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A redescription of *Simulium* (*Edwardsellum*) *mengense* Vajime & Dunbar, 1979* (Diptera: Simuliidae) and designation of a lectotype for this species

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(With 9 figures)

Abstract

A permanent slide of the polytene chromosomes of a specimen of *Simulium damnosum* s.l. (Diptera: Simuliidae) preliminary designated as 'holotype' by C. G. Vajime and R. W. Dunbar was now recognized as *Simulium* (*Edwardsellum*) *mengense* Vajime & Dunbar 1979*. Originally, no types were specified. Results of a re-examination are presented and the specimen is selected as the lectotype of *S. mengense*. A paralectotype and morphological features of adult females are also described.

Introduction

Simulium mengense Vajime & Dunbar 1979* was described as a cytospecies of the *Simulium damnosum* Theobald, 1903 species complex which is widely distributed in the Afrotropical region and the Yemen. The females of many of the species are anthropophilic and act as vectors of *Onchocerca volvulus* Leuckart, 1892, a filarial nematode causing human onchocerciasis. *Simulium mengense* is probably a vector in forest habitat in Cameroon (WHO 1995) and has also been recorded from Tanzania (Vajime & Dunbar 1977b) and the Central African Republic (Crosskey 1987).

* "The description is in Parasitologia **19**: 97 dated on the journal 1977. The part concerned was not in fact issued until 1979 and *mengense* takes this year date." (Crosskey & Howard 1997).

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Of a collection of permanent slides of chromosomes studied and left by C. G. Vajime and R. W. Dunbar in the Bernhard Nocht Institute, Hamburg (BNI) in 1974 one was labelled 'alleged holotype *Simulium Edwardsellum damnosum* n. sp.'. According to a hand-written remark by R. W. Dunbar the entire series of slides contained the two species *S. mengense* and '*S. billense*'. The latter is a manuscript name by Dunbar, based on the Bille river. Dunbar intended at some time to publish the name before it was realized that the formally available name *squamosum* applies to this species. The name 'billense', being unpublished, has no status in nomenclature. By a re-examination of the chromosomal banding patterns and comparison with the figures given in the original description two specimens (including the 'holotype') could be identified as *S. mengense*. The latter species was based on 35 individuals (Vajime & Dunbar 1977b), but a type was not designated. Accordingly, the two existing specimens which belong to the original material (R. W. Dunbar, pers. comm.) must be regarded as syntypes. The specimen bearing the label 'holotype' is herewith designated as lectotype. Minor amendments of the localization of the inversion breakpoints are shown in chromosome maps and supplemented by results of the examination of a further specimen. Morphological features of the adult females are also presented.

Material and methods

The collection of permanent slides of polytene chromosomes left by C. G. Vajime and R. W. Dunbar in the BNI contained one male specimen labelled 'alleged holotype *Simulium Edwardsellum damnosum* n. sp.' (code number WA71/95/12a) and a second specimen (WA71/96/12). Assumingly, the slides belong to the original series and come from the locality mentioned in the description (Cameroon, Menge river, II/X/XII 1972). Further specimens (code numbers WA71/94/91, WA71/94/94, WA71/98/10) were identified as *Simulium squamosum*. Photographic maps of single chromosomes were taken by a ZEISS photomicroscope and then analyzed by comparison with the original description (Vajime & Dunbar 1977b), chromosome pictures given by Vajime & Dunbar (1975), Maegga & Cupp (1993) and own material.

In addition, a sample of adult females (Cameroon, river Menge, 23. I. 1986, caught on man, leg. C. Barthelmess) was examined. The specimens had been separated from *S. squamosum* by their longer antennae (C. Barthelmess, pers. comm. to R. Garms, 1987). Lengths of antenna and thorax and the colours of wing tufts, arculus, setae on the scutellum, the ninth tergite and the basicosta of 18 specimens were scored following Garms (1978) and Peterson & Dang (1981). Black colours had faded to brown as usual after long storage in alcohol. The sample is now deposited in the Zoological Museum Hamburg.

Cytogenetical redescription of the species

Simulium (*Edwardsellum*) *mengense* Vajime & Dunbar 1979*
(Figs 1-8)

Simulium (Edwardsellum) mengense: Vajime & Dunbar 1977b
Simulium (*Edwardsellum*) *damnosum* 'Menge' form: Vajime & Dunbar 1977a

TYPE MATERIAL: Two permanent slides with polytene chromosomes. Both specimens are deposited in the Zoological Museum Hamburg (Reg. No. ZMH 3-1999).

