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Contribution to the taxonomy of European *Bezzia* (Diptera, Ceratopogonidae)*

by Jarosław KRZYWIŃSKI

Department of Invertebrate Zoology, University of Gdańsk, Al. Piłsudskiego 46, 81-378 Gdynia, Poland.

Summary

Two little known species of Bezzia *(Diptera, Ceratopogonidae):* B. exigua *GOETGHEBUER, 1935 and* B. multiannulata *(STROBL, 1906) are redescribed and illustrated. Lectotype is designated for* B. exigua. B. gandavensis *GOETGHEBUER, 1935 and* B. strigula *CLASTRIER, 1962 are considered to be junior synonyms of* B. multiannulata. B. fuliginata *CLASTRIER, 1962 and* B. kazlauskasi *REMM, 1966 are reported as new to the fauna of Belgium, and* B. multiannulata *is recorded for the first time in Greece.*

Key words: *Bezzia*, Ceratopogonidae, Diptera, new synonymy, taxonomy, faunistics, Europe.

Résumé

Deux espèces peu communes de Bezzia *(Diptera, Ceratopogonidae):* B. exigua *GOETGHEBUER, 1935 et* B. multiannulata *(STROBL, 1906) sont redécrites et certains éléments de leur morphologie sont figurés. Un lectotype est désigné pour* B. exigua. B. gandavensis *GOETGHEBUER, 1935 et* B. strigula *CLASTRIER, 1962 sont proposés comme synonymes juniors de* B. multiannulata. B. fuliginata *CLASTRIER, 1962 et* B. kazlauskasi *REMM, 1966 sont signalés comme nouveaux pour la faune de Belgique et* B. multiannulata *pour la faune grecque.*

Introduction

The genus *Bezzia* (Diptera, Ceratopogonidae) was erected by KIEFFER in 1899. However, the species belonging now to *Bezzia* had been described

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since the beginning of XIX century. As many as 95 available names of European species have been published to date, among them 47 are recognized as valid (REMM, 1988). The correct interpretation of many species is still unknown due to insufficient original descriptions and lack of comprehensive revisionary studies. The only recent revision of *Bezzia* in Europe is that of REMM (1974a, b), however, in his studies REMM had not examined the type materials. This note presents redescriptions of two little known species of *Bezzia* based on original descriptions and available types. Both species are omitted in "Catalogue of the Diptera of Belgium" (GOSSERIES, 1991), although they should have been included there as described or reported by GOETGHEBUER (1935, 1945) from this country. During the study of GOETGHEBUER's collection of *Bezzia* the author found additional two species not reported in Belgium as yet. These new records are also presented.

Materials and methods

The materials used for this study were borrowed from the following institutions:
Institut Royal des Sciences Naturelles de Belgique, Brussels (IRScNB);
Muséum National d'Histoire Naturelle, Paris (MNHN);
Natural History Museum, London (NHM);
Tartu Ülikool Zooloogiamuuseum, Tartu (ZMT).

The specimens belonging to species newly recorded in Belgium were compared with the types (listed in the paper). For an explanation of ceratopogonid terminology used in the paper, see WIRTH *et al.* (1977) and WIRTH & GROGAN (1983). The numerical data are presented as follows: mean value (minimum value-maximum value; n = number of measurements).

Bezzia exigua GOETGHEBUER

Bezzia exigua GOETGHEBUER, 1935: 4 (♂; Belgium).

