Bulletin S.R.B.E./K.B.V.E., 146 (2010) : 110-115

Drapetis flavipes Macquart (Diptera, Hybotidae) new for the Belgian fauna, with a re-description of the species and a preliminary key to the West-European species of *Drapetis*

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Abstract

Drapetis flavipes Macquart, 1834 is reported for the first time in Belgium. A re-description of the species and illustrations of the male genitalia are given. A tentative key to the West-European species of *Drapetis* is provided.

Introduction

The genus *Drapetis* Meigen (or subgenus by authors) includes small, shining black, morphologically uniform species, which can be mostly found on tree trunks and leaves. These flies are difficult to collect by sweeping that is why they are quite rare in collections. However, they are rather common in samples taken with mass-trapping techniques, e.g. Malaise traps. Currently, 21 species of *Drapetis* were described from the Palaearctic Region.

Only six *Drapetis* species are known in Belgium and this is merely due to the fact that no recent revision of the complete Palaearctic fauna is available. KOVALEV (1972) published the most comprehensive key to *Drapetis* including 13 species. However, it covers only the European part of Russia and bordering territories. CHVÁLA'S key in the series Fauna Scandinavica is limited to 9 species (CHVÁLA, 1975).

Drapetis is perhaps the only genus in the family Hybotidae that still gives problems in identification and a number of new species for science are expected to occur in that genus (STARK unpublished data). KOVALEV (1972) was the first who drew attention to the diagnostic value of the shape of the abdominal sclerites and the sternites in particular. Also number and distribution of the so-called squamiform bristles on the tergites should be taken into consideration to obtain a correct identification. Further there are some valuable characters to be found on the mid legs of males, which have been neglected since COLLIN (1961). Our studies of thousands of specimens have shown, that these characters are the only possibility to identify large series of alcohol preserved *Drapetis*. Identification of pinned specimens will remain complicated in many cases. In fact a revision of the whole genus in Europe and North Africa is needed. Unfortunately this is a very long work that needs examination of the types of a large number of species actually put in synonymy. Moreover the types are spread over many collections in Europe and often only the female was described.

In the present paper *Drapetis flavipes* Macquart, 1834 is recorded for the first time in Belgium.

Drapetis flavipes is rare all over Europe and CHVÁLA & KOVALEV (1989) report this species in their Palaearctic Catalogue from France where the type locality is expected to be, further they quote Germany, Czecb Republic, Poland (with question mark), Latvia (with question mark) and the Ukraine (Transcarpathians). However ENGEL (1939) recorded *D. flavipes* before from Austria and Spain as well. COLLIN (1961) never found it in Great Britain. On the Fauna Europaea website, *D. flavipes* is now cited from Austria, Croatia, Czech Republic, France, Germany, Italy, Macedonia, Slovenia, Switzerland, Ukraine and even North Africa (http://www.faunaeur.org/distribution_table.php) (CHVÁLA, 2004).

KOVALEV (1972) included *D. flavipes* in his key but it has not been recorded yet from Russia. This species is not keyed in COLLIN (1961) and CHVÁLA (1975) although it has been described from the North of France (near Lille) and is likely to occur on the British Isles and in Scandinavia. Nevertheless both authors mention this species in comments to other species. *Drapetis flavipes* has a number of very distinctive characters that are hardly quoted in these comments (COLLIN, 1961; CHVÁLA, 1975) and therefore a re-description is needed. Unfortunately the type material of *D. flavipes* was not present in MACQUART's Collection in Paris (DAUGERON pers. comm.) and therefore we give here a re-description based on fresh material collected by Pol LIMBOURG in Luttre in the centre of Belgium. A few specimens were also present in the collection of J. VILLENEUVE and M. BEQUAERT at RBINS.