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* see comment on page 65.

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L e c t o t y p e male, original designation: "WA71/95/12a, alleged holotype *Simulium Edwardsellum damnosum* n. sp., Cameroon."

P a r a l e c t o t y p e, "WA71/96/12, Cameroon."

DESCRIPTION: Vajime & Dunbar (1977b) described seven interspecific inversions: IS-1, IS-31, IL-21, IIIL-19 and IIL-34.41.42. The re-examination of the lectotype revealed some minor errors of the breakpoints of these inversions which are described below. In addition, a new inversion was detected on the short arm of chromosome I of both the lecto- and paralectotype. The same inversion was also present in Figs 4 and 5 of the original description (Vajime & Dunbar 1977b).

L e c t o t y p e: On the short arm of chromosome I there are three inverted regions. The actual breakpoints of IS-31 are sections p7-p10 (Figs 1, 2), which slightly differ from the original description. Distally, there is a two-step inversion IS-1.11 (Figs 1, 2) including IS-1 (sections 5-p6) and the new IS-11 (sections 3-p7). The proximal end of IS-1.11 is in direct contact with the distal end of IS-31. On the long arm of chromosome I there are three inversions: a two-step arrangement IL-19.21 including the floating, homozygous IL-19 (sections 28-p37), the fixed IL-21 (sections p30-p37; Figs 3, 4) and the heterozygous IL-20 which forms a distal loop (Figs 3, 4). The banding pattern of chromosome II corresponds with the original description. The complex heterozygous arrangement on the long arm (Figs 5, 6) resembles that of Fig. 12 provided by Vajime & Dunbar (1977b). Chromosome III shows the fixed inversion IIIL-19 (sections 84-86), directly followed by the heterozygous IIIL-31 (sections p87-p91; Fig. 7).

P a r a l e c t o t y p e: Chromosome IS agrees with that of the lectotype. Consequently, it also shows the new, complex inversion IS-1.11. On the long arm, IL-19.21 is present but not fully readable. Inversion IL-20 is absent. As in the lectotype chromosome II shows a complex heterozygous arrangement. On chromosome III only the interspecific IIIL-19 exists (Fig. 8), whereas the distal part shows standard pattern without IIIL-31.

Remarks on the morphology of adult females
(Fig. 9)

Morphometric measurements of 18 specimens from river Menge revealed average lengths of the thorax of 1.15 mm (range 1.04-1.24 mm) and of the antenna of 0.55 mm (range 0.5-0.58 mm). The shape of the antenna is shown in Fig. 9. Segments 4 and 5 are only slightly flattened, as appearing in *S. pandanophilum* (Krüger *et al.*, 1998). The ratio of both characters was approximately 2.08 (range 2-2.21). This value resembles that of *S. pandanophilum* (average 2.06), and is slightly below that of *S. squamosum* (Garms & Cheke 1985). The shape of the tarsal claws was normal (Krüger *et al.* 1998). The wing tuft setae of 17 specimens were of category *E* in the sense of Kurtak *et al.* (1981), except of one with *C-D*. The setae on the scutellum were mainly brownish, occasionally mixed with pale setae, and in four specimens mainly pale. The setae on the ninth tergite and on the basicosta were either pale or a mixture of pale and dark ones, the basicosta always had at least some dark setae. The basicosta and the costal

