiops* and suggested that the male genitalia presented by Remm (1961) for *A. aethiops* belong to *A. pollinivorus*.

Present examination of *Atrichopogon* from different localities and collections shows that in Europe only two species can be distinguished and actually *A. pollinivorus* is synonymous with *A. pavidus*. I follow here the proposition by Downes (1955) to treat the species related to *pavidus* as a species group within the subgenus *Atrichopogon*.

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**MATERIALS**

The present study is based on specimens mounted on microscope slides from the following collections: Department of Invertebrate Zoology, University of Gdańsk, Museum and Institute of Zoology, PAS, Warsaw, University of Tartu, Institut Royal des Sciences Naturelles de Belgique, Bruxelles, and Musée d’histoire naturelle de Neuchâtel.

**DESCRIPTIONS**

*Atrichopogon Kieffer (subg. Atrichopogon)*

*pavidus* species group

**Diagnosis**

Differing from other *Atrichopogon* of the subgenus *Atrichopogon* in the following
combination of characters: thoracic paratergite usually with 2 setae, eyes hairy and macrotrichia on wing membrane usually present in both sexes, female distal flagellomeres (9-13) relatively short. Females feed on pollens.

**Species included**

*A. pavidus* and *A. aethiops*.

**Discussion**

Within the subgenus *Atrichopogon s. str.* the *pavidus* species group has more than one seta (usually 2) on the thoracic paratergite. However, that character state is not stable and sometimes left, right or both paratergites bear only one seta as in other species of the subgenus. Similarly sometimes the male wings have totally reduced macrotrichia.

*A. brevipalpalis* REMM from Eastern Palaearctic (the Kuril Islands) does not belong to the *pavidus* species group as suggested by REMM (1993) because the male has bare wings, and the paratergite bears only a single seta (present examination).

Feeding of females on pollens within *Atrichopogon* is not limited to the *pavidus* species group. The similar feeding habits exhibit all species of the subgenus *Psilokempia* Enderlein (De Meillon & Wirth 1989).

*Atrichopogon pavidus* (Winnertz, 1852)

*Ceratopogon pavidus* Winnertz, 1852: 33 (Germany, male, female, Fig. V 25 a,b wings of male and female, reared from larvae living under bark of a rotting tree).

*Kempia pavidula*: Goetghhebuer 1920: 34 (Belgium, Fig. male genitalia).

*Atrichopogon (Kempia) pavidus*: Edwards 1926: 399 (England, common, especially on honeysuckle flowers); Goetghhebuer 1934: 26 (Germany, Belgium, Netherlands, Austria, England, May-June).

*Atrichopogon* (s. str.) *pavidus*: REMM 1961: 927 (in a key, Estonia); REMM 1988: 89 (Central and North Europe, Lithuania, Estonia, European Russia, East Siberia, Georgia, Kirghizia); Krzywinski 1987: 795 (Poland, male genitalia); Knoz 1997: 83 (Czechia).

*Atrichopogon pollinivorus* Downes, 1955: 442 (male, female, Great Britain). **Syn. n.**

*Atrichopogon pollinivorus*: Krzywinski 1987: 794 (Poland, male).

**Diagnosis**

Wing length of male 1.24 mm (1.17-1.33), of female 1.24 mm (1.06-1.40), wing membrane at apex with macrotrichia in both sexes (rarely bare in male), halteres brownish, male flagellomere X shorter than flagellomere XI 1.4-1.6 times, AR 0.69-0.77 (Table), aedeagus strongly sclerotized along midline, tergite IX with broadly rounded, blunt or emarginate apex, female flagellomere VIII 1.5-1.6 times shorter than flagellomere IX.

**Description**

Male. Body almost black, dark brown to brown. Halteres more or less brownish in mounted specimens, in pinned apex of the knob pale. Eyes pubescent. Length of flagellum 680-810 μm, AR 0.69-0.77, flagellomere XI 1.4-1.6 times longer than flagellomere X (Fig.
Figs. 1-8. Female of *Atrichopogon pavidus* (1, 3, 5-8) and *A. aethiops* (2, 4). 1-2 - flagellum, 3-4 - palp, 5 - mandible, 6-8 - thoracic paratergite and anterior anepisternum.
16). Flagellomeres II-VIII usually or II-VII, II-VI something fused or even all flagellomeres separate. Third palpal segment 48-60 µm long. Wing length 1.24 mm (1.17-1.33), CR 0.59-0.64, macrotrichia present in cells R5 and M1, only in R5 (few along wing margin), or totally absent. Paratergite with 1-3 setae, usually 2 at least on left or right side, rarely 3. Prothoracic sternite trapezoid as in female, with expanded apicolateral corners. Anterior anepisternum B-shaped, the upper lobe large and blunt. Scutellum with 2 lateral and 2 submedian long marginal setae. Legs uniformly coloured, tarsi more pale, without diagnostic characters. Claws with bifid apices. Tarsal ratio (TR) of fore leg TR(I) 2.3-2.6, of mid leg 2.3-2.5, of hind leg 2.1-2.3 (Table).

