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FURTHER NOTES ON THE ETHIOPIAN SPECIES OF
TAENIORHYNCHUS ARRIBALZAGA (DIPTERA, CULICIDAE).

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IN a recent communication (Gillett, 1946) I described eight species of the subgenus *Coquillettidia* Dyar of the genus *Taeniorhynchus* Arribalzaga, including what I held to be a new species. Recent references to the specimens in the British Museum has shown that *Taeniorhynchus atroapicalis* Gillett is identical with *Chrysoconops fraseri* Theobald, which was sunk by Edwards (1912) as a synonym of *T. aurites* Theobald. It is the object of the present paper to define the present status of this species and to add a few remarks about some of the other species of Ethiopian *Taeniorhynchus*.

It is known that most of the species of *Coquillettidia* resemble each other very closely, especially in their aquatic stages. Hopkins (1936) pointed out that the larvae of *T. aurites* and of *T. microannulatus* Theo. were quite indistinguishable. Gillett (1945, 1946) showed that the Ethiopian larvae of the subgenus so far described fall into two groups, viz. those with tuft B of the eighth abdominal segment single and those with tuft B double. He also pointed out that other good differences were to be found in the antennae.

T. atroapicalis was first separated on larval characters and was found to be even more distinct in the pupal stage, the shape of the paddles being markedly different from those of all the other known Ethiopian species. A series of adults was bred out which resembled those of *T. aurites* in general characters, including the male terminalia,¹ but both sexes were readily separable by the fact that in *T. atroapicalis* all the femora had a well marked dark apical ring which was entirely wanting in *T. aurites*. Hence it was clear that here was a species that did not fit any of the descriptions of adults given by Edwards (1941) and which differed in its early stages from all other known Ethiopian *Taeniorhynchus*.² In addition to these constant and non-intergrading morphological differences it may be mentioned that the behaviour on pupation of *T. atroapicalis* and *T. aurites* differs markedly. The latter species invariably leaves its larval pelt turned nearly inside out, a peculiarity which (as far as is known) it shares only with *T. microannulatus* amongst the Ethiopian *Coquillettidia*. Individuals of *T. aurites* from widely separated parts of Uganda all behave in this way, whereas those of other Ethiopian species, including *T. atroapicalis*, leave the larval pelt somewhat telescoped.

Theobald (1911) described *Chrysoconops fraseri* from one female and two males taken at Kampala, Uganda. He separated it from *T. aurites*, which he had also described (Theobald, 1901), by the presence in the former species of a

¹ It should be noted that the male terminalia of *T. nigrithorax*, *T. flavocinctus*, *T. fuscopennatus*, *T. grandidieri* and *T. aurites* are all very similar.

² Another difference, which is discussed below, was not observed at the time because Edwards' combination of the two species *T. aurites* and *C. fraseri* meant that he included one of the key characters of the latter species in his description of the former.

black dot at the posterior corner of the first abdominal tergite. As stated above, Edwards (1912) considered Theobald's *C. fraseri* to be synonymous with *T. aurites*.³ It should be remembered that the larva of neither species was known at that time. In his later description (Edwards, 1941) of *T. aurites* no characters are given for the "*fraseri* form" of *T. aurites*, *C. fraseri* being mentioned as a synonym only.

The description of *T. atroapicalis* by Gillett (1946) fits Theobald's type specimen of *C. fraseri* and the two names are synonymous. It is clear that *C. fraseri* should be reinstated as *Taeniorhynchus (Coquillettidia) fraseri* Theobald.

On going through the material labelled *T. aurites* in the British Museum it was noted that there were several specimens of *T. fraseri* (= *atroapicalis*) included as *T. aurites*. Examination of the geographical distribution of these shows that populations of the two species overlap. The distribution of *T. aurites* given by Edwards (1941) still holds and *T. fraseri* occurs with it at Kampala and Entebbe in Uganda, and at Stanleyville in the Belgian Congo. In addition I have taken both species from Masaka in Uganda. In the British Museum there is also one rather doubtful specimen recorded from Lourenço Marques in Portuguese East Africa, which resembles *T. fraseri* but has no dark apical ring on the front femur.