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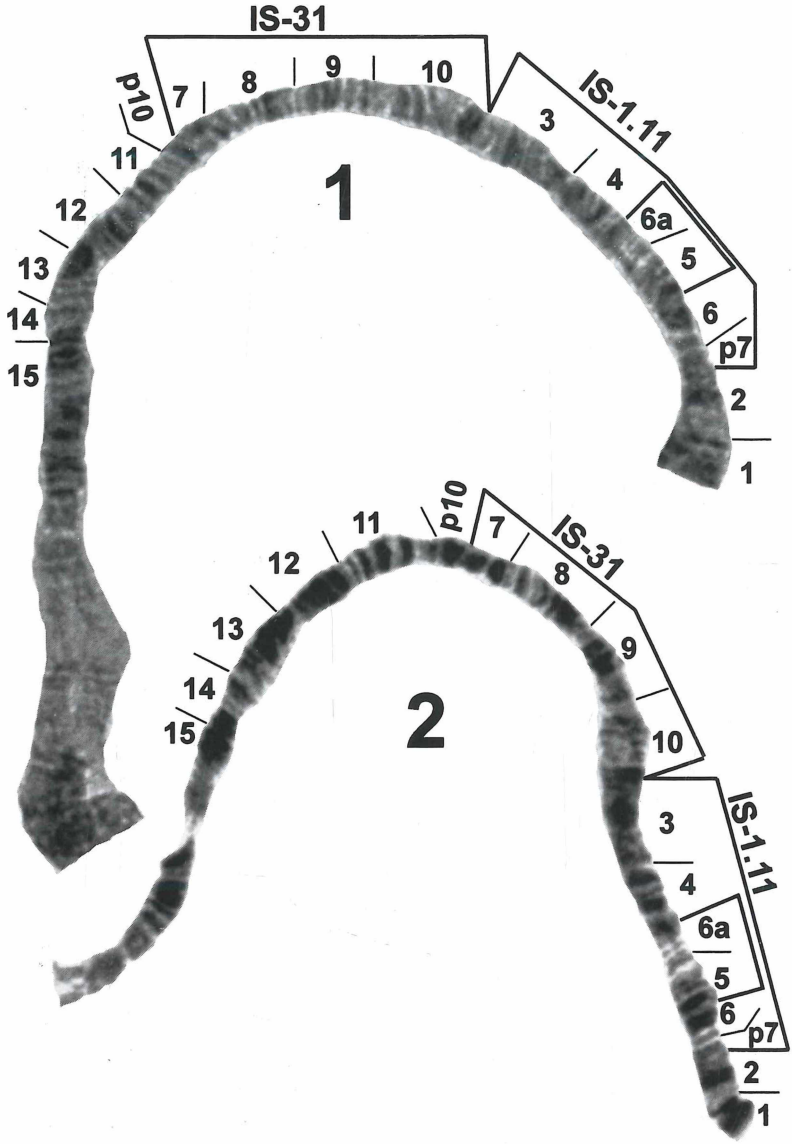

Figs 1-2. Short arm of chromosome I of *Simulium mengense* Vajime & Dunbar with inversions IS-31 and IS-1.11 (lectotype).

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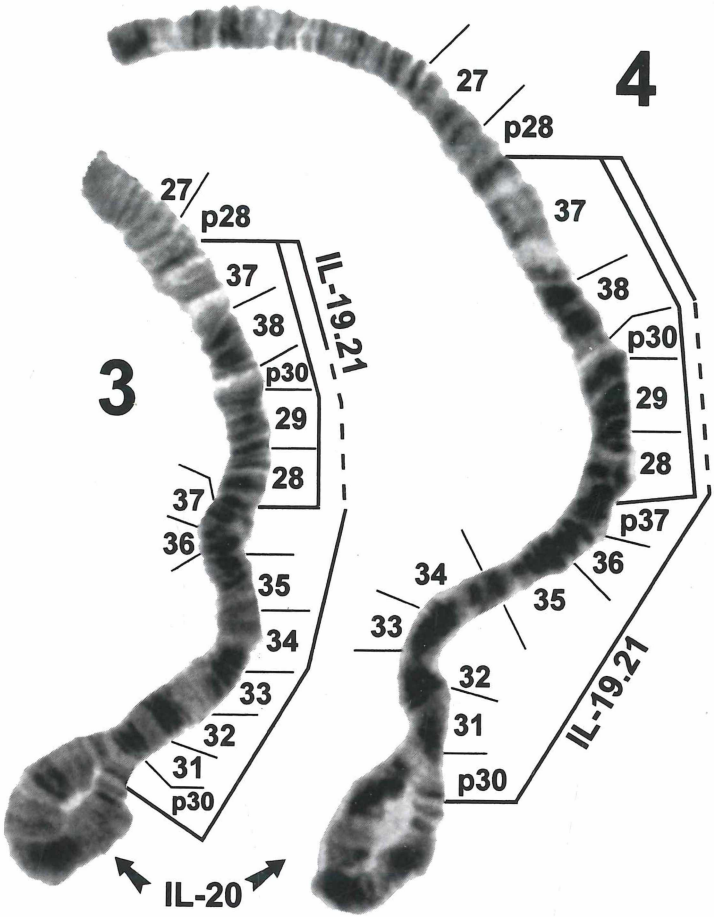

Figs 3-4. Long arm of chromosome I of *Simulium mengense* Vajime & Dunbar showing inversions IL-19.21 and IL-20 (loop) (lectotype).

