

A New *Arthroteles* from South Africa (Diptera, Rhagionidae)

Akira NAGATOMI¹⁾ and Hisako NAGATOMI²⁾

Abstract

The genus *Arthroteles* is distributed only in South Africa and three species have hitherto been known (STUCKENBERG, 1956, 1980). A fourth species from South Africa is here described as new to science.

Key words: Taxonomy, Snipe fly, *Rhagio*-group, A fourth species, *Atherimorpha*.

Introduction

The genus *Arthroteles* is known only in South Africa. STUCKENBERG (1956) revised this genus, and described or redescribed the following three species: *A. bombyliiformis* BEZZI, 1926 (1 ♀, over 3 ♂♂, from Cape province [Cedarberg Mountains] and Western Cape Province [Sneeugat Valley]); *A. cinerea* STUCKENBERG, 1956 (8 ♂♂, 15 ♀♀ from Natal [Drakensberg]); *A. orophila* STUCKENBERG, 1956 (2 ♂♂, 1 ♀ from Cape Town [Table Mountain]).

In a letter to us on August 21, 1989, Dr. Brian R. STUCKENBERG said: "There are several undescribed species of *Arthroteles*, but the separation of species is difficult and gives the impression of recent speciation in the southern and western Cape Province."

In this paper, we venture to add a new species of *Arthroteles* on the basis of a single male specimen. However, this new species (= *longipalpis*) may be at once distinguished from the previously described ones.

Two males and two females of *cinerea* and one male of *longipalpis* have been examined by us but no specimen of *bombyliiformis* and *orophila* is on hand.

We sincerely thank Dr. B. R. STUCKENBERG, Natal Museum, Pietermaritzburg, South Africa

1) 永富 昭, 鹿児島大学農学部害虫学教室

Entomological Laboratory, Faculty of Agriculture, Kagoshima University, Kagoshima 890, Japan

2) 永富尚子, 鹿児島女子大学生物学教室

Biological Laboratory, Kagoshima Women's College, Hayato 899-51, Japan

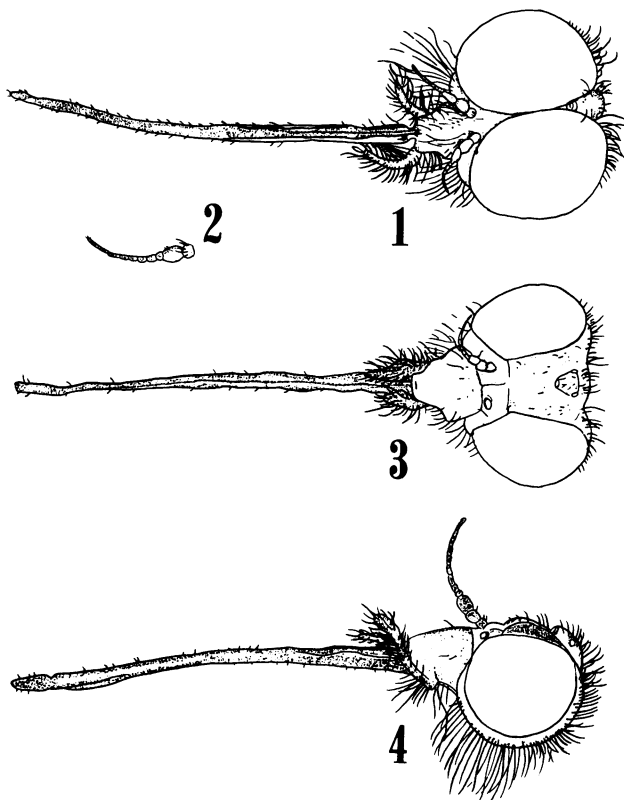
and Dr. H. J. TESKEY, Biosystematic Research Center, Agriculture Canada, Ottawa for their generous gift or loan of material and for their long-term help in many ways.

Genus *Arthroteles* BEZZI

Arthroteles BEZZI, 1926, Ann. S. Afr. Mus., 23:321. Type species: *Arthroteles bombyliiformis* BEZZI, 1926 from South Africa (Cape Province), by original designation.

