

**REVIEW OF PUBLISHED RECORDS OF
CULICOIDES SPECIES IN SUBGENUS *AVARITIA*
(DIPTERA: CERATOPOGONIDAE) FROM THE
NEW GUINEA SUBREGION**

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Abstract. The identity of existing *Culicoides* specimens in the subgenus *Avaritia* studied by earlier authors from the New Guinea zoogeographic subregion is reviewed. Seven species are identified: *C. actoni*, *C. dikhros*, *C. fragmentum*, *C. fulvus*, *C. jacobsoni*, *C. orientalis*, and *C. pungens*. Revised collection data for these species are listed and synonymies clarified. *C. obscurus* and *C. unisetiferus* are placed as junior synonyms of *C. pungens* and *C. jacobsoni*, respectively.

A series of papers on Ceratopogonidae of Micronesia (Tokunaga & Murachi 1959) and New Guinea (Tokunaga 1959, 1960, 1962, 1963, 1976) include descriptions and collection data for 8 *Culicoides* nominates in the subgenus *Avaritia*. Some of the species recorded from New Guinea have since been implicated as vectors of bluetongue (Standfast et al. 1979) and other arthropod-borne viruses (Muller et al. 1982) cycling in livestock in Australia.

Anomalies in the literature concerning specific identities of certain *Avaritia* taxa of the western Pacific (Dyce 1980) embrace some of these species reported from New Guinea. This paper results from an identity check of all available specimens recorded as examined by the earlier authors (Tokunaga & Murachi, loc. cit.; Tokunaga, loc. cit.). Specimens reported total 751 (620♀, 131♂) and include 5 primary types of 4 species (Tokunaga & Murachi 1959: 347; Tokunaga 1959: 236, 1962: 507). Of those, 165 (120♀, 45♂) are in the following institutions: Bernice P. Bishop Museum, Honolulu, Hawaii (BPBM); Kyoto Prefectural University, Faculty of Agriculture Collection, Japan (KYOTO); and United States National Museum, Washington, D.C. (USNM). A further 24 (22♀, 2♂) relevant specimens not cited in publications but which were apparently available to the authors have also been located. Of the total 185 specimens, only 1 is pinned; the rest are mounted on slides in a gum medium. All but 1 female bear an identification label handwritten by Professor Tokunaga.

Data for each species named in the relevant papers are presented below in the following order: pertinent literature with page number; details of synonymy where relevant; numbers of each sex recorded by earlier authors; numbers located by present author; repository; and revised identity.

1. CSIRO, Division of Tropical Animal Science, McMaster Laboratory, Glebe, New South Wales, 2037, Australia.

Culicoides buckleyi Macfie

Tokunaga, 1959: 238; 1962: 505; 1963: 137.

Placed as a synonym of *Culicoides jacobsoni* Macfie by Wirth (1973: 361).

Specimens recorded. 65♀, 1♂.

Specimens located. 24♀, 1♂ (KYOTO); unrecorded 4♀ (KYOTO).

Revised identity. 1♂ identified as *Culicoides (Culicoides) sumatrae* Macfie; all ♀ identified as *C. jacobsoni*.

Culicoides dikhros Tokunaga

Tokunaga, 1962: 507.

Specimens recorded. Holotype ♀ (BPBM 3243), 2♀ paratypes.

Specimens located. All 3♀: holotype and 1 paratype (BPBM), 1 paratype (KYOTO).

Revised identity. All *C. dikhros*.

Culicoides fragmentum Tokunaga

Tokunaga, 1962: 507; 1963: 137.

Specimens recorded. Holotype ♀ (BPBM 3244); 15♀ paratypes, 1♀ topotype; 135♀.

Specimens located. Holotype ♀ (slide lacking BPBM type number), 6♀ paratypes, 10♀ (KYOTO); unrecorded 4♀ (KYOTO).

Revised identity. All *C. fragmentum*.

Culicoides obscurus Tokunaga & Murachi

Tokunaga & Murachi, 1959: 347.

Placed as a junior synonym of *Culicoides pungens* deMeijere. **New synonymy.**

Specimens recorded. Holotype ♀ (USNM 64043), 4♀ paratypes, 6♀.

Specimens located. Holotype ♀ (label in hand of W.W. Wirth), 1♀ (pinned) (USNM); ♀ paratype (A-2; wing only), presumed ♀ paratype (A-1) (BPBM).

Revised identity. All *C. pungens*.

Culicoides orientalis Macfie

Tokunaga, 1959: 256; 1962: 515; 1963: 140.

Specimens recorded. 318♀, 92♂.

Specimens located. 43♀, 22♂ (KYOTO); 1♀, 1♂ (BPBM); unrecorded 6♀ (KYOTO).