When Hopkins (1936) bred out and described the larva and pupa of *T. aurites* he sent a number of the larval and pupal pelts, together with their respective adults, to the British Museum. Recent examination of this material has revealed that both *T. aurites* and *T. fraseri* are represented, and by a stroke of bad luck, which at the time was wholly unavoidable, the larval pelt, pupal pelt and adult which he designated as the paedotype all belong to *T. fraseri*. It is now known, then, that Hopkins had taken the larvae of both species and had reared them through to adult stage, but as *T. fraseri* was at that time considered only as a form of *T. aurites* he had designated them all as *T. aurites*.⁴ The fact that both species were represented in this material led Edwards (1941) to describe the pupa of *T. aurites* as being "subject to some variation." It is, in fact, subject to very little variation. The difficulties which have arisen out of Hopkins' description of the larva of *T. aurites* have been dealt with by Gillett (1945, 1946).

In view of this somewhat confusing situation a new key to the adults of the Ethiopian species of *Taeniorhynchus* seems desirable, and new descriptions with complete synonymies of the adults of *T. aurites* and *T. fraseri* are called for. The key which follows is based on that given by Edwards (1941), but incorporates certain changes, including those made necessary by the situation discussed above.

Key to the adults of the Ethiopian species of *Taeniorhynchus*.

- | | |
|---|---------------------|
| 1. Wing-scales narrow; tarsi without white rings (<i>Coquillettidia</i>) | 2. |
| Wing-scales very broad; tarsi with white rings (<i>Mansonioides</i>) | 17. |
| 2. Dark metallic species; (scutum with pale scales anteriorly); tarsi and wing-scales uniformly black | <i>metallicus</i> . |
| Lighter species; tarsi and wing-scales partly yellow | 3. |

³ Theobald (1907) transferred his *T. aurites* to the genus *Chrysoconops* Goeldi.

⁴ Mr. Hopkins, who has seen this paper in draft, points out that this is exactly the type of case against which his suggestion of paedotypes was directed as a safeguard. He considers that the adult and its larval and pupal pelts now become the paedotype of *T. fraseri*.

3. Brownish species; abdomen with broad dark bands; costa dark
versicolor.
 Lighter species; at least the abdomen largely or all yellow; costal
 scales partly or all yellow 4.
4. Thoracic integument yellow or green, with dark marks on pleurae 5.
 Thoracic integument otherwise 7.
5. A pair of patches of black scales on anterior half of mesonotum
pseudoconopas.
 Scales on anterior half of mesonotum uniformly golden 6.
6. Dark scales on wings *tending* to form two transverse bands; male
 styles without expansion *maculipennis.*
 Wing-scales more uniform; male styles with expansion near apex *ametti.*
7. Thoracic integument very dark and shining; abdomen yellow 8.
 Thoracic integument at most brownish above 10.
8. Tibiae all blackish *nigrithorax.*
 Tibiae not all blackish 9.
9. Hind tibia black with a yellow ring beyond middle *flavocinctus.*
 Hind tibia yellow with a black ring in middle *cristatus.*
10. Mesonotum largely brown; wing-scales extensively dark *fuscopernatus.*
 Thorax rather bright orange-yellow, like the abdomen 11.
11. Hind tibia with a black ring in middle 12.
 Hind tibia yellow, without black ring in middle *microannulatus.*
12. Costa with some dark scales on basal half *grandidieri.*
 Costal scales all yellow 13.
13. Hind tarsi with about the distal third of first segment black; fourth
 segment yellow at base 14.
 Hind tarsi with about the distal fifth of first segment black; fourth
 segment all black above 15.
14. Male styles with very large median lobe *aureus.*
 Male styles with membranous expansion near tip *wahlbergi.*
15. Males styles with membranous lobe 16.
 Male styles simple *chryosoma.*
16. Dark apical ring on all femora; first tergite with a black dot at each
 posterior corner *fraseri.*
 No dark apical ring on femora; no black dots on first tergite *aurites.*
17. Pale scales on thorax arranged in patches; tibiae with separate white
 spots anteriorly *africanus.*
 Pale scales on thorax arranged in stripes; tibiae with confluent creamy-
 white patches anteriorly *uniformis.*

In the keys given by Gillett (1946) to the known larvae and pupae of the Ethiopian species of *Coquillettidia* the word "*fraseri*" should be substituted for "*atropicalis*."

Taeniorhynchus (Coquillettidia) aurites Theobald.