Genitalia variable (Figs. 21-29). Sternite IX with broad caudomedian excavation which bears 9-13 long setae along margin in 1-2 irregular rows. Tergite IX 0.9-2.0 times of gonocoxite length; highly variable in length and shape; it is shorter, equal or longer than gonocoxite, extending well beyond gonocoxites (Figs. 24-26), reaching apices of gonocoxites (Fig. 22) or not (Fig. 21); apex broadly rounded (Figs. 21, 23, 29), blunt (Fig. 24) or even concave (Fig. 25). Gonocoxite (112-132 µm) usually longer than gonostyli (112-128 µm); aedeagus shield-shaped, with curved dorsally lateral and apical margins (Figs. 18, 19); basal arch strongly sclerotized, basal arms directed dorsally towards strong dorsal roots of gonocoxites (Fig. 20); central area of the aedeagus heavily sclerotized along midline (Fig. 19).

**Female.** Similar to male with the usual sexual differences. Eyes pubescent. Flagellum length 562-629µm, flagellomere IX longer than VIII 1.5-1.6 times (Fig. 1), AR 1.11-1.20. Third palpal segment 44-48 µm long, sensorial pit small, located on distal half; fourth palpal segment short (Fig. 3); fifth palpal segment with evenly pointed apex. Mandible with small teeth (Fig. 5), about 15, slightly growing in size to the apex. Wing length 1.24 mm (1.06 - 1.40), CR 0.66 - 0.69; macrotrichia present in cells R5, M1, sometimes in M2. Paratergite bearing usually 2 long setae at least on left or right paratergite, rarely 1 or 3 (Figs. 6-8). Prothoracic sternite trapezoid (Fig. 9). Empodial hairs simple. Abdominal sternites well sclerotized; sternite 7 narrow, with slightly concave caudal margin; sternite 8 fused with the tergite into a ring; a weakly sclerotized, concave caudal lobe cowers the subgenital plate (Fig. 14); subgenital plate not fused with tergite 9, weakly sclerotized, arch-shaped, basal sclerotization interrupted at middle; sternite 10 weakly sclerotized, cerci very short, in lateral view almost rectangular (Fig. 15); seminal capsule single, usually ovoid, with a short neck (Fig. 10), rarely elongated, pyriform (Figs. 11, 12), length 100-120 µm.

**Material examined**

**Belgium:** Destelbergen, 26 May 1936, 1 male, M. Goetghebuer, coll. R.I.Sc.N. B. (Bruxelles).

**Bulgaria:** Pirin Mts., Popina lake, 26 June 1982, 1 male, W. Krzemiński; Rila Mts., Skakavica, 1580 m, 20 July 1976, 1 female, R. Szadziewski.

**Switzerland:** Grangettes, Gros Brasset, 19 June 1992, 2 females.
Figs. 9-20. Female (9-14) and male (15-20) of *Atrichopogon pavidus* (9-12, 14-16, 18-20) and *A. aethiops* (13, 17). 9 - prothoracic sternite, 10-13 - seminal capsules, 14 - subgenital plate and abdominal sternites 7 and 8, 15 - lateral aspect of cercus, 16, 17 - distal flagellomeres, 18 - ventral aspect of aedeagus, 19 - dorsal aspect of aedeagus, 20 - top view of male genitalia.

Biology, distribution

Adults are common in May and June. Rarely collected in July and first decade of August. They are collected on various umbelliferous flowers (Apiaceae), Ribes, Iris, Caprifolium and Crataegus (Downes 1955, present data). Larvae terrestrial, found under bark of rottng tree (Winneertz 1852). Distributed probably throughout the whole Palaearctic region.

Discussion

Types of A. pavidus were probably destroyed in Bonn during the II World War. The species exhibits strange and unusual within the genus variability in the shape and length of tergite IX in the male genitalia (Figs. 21-29). Usually within the same sample and locality
tergites are more or less similar, long or short. Only in the Białowieża Primeval Forest (Figs. 21-25) males have tergites highly variable in shape and size. *A. pollinivorus* with genitalia as in Fig. 23 is recognized here as a junior synonym of *A. pavidus*. It is rather unlikely that *A. pavidus* is a species complex.