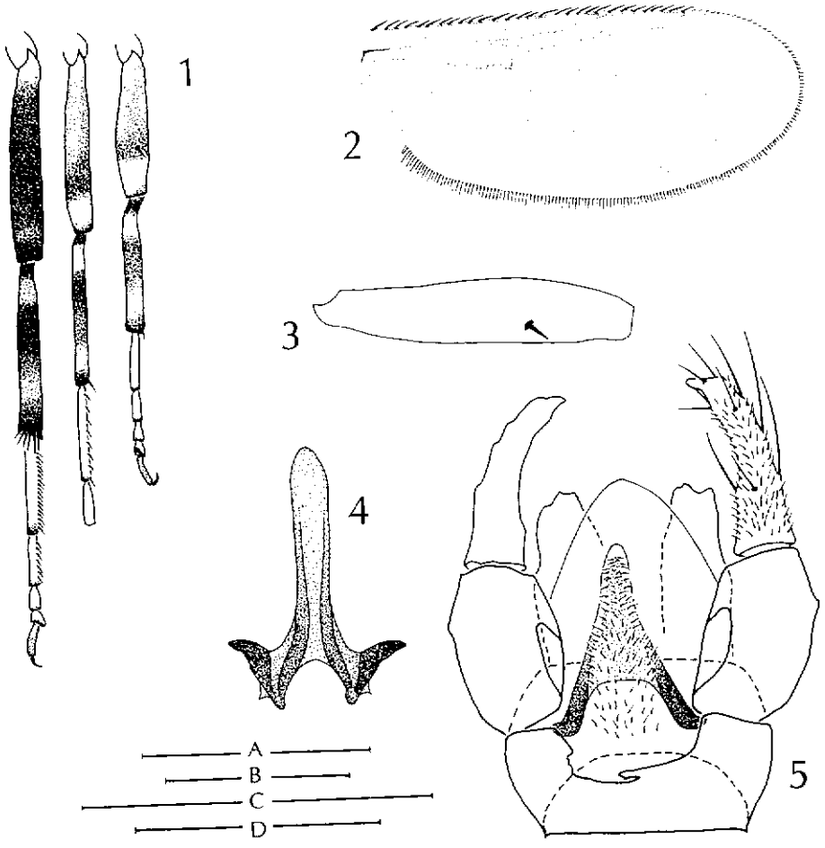
Male

Head: Dark. Eyes separated by a distance of 2 facets. Third palpal segment with 3 capitate sensilla.

Thorax: Dark. Scutellum with 4 setae. Postscutellum bare. Wing (Fig. 2) 1.07 (1.02-1.11; n = 2) mm long, 0.45 (0.43-0.47; n = 2) mm wide; anterior veins brownish; costal ratio 0.76 (n = 2). Halter brown. Legs as in Fig. 1.; fore and mid femora yellowish brown with subapical brown ring, pale at bases and more widely at apices; hind femur dark brown with pale base and barely visible subapical brown ring; all tibiae with both ends dark and a broad dark median band, hind tibia dark brown with light bands less visible than on fore and mid tibiae; tarsi pale except slightly darker on extreme apical portions on four proximal tarsomeres and whole

distal tarsomere. Fore femur with one slender ventral spine (Fig. 3). Ventral palisade setae dense in two rows on hind tarsomere 1 and 2, sparse in one row on mid tarsomere 1. Claws small, equal and simple, ie. without a basal inner tooth.

Abdomen: Dark. Genitalia as in Figs 4-5. Ninth sternum 2.5 times broader than long, with shallow caudomedian excavation; ninth tergum short; cerci long, extending beyond basistyles. Basistyle 1.7 times longer than broad; dististyle almost as long as basistyle, broadest basally, tapering to a pointed tip, curved. Aedeagus triangular, slightly longer than broad, basal arch 1/3 of total length; basal arms heavily sclerotized; distal portion moderately sclerotized, tapering slightly distally, its distal 1/3 slender, tip



Figs 1-5. *Bezzia exigua*, male; 1, hind, mid, and fore legs (left to right); 2, wing; 3, fore femur; 4, parameres; 5, genitalia (parameres removed). Scale (length bars in mm); 1: A (0.5); 2: B (0.5) 3: C (0.4); 4-5: D (0.1).

rounded; except for basal arms and apex aedeagus covered with spinules. Parameres (Fig. 4) heavily sclerotized proximally, more lightly sclerotized distally; basal arms doubly recurved, with a bifurcate anteriorly projecting portion; distal portion slender, rodlike.