Taeniorhynchus aurites Theobald, 1901, *Mon. Cul.* 2: 209; Edwards, 1911, *Bull. ent. Res.* 2: 252 and, partim 1941, *Mosq. Eth. Reg.* 3: 99.

Chrysoconops aurites Theobald, 1907, *Mon. Cul.* 4: 493.

(?) *Taeniorhynchus auripennis* Edwards (♂ only), 1915, *Bull. ent. Res.* 5: 279.

TYPE.—♀ in B.M., NIGERIA, Bonny.

A large bright yellow species; thorax and wings entirely yellow; legs mainly yellow, including apex of all femora, but with a distinct black ring in middle of hind tibia, as in several related species. Fourth hind tarsal segment all black.

♀. *Head* yellow, including clypeus, tori and all scales. Proboscis yellow, narrowly black at tip and at base beneath. Palpi yellow, usually with a few black scales at tip, but these sometimes absent.

Thorax bright yellow, including mesonotal scales and bristles; two large patches of white scales present on the pleurae, one in the middle of the sternopleura and the other in the middle of the mesepimeron; integument underlying these white pleural scales somewhat darkened. In addition, a very small and much less conspicuous patch of white scales lower down on the posterior border of the sternopleura.

Abdomen bright yellow, often with a few black scales which are apt to be most numerous towards posterior margins of tergites 2-4. Small black patches on the integument at posterior corners of tergites 2-5, usually only clearly visible when the abdomen is distended; no black dots on posterior corners of tergite 1.

Legs yellow, with only a few scattered black scales on femora and on anterior tibia; apex of all femora yellow; hind tibia with a narrow black ring in middle and very narrowly black at tip. Front tarsi variable, but usually with first segment yellow except for black tip; second segment yellow with apical third or half black; third, fourth and fifth segments all black; (front tarsi much more extensively yellow in some specimens). Middle tarsi variable, usually all yellow except for fifth segment, which is all black, but sometimes with a black tip to segments 1-4. Hind tarsi with first segment yellow except for black tip occupying from a sixth to a quarter of its length; second segment yellow with distal half black; third, fourth and fifth segments all black (third yellow at base in some specimens).

Wings yellow-scaled, with very occasionally a few dark scales present, especially on sixth vein.

♂. Ornamentation as in ♀. Palpi exceeding proboscis by length of last segment; yellow; with a few black scales at tip of shaft and more at tip of penultimate segment; most of terminal segment black, plumes yellow. Abdominal tergites 2-4 sometimes with narrow black bands or triangles.

Terminalia.—Style with a membranous expansion in middle, somewhat larger and more hairy than that of *T. fuscopennatus*.

Wing-length about 5 mm.

Distribution.—NIGERIA: Bonny (*Annelt*); Lagos (*Philip, Graham*). GABOON: Fernan Vaz (*Galliard*). UGANDA: Kampala (*Hancock, Hopkins*); Entebbe (*Hodges, Gillett*); Masaka (*Gillett*). BELGIAN CONGO: Stanleyville and Lake Albert (*Schwetzel*); Sandoa (*Chaussier*); Futwe and Mwabo (*Seydel*).

Taeniorhynchus (Coquillettidia) fraseri Theobald.

Chrysocomops fraseri Theobald, 1911, *Novae Cul.*: 22.

Taeniorhynchus aurites Edwards (nec Theobald), partim, 1912, *Bull. ent. Res.* 3: 25, and 1941, *Mosq. Eth. Reg.* 3: 99.

Taeniorhynchus atroapicalis Gillett, 1946, *Bull. ent. Res.* 36: 436.

Taeniorhynchus aurites Hopkins (nec Theobald), partim, 1936, *Mosq. Eth. Reg.* 1: 83.

TYPES.—♂♀ in B.M., UGANDA, Kampala.

A medium-sized bright yellow species resembling *T. aurites*, from which it may at once be separated by its dark-tipped femora, the presence of small black dots on the posterior corners of the first abdominal tergite and its smaller size.

♀. *Head* yellow; erect and decumbent scales pale yellow; tori and clypeus orange yellow; proboscis yellow, with black tip and narrow black base beneath; palpi yellow, with broad black tips (reduced to a few scattered black scales in one specimen).