**Atrichopogon aethiops** (GOETGHEBUER, 1920)

*Kempia aethiops* GOETGHEBUER, 1920: 33 (male, female, Belgium).
*Atrichopogon* (*Kempia*) *aethiops*: EDWARDS 1926: 309 (Great Britain).
*Atrichopogon aethiops*: REMM 1988: 87 (Belgium, Great Britain, Estonia, Latvia);
KRZYWiŃSKI 1987: 795 (Poland, male genitalia).
*Atrichopogon pavidus*: HAVELKA & CASPERS 1981: 8 (Germany, misidentified).

**Diagnosis**
Smaller than *A. pavidus*, male wing 1.04 mm (0.95-1.13 mm) long (Table), female 1.04
mm, wing membrane always with macrotrichia at apex, and halteres dark brown, male
flagellomere X 1.8-2.2 times shorter than flagellomere XI, female flagellomere IX 1.3
times shorter than flagellomere X; aedeagus weakly sclerotized along midline, tergite IX
with triangular apex.

**Description**

**Male.** Eyes pubescent. Flagellum with flagellomeres II-VIII or II-VII fused, total length
584-656 μm, AR 0.83-0.93, flagellomere X 1.8-2.2 times shorter than flagellomere XI (Fig.
17). Third palpal segment with small sensory pit on distal half, length 40-45 μm, fourth
palpal segment short, almost spherical. Wing length 1.04 mm (0.95-1.13 mm), CR 0.58-
0.61, macrotrichia in cells R5 and M1 always present. Thoracic paratergite bearing 1-2
strong setae; usually 2 on left, right or both paratergites; only two specimens examined had
1 seta on both paratergites. Scutellum with 2 lateral and 2 submedian strong setae. Halter
dark brown with more pale (yellowish when dry) apex of the knob. In mounted specimens
in lateral view halteres dark brown or blackish brown. Claws with bifid apices. Tarsal ratio
(TR) of fore leg TR(I) 2.3-2.5, of mid leg (TR(II) 2.3-2.4, of hind leg TR(III) 2.1-2.2.

Genitalia as in Figs. 30-34. Sternite IX with deep caudomedian excavation, which bears
3-8 marginal setae in a row. Tergite IX elongate, longer than gonocoxite 1.7-1.9 times,
evidently triangular, gradually tapering to an evenly pointed apex, extending beyond the
gonocoxite, lateral and caudal margins curved ventrally. Cerci fused with lateral margins of
the tergite. Gonocoxite short (88-100 μm), 1.1-1.4 times shorter than gonostyly, dorsal
root of gonocoxite strong. Gonostyly evenly curved, without diagnostic features. Aedeagus
with heavily sclerotized basal arch, ventral surface of the central body weakly sclerotized
(Figs. 35-36).

**Female.** Similar to male with the usual sexual differences. Flagellum (Fig. 2) with distal
flagellomeres VIII-XIII growing in length, flagellomere IX only 1.3 times longer than VIII;
total length 484μm, AR 1.24. Palp as in Fig. 4, third palpal segment 44 μm long. Wing
length 1.04 mm, CR 0.67, macrotrichia present in cells R5 (36) and M1 (10). Paratergite
bearing 2 setae. Halter blackish brown. Scutellum with 2 lateral and 2 submedian strong
setae. Empodial hairs simple. Sternite VII and genitalia as in *A. pavidus*. Seminal capsule
ovoid (Fig. 13), length 96 μm.

**Material examined**


Other specimens


Biology, distribution

Adults collected in June and July. Reported from Belgium, Great Britain, Germany, Poland, Latvia and Estonia.

Discussion

Exact determination of the species is possible using unique shape of the male genitalia. Other supporting characters should be used with a caustion. A aethiops is smaller and its halteres are darker than in A. pavidus. The male AR is higher, and flagellomere XI is evidently longer than flagellomere X (Table). Females of A. aethiops cannot be separated from A. pavidus by the shape of abdominal sternite VII as proposed by previous authors. Also proportions of flagellomeres proposed in keys were only formal characters (GOETGHEBUEER 1934, REMM 1961).

Table. Numerical characters of males of the pavidus group.

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<th>A. pavidus</th>
<th>A. aethiops</th>
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<tr>
<td>wing length (mm)</td>
<td>1.24 (1.17-1.33)</td>
<td>1.04 (0.95-1.13)</td>
</tr>
<tr>
<td>CR</td>
<td>0.59-0.64</td>
<td>0.58-0.61</td>
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<tr>
<td>flagellum length (μm)</td>
<td>680-810</td>
<td>584-656</td>
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<tr>
<td>AR (10-13/1-9)</td>
<td>0.69-0.77</td>
<td>0.83-0.93</td>
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<tr>
<td>flagellomere XI/X</td>
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<td>1.8-2.0</td>
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<td>3rd palpal segment (μm)</td>
<td>48-60</td>
<td>40-45</td>
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<td>setae on thoracic paratergite</td>
<td>1-3</td>
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<td>tergite IX/gonocoxite</td>
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