Revised identity. 37♀ *C. orientalis*; 2♀, 21♂ *C. fragmentum*; 10♀ *C. fulvus* Sen & Das Gupta; 1♂ *C. jacobsoni* (specimen illust. Tokunaga 1962: 514, Fig. 18); 1♀ *Ornatus* group (not determinate to sp.); 1♂ *C. actoni* Smith (BPBM) [specimen illust. (Tokunaga 1959: 156, Fig. 47); later corrected in error to *Culicoides robertsi* Lee & Reye (Tokunaga 1960: 74; 1962: 487); corrected to *C. actoni* (Dyce 1980: 2391)].

Culicoides pungens de Meijere

Tokunaga, 1962: 516; 1963: 140.

Specimens recorded. 13♀.

Specimens located. 11♀ (KYOTO).

Revised identity. 9♀ *C. pungens*; 2♀ *C. fulvus*.

Culicoides robertsi Lee & Reye

Tokunaga, 1960: 74; 1962: 485.

Specimens recorded. 53♀, 36♂ [see above under *C. orientalis* ref. 1♂ illust. (Tokunaga 1959: 256, Fig. 47)].

Specimens located. 16♀, 18♂ (KYOTO); unrecorded 8♀, 2♂ (KYOTO).

Revised identity. All *C. actoni*.

Culicoides unisetiferus Tokunaga

Tokunaga, 1959: 238; 1963: 137.

Placed as a junior synonym of *Culicoides jacobsoni* Macfie. **New synonymy.**

Specimens recorded. Holotype ♀ (BPBM 2874), allotype ♂; 2♂.

Specimens located. Holotype ♀, allotype ♂ (BPBM); 2♂ (KYOTO).

Revised identity. All *C. jacobsoni*.

REVISED COLLECTION DATA FOR AVAILABLE SPECIMENS

Revised collection data for the 7 *Avaritia* species that I have identified from the 189 available specimens studied by the earlier authors (Tokunaga & Murachi, loc. cit.; Tokunaga, loc. cit.) are as follows.

Culicoides actoni Smith

IRIAN JAYA: 1♂, 100 m, 23.VIII.1955 (J.L. Gressitt). PAPUA NEW GUINEA. NEW GUINEA (N): 1♀, Mt Hagen area, 1650 m, 26.VI.1957 (D. Elmo Hardy); 1♀, Sepik Distr, Maprik, 160 m, 26.VIII.1957 (Hardy); 11♀, 15♂, same loc., I,II,III.1959 (W. Peters); 2♀, Bubia, nr Lae, 26–27.IV.1959 (J.H. Ardley); 2♀, 2♂, Minj, W Highlands, 8.V.1959 (Peters); 4♀, 2♂, Kainantu, 1650 m, 20–26.X.1959, merc. vap. light trap (T.C. Maa). WOODLARK I: 1♀, Kulumadau (Murua) Hill, 27–30.IV.1957 (W. Brandt). SOLOMON IS: BUKA I: 1♀, Gagan, 40 m, 15.VI.1956 (Gressitt); BOUGAINVILLE I: 1♀ Kieta, 26.IV.1959 (Peters).

Culicoides dikhros Tokunaga

PAPUA NEW GUINEA. NEW GUINEA (N): holotype ♀, Bubia, nr Lae, 8.III.1959 (J.H. Ardley) (BPBM 2343). Paratypes: 1♀, same loc. and coll. as holotype, 18.III.1959 (KYOTO); 1♀, Sepik Distr, Maprik, I.1959 (W. Peters) (BPBM).

Culicoides fragmentum Tokunaga

PAPUA NEW GUINEA. NEW GUINEA (N): holotype ♀, Bubia, nr Lae, 8.III.1959 (J.H. Ardley) (KYOTO). Paratypes (KYOTO): 1♀, same data as holotype; 3♀, Sepik Distr, Maprik, I,III.1959

(W. Peters). Other specimens. 8♀, 20♂, Sepik Distr, Maprik, I, II, III. 1959 (Peters). NEW GUINEA (S): 1♂, Port Moresby, I. 1960 (Peters). NEW BRITAIN: 1♀, Gazelle Penin, Keravat, 60 m, 10.IX.1955, light trap (J.L. Gressitt); 1♀, Gazelle Penin, Baining Mts, St. Paul's, 350 m, 8.IX.1955, light trap (Gressitt); 1♀, Linga Linga Pl'n., W of Willaumez Penin, 1 m, 11–12.IV.1956, light trap (Gressitt); 1♀, Willaumez Penin, Volupai, 100 m, 17.IV.1956, light trap (Gressitt); 2♀, Gazelle Penin, Vunakanau, Malmalwan, 11–13.V.1956, light trap (Gressitt). NEW IRELAND: paratypes (KYOTO); 2♀, Kavieng, 4.IV.1959 (Peters). SOLOMON IS: BUKA I: 2♀, Gagan, 40 m, 15–16.VI.1956, light trap (Gressitt).