Material studied. Types: Lectotype male of *B. exigua* GOETGHEBUER, present designation - "Sy, 24.6.33, M. Goetghebuer, *Bezzia exigua* Gtg.; *exigua* G.; Type ♂ M. Goetghebuer; R.I.Sc.N.B. 18.073, Coll. et det., M. Goetghebuer". (IRScNB). Paralectotype male - "Sy, 24.6.33, M. Goetghebuer; det. *B. exigua* Gtg., R.I.Sc.N.B. 18.073, Coll. et det., M. Goetghebuer". (IRScNB).

Distribution. The species is known from the type locality only.

Discussion. *B. exigua* has been described from two males. GOETGHEBUER had selected one male and labelled it "Type ♂ M. Goetghebuer". However, he did not mention the type designation in the original description of the species. Thus, the specimen labelled by Goetghebuer is hereby designated as lectotype. The second specimen is labelled "Paralectotype". Both specimens have been slide mounted (probably by Dr. P. HAVELKA) and considerably damaged. They lack antennal flagella and thorax of each specimen is torn into pieces. Lectotype lacks fore and mid legs; one fore leg is lost in paralectotype. The notes given above are presented from both lectotype and paralectotype.

According to GOETGHEBUER's description of *B. exigua* mesonotum is black, matt and grayish pollinose with gray vittae. As the types had been slide mounted prior to present examination, these characters were not confirmed by the author, because they are not visible in Canada balsam. Hence they were not included in the description presented above. The only fore femur present in paralectotype is armed with a small ventral spine. This character must have been overlooked by GOETGHEBUER, who in the description stated: "fémurs antérieurs sans épines".

REMM (1988) placed *B. exigua* in the subgenus *Bezzia* s. str. However, the characters found during the present examination of types (aedeagus with spinules, wide wings similar to those in female) and given in the original description (plume weakly developed) prove that the species belongs to the subgenus *Homobezzia* MACFIE.

Among Palaearctic species of the subgenus *Homobezzia* males of *B. japonica* TOKUNAGA, 1939 and *B. solstitialis* (WINNERTZ, 1852) are most similar to *B. exigua*. However, they are readily distinguished by bigger size (wing length 1.41-2.00 mm in *B. solstitialis* and 1.50-2.25 mm in *B. japonica*) and at least two spines on fore femur. Rarely *B. solstitialis* may have only one slender spine, but this species is recognized by its hind femur dark in no more than distal 1/3. In *B. japonica*, hind femur of which is dark as in *B. exigua*, spines on fore femur are stout and subconical.

Bezzia multiannulata (STROBL)

Ceratopogon multiannulatus STROBL, 1906: 400 (♂; Spain).
Bezzia multiannulata (STROBL); EDWARDS, 1926: 423 (♂; combination; Great Britain); GOETGHEBUER, 1945: 190 (Belgium); REMM, 1988: 27 (in list).
Bezzia gandavensis GOETGHEBUER, 1935: 4 (♀; Belgium). **syn. n.**
Bezzia strigula CLASTRIER, 1962: 68 (♂; figs; France); REMM, 1967: 35 (♀, ♂; Azerbaijan); REMM, 1974b: 900 (♀, ♂; in key; descriptive notes; figs; Georgia). GLUKHOVA, 1979: 151 (♀, larva; figs; Turkmenistan). **syn. n.**

Male

Head: Blackish brown. Eyes separated by a distance of 2-3 facets. Antenna (Fig. 6) brown, segment 12 yellowish in proximal half, narrow bases of segments 13-15 yellowish brown; plume well developed, reaching end of segment 13, dark brown; antennal ratio 0.79 (0.77-0.83; n = 5); lengths of flagellar segments in proportion of 17-8-7-8-8-8-9-12-18-36-10-12-14. Palpus brown; third segment slender, with 3-4 capitate sensilla; palpal ratio 3.5 (3.1-4.0; n = 3); lengths of palpal segments in proportion of 8-17-27-14-18.