We suspect that COLLIN (1961) has seen the type material because he gives details in his book on British Empididae that are not mentioned in the very short original description given by MACQUART (1834). Especially the fact that veins R_{4+5} (cubital vein *sensu* COLLIN) and M_{1+2} (discal vein *sensu* COLLIN) are curving downward is a quite unique feature in *Drapetis*. ENGEL (1939) gives a description of *D. flavipes*, but we doubt that he has seen the type material. His description fits more or less to our specimens, but the drawing of the head (ENGEL, 1939: Textfig. 65) does not fit because on this drawing the palpus is pointed, the pedicel bears a long ventral bristle and there is only one pair of vertical bristles. The un-detailed drawing of the male genitalia is of no help in identification.

To enhance the study of the genus *Drapetis* we give a preliminary key to the European species that are expected to occur in Belgium. However for detailed descriptions and illustrations of the various species we still refer to COLLIN (1961), KOVALEV (1972) and CHVÁLA (1975).

Taxonomic account

Preliminary key to the western European *Drapetis* species

1. Upper crossvein (crossvein r-m) at or before middle of second basal cell (cell bm) 2
- Crossveins r-m and m-m closer together: upper crossvein beyond middle of second basal cell 7

2. Prothorax shining black, not dusted except above neck. Pedicel (second antennal segment) with one or two bristles beneath that are longer than the others 3
- Prothorax dusted greyish. Bristles beneath pedicel short, of equal length 6

3. Male hind femur with conspicuous posteroventral pale hairs. Prothoracic episterna without long pale bristle 4
- Male hind femur with shorter pale posteroventral hairs. Prothoracic episterna with a long pale upturned hair 5

4. Face and clypeus polished black. Legs blackish-brown to black, at most fore legs paler. Vein R_{4+5} curving downward before tip ..... *assimilis* Fallén
- Face and clypeus dull greyish. Legs yellowish to yellowish-brown, at most femora darkened above. Vein R_{4+5} diverging from M_{1+2} ..... *ingrica* Kovalev

5. Vein R_{4+5} almost straight, evenly diverging with vein M_{1+2}. Hind femur with pale posteroventral hairs shorter than femur is wide ..... *arcuata* Loew
- Vein R_{4+5} somewhat down curved before tip, but ending parallel with vein M_{1+2}. Hind femur with only minute posteroventral hairs ..... *simulans* Collin

6. Basal antennal segments black. Veins R_{4+5} and M_{1+2} converging towards tip. Terminal tarsomere of all legs darkened, more contrastingly on fore tarsus .... *convergens* Collin
- Basal antennal segments orange. Veins R4+5 and M_{1+2} running parallel throughout and both bending downward before tip; tarsi pale brownish, terminal tarsomere not darker than the others .. *flavipes* Macquart

7. Wing membrane clear. Pedicel with very short bristles beneath 8
- Wing membrane more or less darkened or anteriorly clouded. Pedicel with bristles beneath more than half as long as pedicel is long 10

8. Legs blackish even on fore tarsi. Vein M_{1+2} slightly undulating towards tip. Male: fore femur near tip with an anteroventral recurved bristle; mid femur anterodorsally with a series of deeply incised washboard-

like ribs ..... *pusilla* Loew

- Legs blackish, leaving fore tibiae and all tarsi yellowish. Male: fore femur without anteroventral recurved bristle; washboard-like ribs on mid femur lacking (present in *D. parilis* but here smoother than in *D. pusilla*) 9

9. Crossveins r-m and m-m closer together: distance between them 1.4 times length of lower crossvein. Male: right cercus only slightly longer than left cercus. Female: hind tibia with conspicuous long pale hairs behind ..... *exilis* Meigen

- Crossveins r-m and m-m wider apart: distance between them 1.5 times length of lower crossvein. Male: right cercus much longer than left cercus. Female: hind tibia without long outstanding hairs ..... *infitialis* Collin

10. Wing faintly darkened. Vein R_{4+5} distinct throughout its length ..... *parilis* Collin

- Wing anteriorly distinctly clouded. Tip of vein R_{4+5} very faint near tip .... *incompleta* Collin

Drapetis flavipes Macquart, 1834

Figs 1–8.