***Culicoides fulvus* Sen & Das Gupta**

IRIAN JAYA (N): 1♀, 100 m, 24.VIII.1955 (J.L. Gressitt). PAPUA NEW GUINEA. NEW BRITAIN: 3♀, Linga Linga Pl'n., W of Willaumez Penin, 1 m, 11–12.IV.1956, light trap and from sago palm (Gressitt). N SOLOMON IS: BUKA I: 5♀, Gagan, 40 m, 15.VI.1956, light trap (Gressitt); BOUGAINVILLE I: 3♀, Kieta, 26.V.1959 (W. Peters).

***Culicoides jacobsoni* Macfie**

PAPUA NEW GUINEA. NEW GUINEA (N): 1♀, Tsenga, upper Jimmi Val, 1200 m, 14.VII.1955, light trap (J.L. Gressitt); 1♀, Wum, Jimmi Val, 16.VII.1955, light trap (Gressitt); 3♀, Lae, 10 m, 15.VII.1957 (D. Elmo Hardy); 12♀, 1♂, Sepik Distr, Maprik, I, II, III. 1959 (W. Peters); 2♀, Bubia, nr Lae, 8.III & 26–27.IV.1959 (J.H. Ardley); 1♂, W Highlands, Eliptamin Val, 1200–1300 m, 16–31.VI.1959 (W. Brandt). NEW BRITAIN: 1♀, Gazelle Penin, Keravat, Lowlands Agr Sta, 22–26.VI.1956 (L. Smee); 1♀, 2♂, Gazelle Penin, Baining Mts, St. Paul's, 300–350 m, 4, 7.IX.1955 (Gressitt). SOLOMON I: BUKA I: 8♀, Gagan, 40 m, 15.VI.1956, light trap (Gressitt).

***Culicoides orientalis* Macfie**

PAPUA NEW GUINEA. NEW GUINEA (N): 2♀, Wum, upper Jimmi Val, 840 m, 16–18.VII.1955, light trap (J.L. Gressitt); 22♀, Sepik Distr, Maprik, I, II, III. 1959 (W. Peters); 1♀, Wamput Val, nr Wau, nr Gurakor Vill, 7.VII.1957 (D. Elmo Hardy); 2♀, Bubia, nr Lae, 8–12.III & 26.IV.1959 (J.H. Ardley). NEW BRITAIN: 1♀, Gazelle Penin, Baining Mts, St. Paul's, 5.IX.1955 (Gressitt); 6♀, Gazelle Penin, Keravat, 3–4.IV.1956 (Gressitt); 1♀, same loc., 13–17.IV.1960 (L. Smee). NEW IRELAND: 2♀ Kavieng, 3–4.VI.1959 (Peters).

***Culicoides pungens* de Meijere**

PAPUA NEW GUINEA. NEW BRITAIN: 1♀, Linga Linga Pl'n. W of Willaumez Penin, 1 m, 15.IV.1956 (J.L. Gressitt). NEW IRELAND: 8♀, Kavieng, 3–4.IV.1959 (W. Peters). CAROLINE IS: PALAU I: 2♀, SW Koror, 25 m, 5.XII.1952, light trap (Gressitt); 2♀, Babelthuap I, Ngaremeskang, 30 m, 24.XI.1952, light trap (Gressitt).

DISCUSSION

About 20% of the specimens listed by Tokunaga & Murachi (loc. cit.) and Tokunaga (loc. cit.) belonging in the subgenus *Avaritia* were located for the present analysis. It is probable that not all of the larger series recorded were mounted on slides and that the residual specimens stored in alcohol no longer exist. Most of the errors in identity disclosed in this present study involve *C. actoni* and *C. orientalis*. Specimens now identified as *C. actoni* were listed mainly under *C. robertsi* [a junior synonym (Lee &

Reye 1963: 362) of *C. brevitarsis*], which is not represented among the specimens located. The redescription and certain illustrations of the male of *C. orientalis* (Tokunaga 1959: 254, Fig. 47) were based on a single *C. actoni* specimen. Other illustrations of the male shown under *C. orientalis* (Tokunaga 1962, Fig. 18) were prepared from a single specimen now identified as *C. jacobsoni* [not *C. fragmentum* as was speculated earlier (Dyce 1980: 291)]. The male of *C. fragmentum* was not recognized by Professor Tokunaga, possibly as a result of the original faulty description of the male of *C. orientalis* (see Dyce 1980). Two females and 21 males of *C. fragmentum* and 10 females of *C. fulvus* were wrongly placed as *C. orientalis*. Four females of *C. fulvus* were misidentified as *C. pungens*.

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