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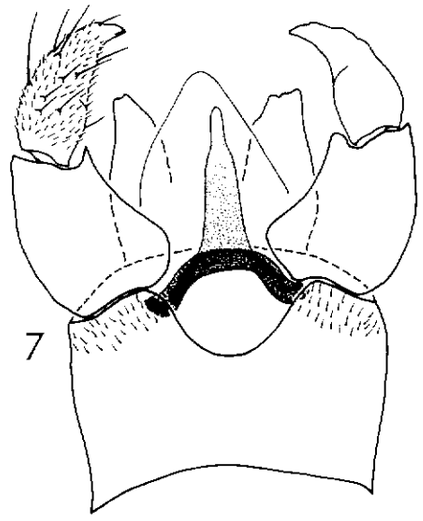

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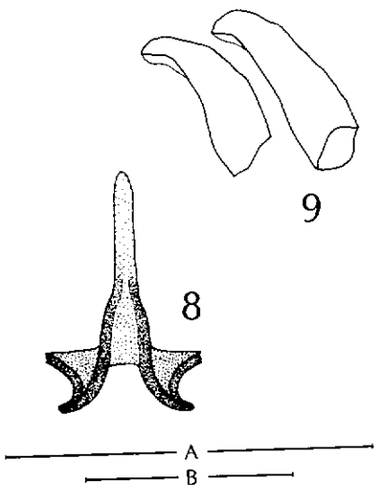

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A

B

Figs 6-9. *Bezzia multiannulata*, male; 6, antenna; 7, genitalia (parameres removed); 8, parameres; 9, dististyles. Scale (length bars in mm): 6: A (0.5); 7-9: B (0.1).

Thorax: Blackish brown, grayish pollinose; humeral parts and three vittae (median very narrow and two, each on its sides, wider) extending to anterior 2/3 of mesonotum shining silvery (variance pattern occurs with different lighting and the angle of observation). Scutellum blackish brown with 4 long setae. Postscutellum with few small setae or rarely bare. Wing 1.58 (1.22-1.84; n = 7) mm long, 0.49 (0.40-0.60; n = 7) mm wide; anterior veins yellow; costal ratio 0.65 (0.62-0.67; n = 7). Anterior margin of mesonotum without a tubercle. Halter dark brown. Legs: fore and mid femora yellow in a proximal half with brown ventral parts, dark brown in a distal half with a yellow subapical ring; hind femur brown becoming dark brown distally, with yellow base and subapical ring; all tibiae blackish brown with yellow subbasal and subapical rings; tarsi pale on three proximal tarsomeres except darker on extreme apical portions, distal two tarsomeres brown. Fore femur without ventral spines. Ventral palisade setae dense in two rows on hind tarsomere 1 and 2, sparse in one row on mid tarsomere 1. Claws small, equal and simple.

Abdomen: Blackish brown, somewhat shining. Genitalia as in Figs 7-9. Ninth sternum 1.6 times broader than long, with deep rounded caudomedian excavation, covered with small setae on the level of excavation; ninth tergum tapering abruptly and becoming broadly rounded where it joins the long, slender cerci which extend beyond basistyles. Basistyle 1.4 times longer than broad, broadest basally, tapering distally, slightly curved; dististyle as long as basistyle, broadest subbasally, tapering in a distal half to a pointed tip; curved in a distal half. Aedeagus slightly longer than broad, basal arch 1/3 of total length; basal arms heavily sclerotized; distal portion lightly sclerotized, tapering slightly distally, more at extreme distal end to a slender pointed tip, apex of which is hyaline. Parameres (Fig. 8) heavily sclerotized proximally, more lightly sclerotized distally; with bilobed basal arms; distal portion slightly broader proximally, then more slender and rodlike distally to the rounded tip.