Drapetis flavipes Macquart, 1834: 357. Type locality: Lestrem, France.
Drapetis fascipes von Roser, 1840: 54 . Type locality: not given (Württemberg).
Drapetis exilis Meigen: Macquart, 1827: 88, plate 2, fig. 2 (wing) [= *D. flavipes*].
Misidentification.

Material examined:

Belgium: 1 male, Luttre, 3 June 2010; 1 female 18 June 2010 (leg. P. LIMBOURG; RBINS).
Italy: 1 male, Firenze, 4.10.1941, F. VENTURI (coll. M. BEQUAERT at RBINS);
France: 1 male, 1 female, Rambouillet, 16.08. 1915; 1 female, Hautil, 18.09 (coll. VILLENEUVE, RBINS).

Diagnosis: Postpedicel almost triangular, as long as wide, black; pedicel contrastingly orange, with circlet of pale short setulae. No pale upturned bristle on prothoracic episterna. Wing clear, veins brown, but apical half of R_1 black; R_{2+3} almost straight, hardly bending upward; R_{4+5} and M_{1+2} parallel, bending down before reaching costa. Distance between crossveins r-m and m-m almost equal to half the length of basal portion of vein M_{1+2}. Anal vein distinct for the whole length. Legs yellow with white fore coxae and posterior four coxae yellow. All femora and tibiae yellow, but apical half of hind femora sometimes brownish. All tarsomeres brownish. Mid femur with a single row of distinct black posteroventral bristles about one third of the width of femur. Hind femur thickened and twisted at base with pale bristles. Abdominal tergite 1 pale, following tergites black. Tergite 4 very long, tergite 5 very short. Halter white.

Male

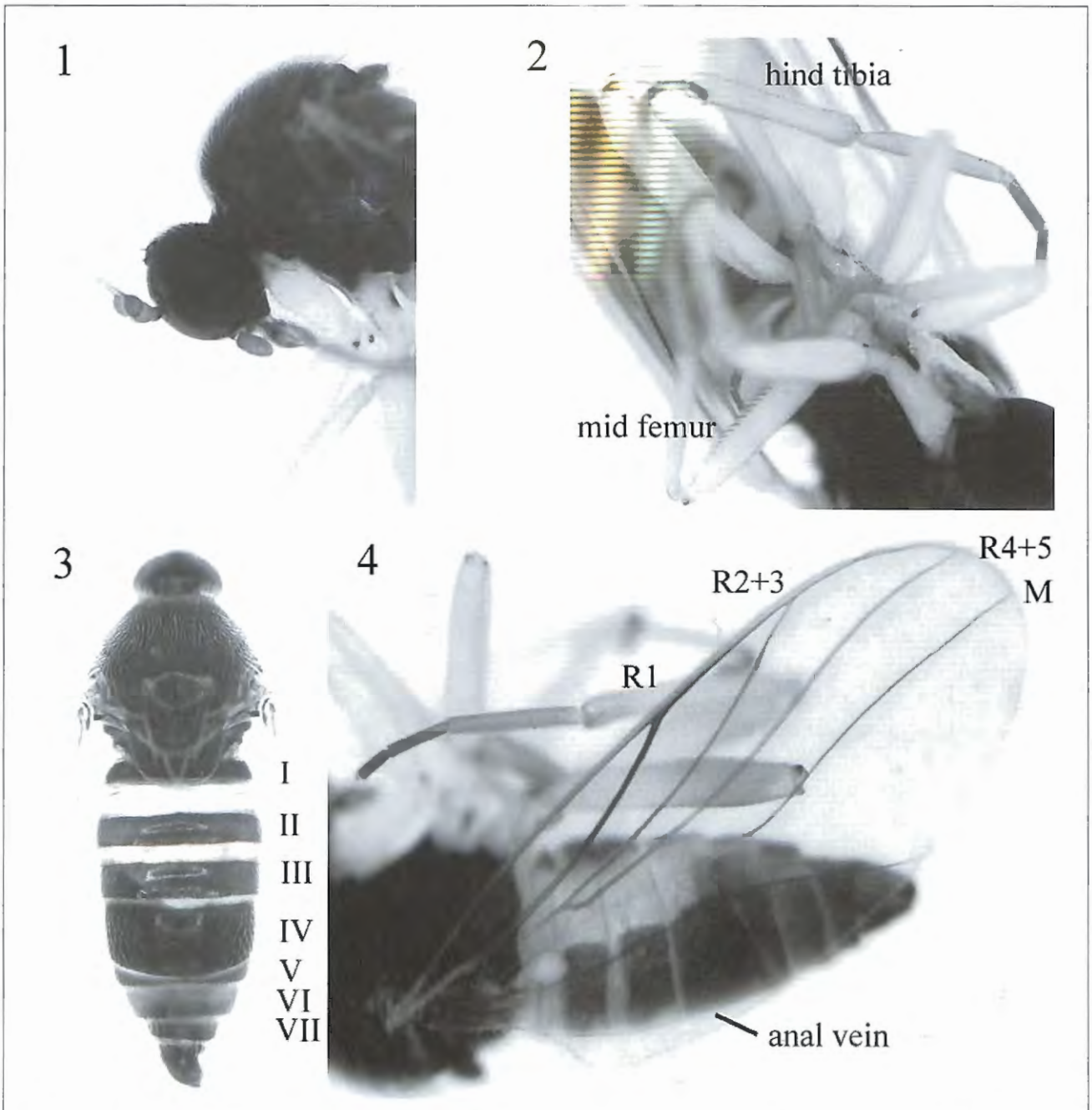
Body length: 2.9 mm; wing 3 mm.