For diagnosis of *Arthroteles*, see BEZZI (1926), STUCKENBERG (1956) and NAGATOMI (1982). As to *Arthroteles cinerea* (Figs.1-4), the following structures were described and illustrated: Mouthparts, STUCKENBERG (1956) and NAGATOMI and SOROIDA (1985); male genitalia, STUCKENBERG (1956) and NAGATOMI (1984); female terminalia, STUCKENBERG (1956) and NAGATOMI and IWATA (1976).

Arthroteles is most closely related to *Atherimorpha*. NAGATOMI and H. NAGATOMI (in press) discussed the origin of *Arthroteles*.



Figs. 1-4. *Arthroteles cinerea*. 1, Male head from a direct frontal view; 2, male antennal segments 2, 3 and style, outer view; 3, female head from a direct frontal view; 4, female head in lateral view.

Sexual dimorphism in *Arthroteles* species

In *cinerea* (Figs.1-4), the female differs from the male by having the eyes widely separated (in male, eyes are contiguous) and the pile on occiput, palpus, thorax, abdomen, coxae and femora shorter than in male. Besides the characters above, no striking sexual dimorphism is seen.

As to the female *bombyliiformis*, the following are quoted from STUCKENBERG (1956).

The head is small in relation to the body, particularly when the insect is viewed laterally.

Palps neither large nor strongly flattened, nor as hairy as in the male; the segments are subcylindrical,.... [in male, palps strikingly large, black, porrect, the apical segment long, broad, and conspicuously flattened laterally; apical segment with many radiating, black hairs, the hairs on the extreme short; basal segment with long, radiating, white hairs].

The female is unique in having shining yellowish-white hairs on the frons.

Genae, postgenae and lower part of occiput broad, protruding prominently around the eye when the head is seen in lateral view.

Mesonotal pile short, shining yellow, quite different to that of male. [in male, hairs of mesonotum extremely long, erect, dark brown, more closely aggregated on the sides before the suture.....].

Length of proboscis and antenna in *Arthroteles bombyliiformis* and *A. cinerea*

NAGATOMI (1982:43) wrote, "proboscis is longer in *cinerea* and *orophila* than in *bombyliiformis*.... and this may be associated with the central part of face conically produced forward in the former two species". However, this statement is not correct. The proboscis in male *bombyliiformis* is evidently very long, judging from BEZZI (1926) who wrote, "Proboscis slender and acute, directed obliquely forwards, as long as head and thorax together."

STUCKENBERG (1956) wrote, "Rostrum slender, about twice or a little less as long as the antennae [in male *bombyliiformis*]" and "Proboscis about 3 1/4 times as long as the antennae [in female *bombyliiformis*]."

BEZZI (1926) wrote, "The antennae.... are longer than antero-posterior diameter of head, being carried horizontally [in male *bombyliiformis*]."

In *cinerea*, "Rostrum elongated, slightly curved downwards, about 3 1/2 times as long as the antennae [in male]" and "Proboscis about four times as long as the antennae [in female]" (after STUCKENBERG, 1956).

We have measured the proboscis and antenna in 1 ♂, 1 ♀ of *cinerea*. Proboscis measured along dorsal surface is 1.1 times (in ♂) and 1.0 times (in ♀) as long as combined length of head and thorax (from base of antenna to postscutellum), 3.7 times (in ♂) and 3.3 times (in ♀) as long as antenna, which is 0.75 times (in ♂) and 0.95 times (in ♀) as long as head (from upper eye margin or occiput to parafacials). Probably the length of proboscis varies to some degree with individual.

Notes on *Arthroteles orophila*

A. orophila is similar to *A. cinerea* in the facial swelling conically produced forward, "though not quite as much as in *cinerea*" (after STUCKENBERG, 1956) in both sexes. Judging from STUCKENBERG (1956), *orophila* differs from *cinerea* by having antennal segments 1-2 with conspicuous, stiff, radiating hairs and female occiput and cheek more developed behind and below eye than in *cinerea*. In *cinerea*, antennal segments 1-2 have shorter hairs which are less abundant than in *orophila* and female occiput and cheek are less developed behind and below eye than in *orophila*. In *cinerea*, the pile on face, antenna, and mesonotum may vary from white to black with individual.