Female

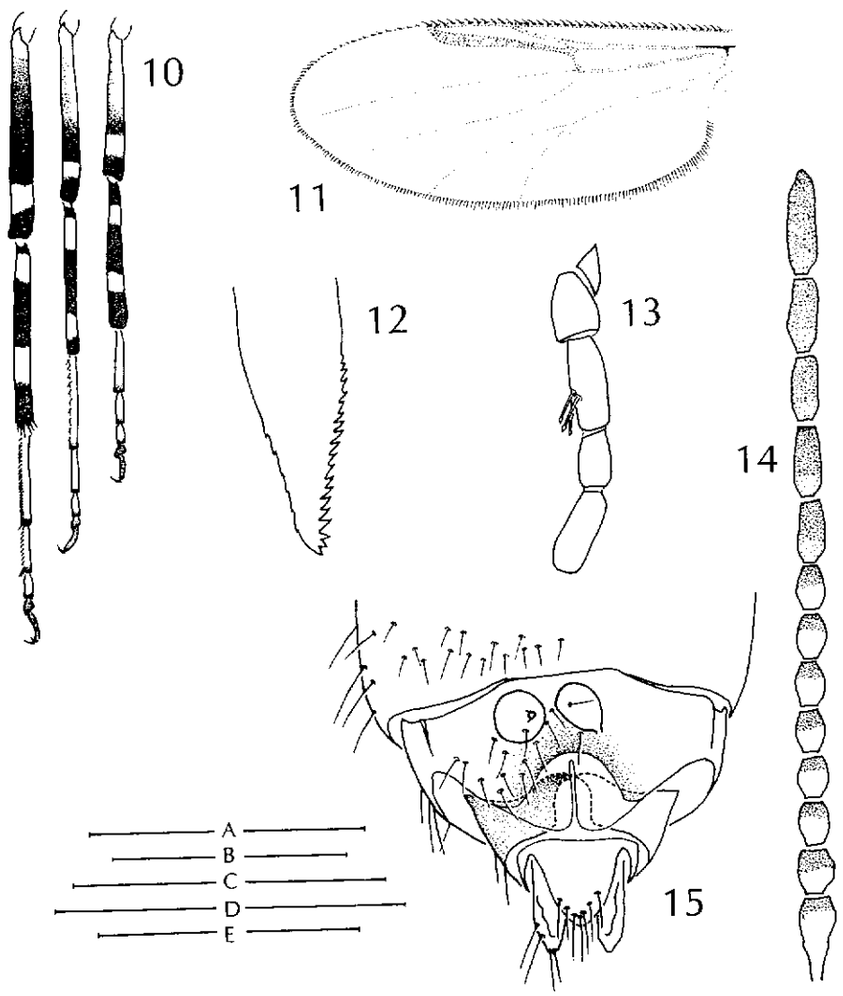
Similar to male with the following differences: Antennal segments 3-10 yellow with distal parts brown, segments 11-15 brown with yellowish brown bases (Fig. 14); antennal ratio 0.85 (0.82-0.89; n = 7); lengths of flagellar segments in proportion of 14-6-6-6-6-6-7-7-9-10-8-10-14. Mandible (Fig. 12) with 17-20 teeth on inner margin and 5-6 very small widely spaced teeth on outer margin. Palpus (Fig. 13); lengths of palpal segments in proportion of 9-14-21-13-19.

Wing (Fig. 11) 1.93 (1.44-2.29; n = 7) mm long, 0.78 (0.60-0.87; n = 7) mm wide; translucent, with anterior veins brown, R_{4+5} thickened in a distal half; costal ratio 0.70 (0.68-0.71; n = 7). Legs as in Fig. 10.

Abdomen with 1 pair of gland rods. Genital part of abdomen as in Fig. 15. Spermathecae small, ovoid, with very short necks, unequal, measuring 0.074 (0.057-0.080; n = 4) by 0.047 (0.043-0.051; n = 2) mm and 0.060 (0.049-0.071; n = 4) by 0.033 (0.031-0.034; n = 2) mm including necks.