Thorax with yellow integument; scutum with a scanty covering of bright yellow scales, which tend to be arranged in longitudinal lines. Three patches of white scales on the pleurae, in the middle of the sternopleura, on the posterior margin of the lower part of the sternopleura and on the mesepimeron; those on the middle of the sternopleura and mesepimeron smaller than those in *T. aurites*, and with scarcely any darkening of the integument beneath.

Abdomen mainly yellow, but with a few scattered black scales often tending to form black triangles on the posterior margins of tergites 2-4. Small black dots on the posterior corners of tergite 1, and black patches on the postero-lateral corners of tergites 2-6. Sternites mainly yellow, but with black scales tending to form posterior dark bands.

Legs mainly yellow; femora yellow with numerous scattered black scales (these scales moderately numerous on the distal half only of front and hind femora, but very numerous for the full length of the middle femur) and a well marked dark apical ring (sometimes less conspicuous on the front femur). Front and middle tibiae with numerous scattered black scales, and a dark apical ring; the scattered black scales are almost entirely restricted to the anterior surface of the middle tibia, where they generally form an almost complete black line extending for two-thirds the length of the tibia. Hind tibia with an apical black ring, a black ring just beyond the middle and a few black scales at the extreme base. Front tarsi with first segment yellow except for black tip; second segment yellow, with apical third black; third, fourth and fifth segments all black. (The basal half of the third segment is yellow in a few specimens.) Middle tarsi all yellow except for fifth segment, which is all black; in some specimens there is a slight darkening at the apices of segments 1-4. Hind tarsi yellow, with distal quarter of first segment black, distal half of second segment black, distal two-thirds of third segment black, fourth and fifth segments all black. No variation has been observed in the hind tarsi, which thus differ from those of *T. aurites*.

Wings all yellow; occasionally a few scattered dark scales on the sixth vein.

♂. Ornamentation as in ♀. Palpi mainly yellow; tip of shaft black-scaled; distal half of penultimate and whole of terminal segments black-scaled; plumes yellow.

Terminalia.—Style with median membranous expansion as in *T. aurites*.

Wing-length about 4 mm.

Distribution.—UGANDA: Kampala (*Fraser, Baker, Hancock, Hopkins*); Entebbe (*Hodges, Gillett*); Masaka (*Gillett*). BELGIAN CONGO: Stanleyville (*Schwetz*).

SUMMARY.

In 1912 *Chrysoconops fraseri* Theo. was sunk by Edwards as a synonym of *Taeniorhynchus aurites* Theo. In 1946 Gillett described the larva, pupa and adult of *T. atroapicalis*, which was shown to be clearly distinct from *T. aurites* in all three stages.

Comparison of *T. atroapicalis* with the type specimen of *C. fraseri* shows them to be identical. Theobald's species is therefore reinstated as *Taeniorhynchus fraseri* Theo., with *T. atroapicalis* as a synonym.

Notes are given on the geographical distribution of *T. aurites* and *T. fraseri*, together with some observations on their larvae and pupae.

An amended key is given for the adults of the Ethiopian species of *Taeniorhynchus* and full new descriptions of the adults of *T. aurites* and *T. fraseri*.

I am indebted to the Trustees of the British Museum for permission to look through the material, and to Messrs. R. B. Freeman, P. F. Mattingly and G. H. E. Hopkins for many helpful suggestions.

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BOOK NOTICE.

The Butterflies and Moths found in the Counties of Cheshire, Flintshire, Denbighshire, Caernarvonshire, Anglesey and Merionethshire. Compiled and edited by S. GORDON SMITH. 8vo. Chester (Chester Society of Natural Science, Literature and Art), 1948. Pp. 250. 17 pls. Price 15s. 6d.

The author in his preface to this work says that his aim has been to bring up to date the list of records of Macro-Lepidoptera, including the Zygaenidae, Cossidae, Sesiidae and Hepialidae, which have been found in the counties of Cheshire, Flintshire, Denbighshire, Caernarvonshire, Anglesey and Merionethshire.

To this end the records of over 130 entomologists and earlier published records have been embodied to make the work as comprehensive as possible.

The arrangement is by families, each genus being listed under its subfamily, and the species numbered consecutively through the book. The English names are given for each species, followed by a general indication of the abundance and habitat of the insect. This is followed by the records for each county.

The book is illustrated by 17 half-tone plates, most of the specimens shown being in the author's collection.

An index of families, subfamilies, genera, species and English names completes the book.