Habitat and flower-visiting habit in *Arthroteles cinerea*

The following are taken from STUCKENBERG (1956).

At the type locality in the Drakensberg a distinct zone of flowering plants occurs from an altitude of about 7,600 ft. upwards, and it was only over the range of this zone that *cinerea* was found. It was on Composite flowers, particularly *Helichrysum* spp., that the flies were most often taken. At that altitude the topography is youthful, the terrain being deeply dissected by steep-sided valleys cut by torrential streams and rising rapidly to the precipices which form the crest of the range. These slopes are thickly covered with grass, and flowering plants occur on the ridges and north-facing slopes.

The flies resemble bombyliids in the way they hover over and settle on flowers, though they are not as strong on the wing. It was noticed that they remain for some time on a flower once they have settled, and on several occasions a number of individuals were seen on the same flower-head. The flies seem adept at clinging to their perches, even when the flowers sway considerably in the stiff breeze which often prevails at that altitude. However, their legs are poorly adapted for walking and the flies are quite helpless when confined in glass tubes.

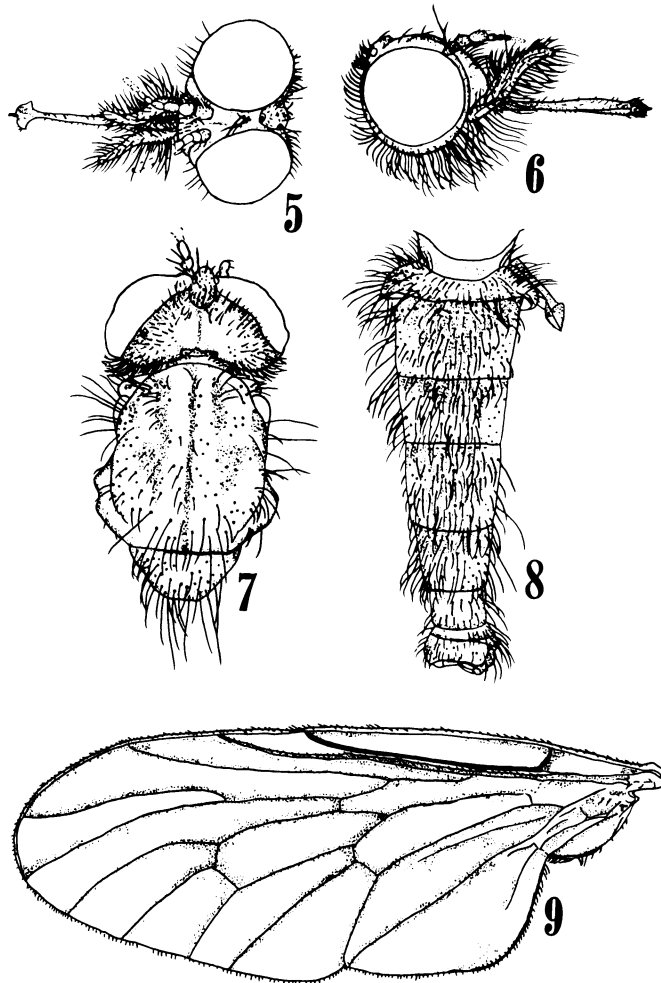
Arthroteles longipalpis sp. n.

(Figs. 5-14)

This species, whose female is unknown, differs markedly from *bombyliiformis*, *cinerea* and *orophila* by having the male eyes widely separated and not divided into upper and lower portions by size of facets, and proboscis much shorter than combined length of head and thorax.

The male and female facial swelling is produced forward conically in *cinerea* and *orophila* but not so in *bombyliiformis* and *longipalpis*.