Eighth sternum weakly sclerotized, somewhat stronger in the middle of distal margin. Ninth sternum wide; weakly sclerotized, more heavily on ends of anterior portions of its arms.

Material studied: **Types**: Holotype female of *B. gandavensis* GOETGHEBUER - "*gandavensis*; Type ♂, M. Goetghebuer, det. *Bezzia gandavensis* Gtg.;



Figs 10-15. *Bezzia multiannulata*, female; 10, hind, mid, and fore legs (left to right); 11, wing; 12, mandible; 13, palpus; 14, antenna; 15, genitalia. Scale (length bars in mm): 10-11: A (1.0); 12: B (0.1); 13: C (0.2); 14: D (0.3); 15: E (0.2).

Gand, 4.7.27, M. Goetghebuer; Gand, M. Goetghebuer; R.I.Sc.N.B. 18.073, Coll. et det., M. Goetghebuer". (IRScNB). Holotype male of *B. strigula*: Montpellier (Hérault) [France], 10.VIII.1961 - "*Bezzia strigula*, Type, ♂, 2553-1, Montpellier, Institut Pasteur d'Algérie, J. Clastrier - det.". (MNHN).

BELGIUM: Hoeke (Br), 10.VI.1939, M. GOETGHEBUER, 2♂. (IRScNB).

GEORGIA: Sukhumi, 19.V.1966, H. REMM, sweeping from bushes, 1♂. (ZMT).

GREAT BRITAIN: Essex, East Tilbury, 22.VI.1970, J. BOORMAN, at light, 5♀, 1♂. (NHM).

GREECE: Rhodes, Paradisi, 5.VIII.1985, J. BOORMAN, 1♂ (NHM); Kolimbia, 19.VI.1985, J. BOORMAN, 1♀, 1♂ (NHM). Chios, 13-14.IX.1991, P. MELLOR, at light, 1♂ (NHM).

Distribution. The species known from Spain, France, Belgium, Great Britain, Georgia, Azerbaijan and Turkmenistan. Recorded for the first time from Greece.

Discussion. This blackish brown species with grayish pollinose thorax is readily distinguished from any other Palaearctic species of *Bezzia* by unarmed femora and vivid, contrasting pale bands present on all femora and tibiae. In his description of *B. multiannulata* STROBL states as follows: "Kopf und Federbusch schwarz ...; thorax matt, dunkel aschgrau ...; schwinger braun ...; Beine rotgelb; alle Schenkel einfach, unbedornt, vor der Spitze mit 1 schwarzbraunen Ringe; alle Schienen an Basis und Spitze schmäller, in der Mitte breiter schwarzbraun, sodass man sie auch schwarzbraun mit 2 rotbraunen Ringen nennen kann". The composition of characters of the specimens listed above wholly agree with the original description. STROBL described *B. multiannulata* from a single male collected at Alicante during his travels in Spain in 1904. The holotype is probably lost, because it is not listed among preserved specimens in the STROBL's type collection (MORGE, 1974).

B. strigula CLASTRIER, as the present examination of its holotype male indicates, is conspecific with *B. multiannulata*. *B. gandavensis* GOETGHEBUER also is proposed as a younger synonym of *B. multiannulata*. *B. gandavensis* is known from only a single female taken at Gand (Belgium). This holotype examined now is very similar to *B. multiannulata* in overall coloration (particularly in the legs banding pattern) and lack of spines on fore femora. In view of these similarities the author concludes that *B. gandavensis* is actually the opposite sex of the male of *B. multiannulata*. This statement is supported by the fact that specimens representing both forms, ie. males and females, were collected from the same localities and at the same dates.