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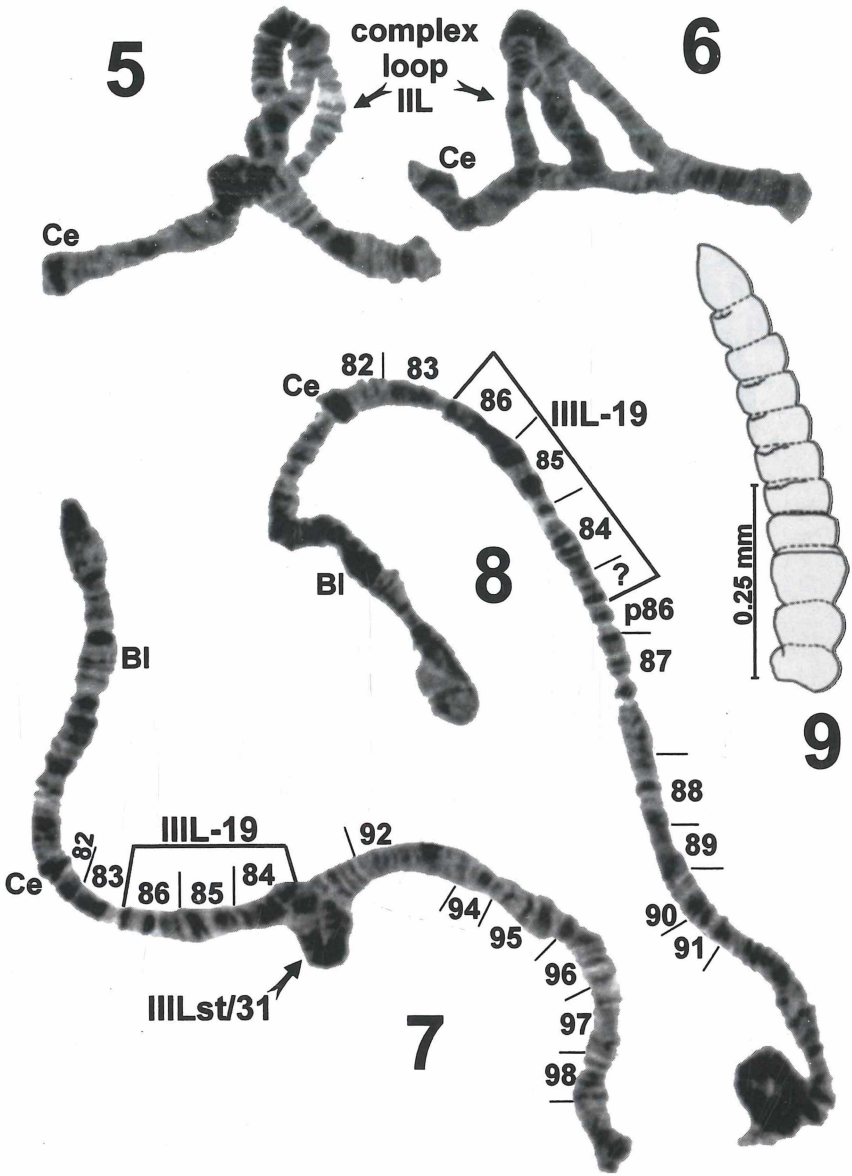

Figs 5-9. *Simulium mengense* Vajime & Dunbar: (5-8 - chromosomes II and III): **5-6** - complex loop of the inverted long arm of chromosome II; **7** - chromosome III showing interspecific inversion IIIL-19 and the polymorphic IIIL-31; **8** - chromosome III with IIIL-19, and standard banding pattern in sections p87-p91; **9** - antenna of an adult female. (*Bl* = blister, *Ce* = centromere. Figs 5-7: lectotype, Fig. 8: syntype).

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vein were of the same light brownish colour in all specimens and the arculus light brown or brown.

Since these colour patterns and the thorax/antenna ratio differ from those of *S. squamosum*, it is assumed that the specimens are of *S. mengense*.

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Zusammenfassung

C. G. Vajime und R. W. Dunbar hinterließen dem BNI 1974 eine kleine Sammlung von Chromosomen-Dauerpräparaten von *Simulium damnosum* s.l. (Diptera: Simuliidae) aus Kamerun. Darunter befand sich ein als 'Holotypus' beschriftetes Exemplar, das nun als *Simulium* (*Edwardsellum*) *mengense* Vajime & Dunbar 1979 bestimmt wurde. Da die Autoren keine explizite Typenbezeichnung vorgenommen haben, wird das Exemplar als Lectotype festgelegt. Seine Chromosomenmerkmale sowie die eines weiteren Exemplares (Paralectotypus) werden ergänzend beschrieben. Außerdem wird auf die Morphologie der adulten Weibchen eingegangen.

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