The male palpal segment 2 is very large and flattened laterally in *bombyliiformis* but cylindrical in *longipalpis*. "The ocular fringe and vestiture of the thorax, abdomen, and palps extremely long" (after STUCKENBERG, 1956:325) in male *bombyliiformis*, but those in male

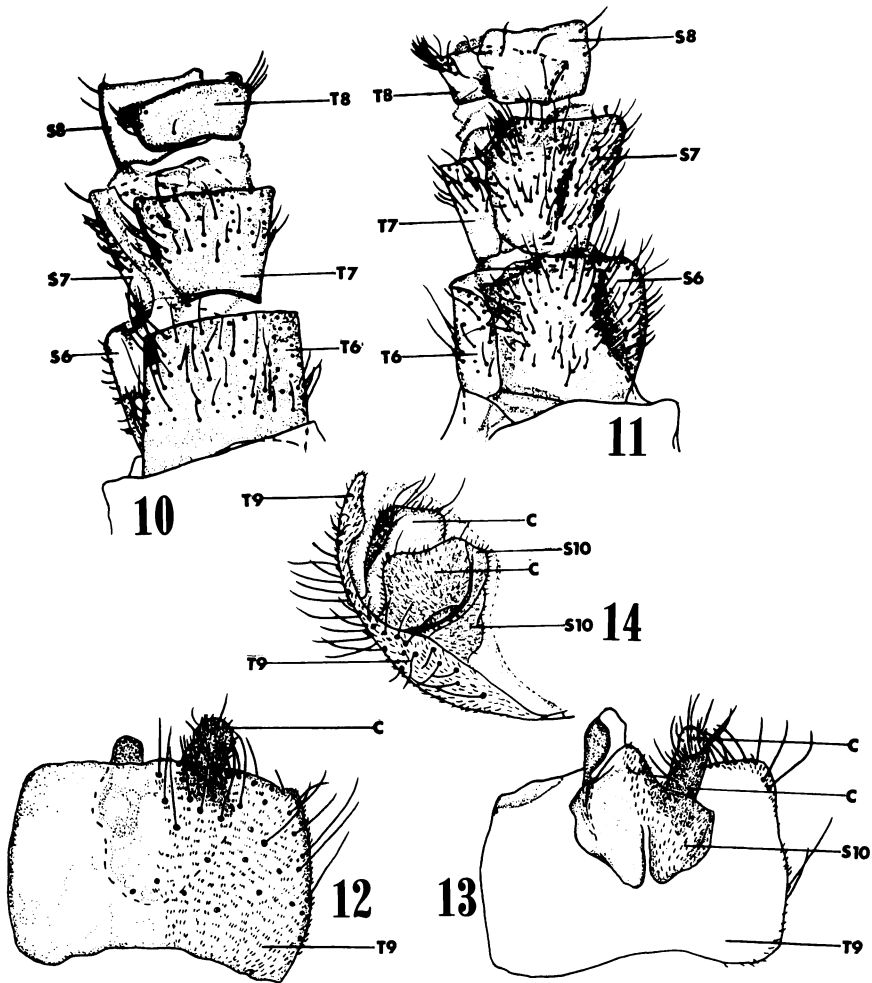


Figs. 5-9. *Arthroteles longipalpis*, male. 5, Head from a direct frontal view; 6, head in lateral view; 7, head and thorax from dorsal view; 8, abdomen, postscutellum and halter from dorsal view; 9, wing, whose magnification is larger than in Figs. 5-8.

longipalpis are apparently shorter than in male *bombyliiformis*.

Male: Dark brown to black; head, thorax, abdomen, coxae and femora pale gray pollinose; wing brown (or bark brown) fumose and stigma not distinctly marked or slightly darker.

Male. Head [apical portion of antennal style is lacking] (Figs.5-7): Dark brown to black, and pale gray pollinose; with black hairs on upper frons (before median ocellus), ocellar triangle, vertex, occiput (except cerebrale), mid-upper face, antennal segments 1-2, and palpus; cheek with longer pale pile; proboscis with shorter and sparser black hairs; antennal segment 3 at dorsal part with black hairs which are short and inconspicuous; hairs are stiff on occiput, long on ventral surface of palpal segment 1 where some pale pile may be intermixed; at least some hairs on antennal segment 1 may be long; width of one eye at greatest point from a direct frontal view 1.7 times distance from antenna to median ocellus, 0.8 times width of face at lowest portion from a direct frontal view, and 2.2 times width of front just above antenna; width of front at median ocellus 0.6