Data on labels stuck to the slide, on which the holotype of *B. gandavensis* has been mounted (probably by Dr. P. HAVELKA) are not consistent with the data from the original description. The label "Type ♂" is attached, even though a female was originally described and a female specimen is dissected on the slide. As the author has learned during the review

of the collection in IRScNB an error of this kind happens rarely with the types of species described by GOETGHEBUER. The difference in the collecting date ("4.7.27" on label and "4-8-1927" in the description) is probably the result of an error in printing. In spite of these inconsistencies there is no doubt that the specimen of *B. gandavensis* examined in this study is the one that GOETGHEBUER (1935) described.

REMM (1988) classified *B. multiannulata* in the subgenus *Homobezzia*. The present study revealed that the species is a typical member of the subgenus *Bezzia* s. str., because the male antennal segment 12 is the longest, male genitalia are not greatly elongated, nor ninth tergite is separated from ninth sternite by basimeres.

When observed with a microscope, the shape of dististyles varies considerably according as they are positioned in relation to other parts of male genitalia. Variants of dististyle shapes different from those in figure of male genitalia (Fig. 7) are presented in Fig. 9. A geographical variation in size has been noticed in *B. multiannulata*. The specimens from southern localities (Greece, southern France) are smaller than those collected in the north (Belgium, England). However, undoubtedly they all belong to the same species.

B. multiannulata is closely related to *B. pygmaea* GOETGHEBUER, 1920 and *B. kazlauskasi* REMM, 1966, sharing with those species the absence of spines on fore femora. The banding pattern on legs is similar in this group, but both *B. pygmaea* and *B. kazlauskasi* differ from the former species in much less contrasting rings, especially on mid and hind legs and in the lack of a yellow subapical ring on hind femur.

Bezzia kazlauskasi REMM

Bezzia kazlauskasi REMM, 1966: 67 (♂, ♀; fig.; Lithuania).

Diagnosis. Legs dark brown; fore and mid femora yellow, brownish ventrally, with brown subapical ring, hind femur blackish brown, yellow at base; fore and mid tibiae with basal and subapical pale rings, hind tibia blackish brown, yellow at base; tarsi pale; fore femur unarmed with spines. Spermathecae small. Aedeagus with wide distal part; parameres rod-like distally.

Material studied: Types. Paratype female of *B. kazlauskasi* REMM. (TZM).

BELGIUM: Munte (bois), 26.V.1931, M. GOETGHEBUER, 1♀, RIScNB 18.0-73, Coll. et det. M. GOETGHEBUER. (IRScNB).

Distribution. The species known from Germany, Poland, Lithuania and Estonia. For the first time recorded from Belgium.

Discussion. *B. pygmaea* GOETGHEBUER is very similar to *B. kazlauskasi*, but the former species differs in subapical pale ring on hind tibia, moreover female in large spermathecae and male in aedeagus narrow distally.

GOETGHEBUER identified the specimen studied at present as *B. signata* (MEIGEN, 1804).

Bezzia fuliginata CLASTRIER

Bezzia fuliginata CLASTRIER, 1962: 115 (♂; fig; Serbia).

Diagnosis. Legs black; tarsi pale. Fore femur with 2-3 spines. Male genitalia greatly elongated; dististyle trilobate; parameres robust above basal arms, ventrally inflated in a proximal half, with two narrow projections directed proximally, surface of the inflated area smooth, end of parameres hyaline, formed by two small rounded lobes.

Material studied: Types. Holotype male of *B. fuliginata* CLASTRIER. (MNHN).

BELGIUM: Postel, VII.1922, G. SEVERIN, 1♂, (IRScNB).

Distribution. This species is known from Serbia, Hungary, Ukraine (Crimea), Azerbaijan, Georgia, Kazakhstan, Uzbekistan, Tadjikistan and Turkmenistan. For the first time recorded from Belgium.

Discussion. *B. albicornis* (MEIGEN, 1818) and *B. nigrita* CLASTRIER, 1962, species closely related to *B. fuliginata*, differ in parameres expanded in the middle, with lateral surfaces of the widened area coarsely corrugated or covered with numerous fine wrinkles.

The Belgian specimen examined now was identified by GOETGHEBUER as *B. albicornis*.

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