Head. Black in ground-colour. Frons narrower than scape, dusted; face narrower than frons, almost linear. All hairs and bristles on head yellowish. Anterior ocellars longer than postpedicel, crossing; median ocellars nearly as long, diverging; a few tiny posterior ocellars. Two pairs of long vertical bristles. Occiput densely set with bristles, becoming longer below. Antenna (Fig. 1) with black postpedicel, orange yellow pedicel and scape (a little darker than pedicel); pedicel with a circlet of short yellowish hairs; postpedicel about as long as wide, triangular, with a long apical stylus which is about 3 times as long as antennal segments combined. Palpus ellipsoid, rather long, brown in ground-colour, with a long pale subterminal bristle. Proboscis brown.

Thorax mostly shining black, except for prothoracic episterna, upper part of mesopleuron, pteropleuron and metapleuron that are somewhat dusted and bear hairs; especially mesopleuron is densely set with short hairs. No turned up bristle on prothoracic episterna.

Mesonotum densely set with rather long yellowish hairs; acrostichals not distinct from other hairs except for a single pair anteriorly; a pair of prescutellar dorsocentrals, 4–5 distinct notopleurals, 2 pairs of scutellars with a pair of long apicals crossing; lateral scutellars shorter.

Legs (Fig. 2) yellowish to brownish, short haired only with few distinct bristles; all coxae almost white; apical half tip of hind femur darkened yellowish to brown; all tarsomeres brown. All hairs and bristles yellowish except for the ventral row of hairs on mid femur. Fore coxa with a row of long white anterior bristles. Mid coxa with a flattened bristle among the usual exterior bristles. Fore femur thickened on basal 2/3 with inconspicuous bristles. Mid femur almost equally wide as fore femur, with a pale

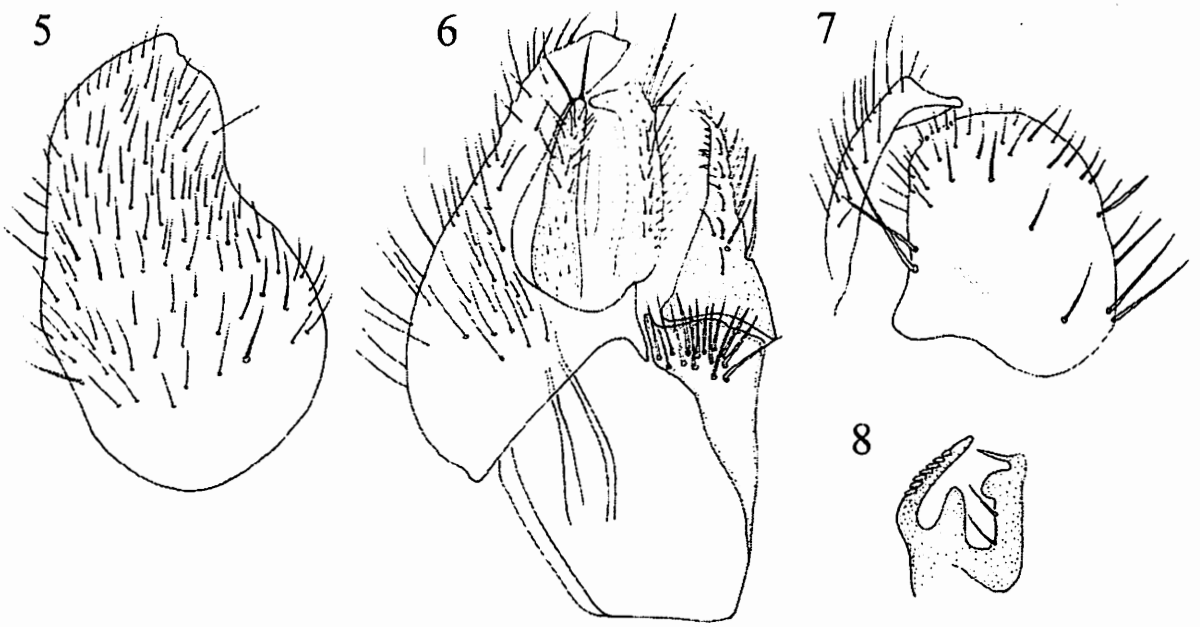


Figs 1-4. *Drapetis flavipes* Macquart, 1834 male (Belgium, Luttre). 1. head lateral; 2. mid and hind legs. Mid femur with black ventral bristles; 3. thorax and abdomen dorsally; 4. wing.

anterior preapical, a long basal ventral bristles and a row of black ventral hairs, about a third as long as femur is wide. Hind femur arched dorsoventrally, with a pale anterior preapical, dorsally at base with long erect bristles, ventrally with only short inconspicuous hairs. Hind tarsomere 1 slightly swollen and nearly as long as following tarsomeres together.

Wing (Fig. 4) hyaline, with brown veins. Vein R_1 contrastingly dark brown; vein R_{2+3} not distinctly bending up as usual, but almost straight throughout before reaching the costa and thus reaching the costa in a sharp angle; veins R_{4+5} and M_{1+2} running parallel and both bending down before reaching the costa. Upper crossvein (r-m) faintly sclerotised and near the middle of the basal portion of vein M_{1+2}. Anal vein faintly sclerotised, but distinct for its whole length. Squama brown with numerous long pale hairs. Halter completely white (alcohol specimens) to yellow in dried specimens.

Abdomen (Fig. 3) shining black, but tergite 4 dull at sides. All hairs and bristles yellowish. Tergite 1 and basal part of tergite 2 not sclerotised; tergite 4 long, tergite 5 very short. Sternite 1 very short, but normally sclerotised;



Figs 5-8. *Drapetis flavipes* Macquart, 1834 male (Belgium, Luttre). 5. right epandrial lamella; 6. epandrium with cerci; 7. left cercus with left surstylus; 8. median surstylus.

sternite 2 complete, rectangular; sternite 3 apically concave; Sternites 4 and 5 divided into two lateral sclerites; sternites 6 and 7 complete, rectangular.

Genitalia (Figs 5–8) dark brown, but cerci yellowish. Right cercus digitiform; left cercus with a beak-like projection (Figs 6–7). Tip of left epandrial lamella (Fig. 6) with at least 15 short bristles. Dorsal sclerite of left surstylus large and round (Fig. 7). Median sclerite trifid: one of the projections toothed (Fig. 8). Two rod-shaped apodemes present.

Female

Body length: 2.6 mm; wing 3.0 mm.

Identical to male except the following characters: mid femur without a row of black ventral hairs; hind tarsomere 1 ventrally more densely set with shorter bristly hairs than in male and slightly longer than following tarsomeres together. Cerci pale brown.

Discussion

It is of course unfortunate that the type material was not available for our study, however, we are quite sure about the identity of the species. In 1827 MACQUART cited *Drapetis exilis* Meigen found at Lestrem (near Lille, Nord France) and remarked that it was not completely identical to MEIGEN'S description of *D. exilis*, but he found the differences not important enough to create a new species. MACQUART gave a drawing of the wing that shows very well the shape of vein R_{2+3} and the parallel-running veins R_{4+5} and M_{1+2}. The position of the upper crossvein (r-m) is not correct understandable because it is very difficult to see. Finally he depicted "la fausse nervure" being the anal vein, which is a rare character in *Drapetis*. In addition his description fits completely to our Belgian specimens that originate from the same geographical region. In 1834 MACQUART put his "*Drapetis exilis* var." into a new species: *Drapetis flavipes* Macquart, without repeating his first detailed description and not referring to his original drawing. He just referred to his book "Diptères du Nord de la France". This act caused some confusion and CHVÁLA & KOVALEV in their Palaearctic Catalogue did not precise the type locality that was indeed not repeated in the erection of the species (CHVÁLA & KOVALEV, 1989: 219).

At the moment two species groups are recognised in *Drapetis*: the *D. assimilis* group has the crossveins r-m and m-m widely separated while in the *D. exilis* group both crossveins are closer together i.e. upper crossvein beyond middle of second basal cell (bm). Although the position of the upper crossvein would suggest that *D. flavipes* belongs to the *D. assimilis* group *sensu* KOVALEV (1972), the structure of the genitalia shows that it belongs rather to the *D. exilis* group. In the *D. assimilis* group the left surstylus is narrow, while it is broad in most members of the *D. exilis* group. This shows that the position of the upper crossvein (r-m),

especially if it is near the middle of the second basal cell is not a conclusive character to separate the two groups.

Acknowledgements

We thank Mr. Pol LIMBOURG (RBINS) who collected the first Belgian *Drapetis flavipes*. Dr. Christophe DAUGERON searched the Macquart Collection at the Muséum national d'Histoire Naturelle in Paris for the type material.

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Bulletin S.R.B.E./K.B.V.E., 146 (2010) : 115-122

Checklist of the Belgian stoneflies (Plecoptera)

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Abstract

In the present study, 52 species of stoneflies are listed for Belgium. However, 14 of these have not been reported for several decades: some have probably been overlooked and will hopefully be rediscovered in the future, while others are probably extinct in Belgium. The latter species are especially potamal species that were restricted to the river Meuse and the downstream part of the river Ourthe. A few other species have been reported from the surrounding countries and may also be encountered in Belgium. An overview of the literature dealing with the Belgian stoneflies is given. In addition, three species are reported here for the first time for Belgium: *Amphinemura borealis* (Morton, 1894), *Nemoura flexuosa* AUBERT, 1949 and *Leuctra major* BRINCK, 1949.

Keywords: aquatic insects; *Amphinemura borealis*; Belgium; *Leuctra major*; macroinvertebrates; *Nemoura flexuosa*.