Figs. 10-14. Male abdominal segments 6-8 and male cercus, tergum 9 and sternum 10 in *Arthroteles longipalpis*. 10, Dorsal view; 11, ventral view; 12, dorsal view; 13, ventral view; 14, a posterolateral view; C, cercus; S6-S8, sternum 6 - sternum 8; S10, sternum 10; T6-T8, tergum 6 - tergum 8; T9, tergum 9. Figs. 12-14 are larger in magnification than Figs. 10-11.

times that just above antenna, 1.2 times that at narrowest point, and 0.8 times width of ocellar triangle; ocellar triangle as wide as long; space between antennae 0.2 times width of ocellar triangle; distance from antenna to ventral base of palpus 1.4 times that from antenna to median ocellus, which is 1.8 times length of ocellar triangle; relative lengths of antennal segments 1, 2, 3, 100:100:120 and their relative widths from the side 110:100:80 [antennal style is distinctly jointed but its apical portion is lacking in specimen at hand]; palpus cylindrical, 1.6 times as long as distance from antenna to ventral base of palpus and 2.3 times as long as distance from antenna to median ocellus; palpal segment 2, c. 6 times as long as wide and c. 3 times as long as and c. 1 1/2 times as wide as segment 1, which is c. 3 times as long as wide; proboscis measured along dorsal surface 1.4 times as long as palpus and 0.5 times as long as combined length of head and thorax

(from base of antenna to postscutellum); facial swelling, which is not produced forward conically, extends to antennae; side of face gradually wider considerably below; lower occiput and cheek developed to some degree below and behind eye.

Thorax (Fig.7): Dark brown to black, and pale gray pollinose; mesonotum with three darker stripes (starting opposite posterior part of humeral calli), of which median one extends to scutellum; each side of mesonotum also with two darker spots before and behind suture; mesonotum (except anterior part) and scutellum with long black hairs; pro-, meta- and lower part of sternopleuron with pale pile.

Wing (Fig.9): Membrane brown (or dark brown) fumose; stigma not distinctly marked or slightly darker than rest of membrane; veins brown to dark brown; anal cell closed or nearly closed at wing margin in the specimen on hand; halter is pale brown to brown, but knob may be more or less darker.

Legs: Dark brown to black; coxae and femora pale gray pollinose; coxae with longer, chiefly black hairs; femora with black hairs which become pale on basal portions of mid- and hind femora where hairs are longer on ventral surfaces; tibiae with black spinules which are shorter than thicknesses of tibiae; relative lengths of segments (excluding coxa and trochanter) of fore leg 158 : 211 : 100 : 41 : 30 : 19 : 26, of mid leg 154 : 222 : 95 : 41 : 27 : 16 : 24, of hind leg 211 : 284 : 116 : 51 : 32 : 19 : 27 and in hind leg from the side, relative widths of femur, tibia, and tarsal segments 1-3, 32 : 19 : 14 : 11 : 11.

Abdomen (Figs. 8, 10-11): Dark brown to black, and pale gray pollinose; terga 2-5 are darker at basal borders where pollen is less distinct; above and below with pale pile, but segments 6-7, sternum 5 and genitalia with shorter black hairs (some hairs in middle of terga 2-5 may be black); sternum 8 longer than tergum 8; hairs on tergum 8 is confined to posterolateral parts.

Genitalia (Figs. 12-14): No significant difference is seen between *longipalpis* and *cinerea*, except for the tergum 9 which is rectangular and has the anterior part about as wide as posterior part (in *cinerea*, the tergum 9 is rather trapezoid and wider anteriorly). Cercus rather square-shaped in lateral view (this is so in *cinerea*). For male genitalia of *cinerea*, see STUCKENBERG (1956) and NAGATOMI (1982).

Length: Body 5.5 mm; wing 5.4 mm; fore basitarsus 0.93 mm.

Female. Unknown.

Distribution. South Africa (Cape Province).

Holotype: ♂, Bainskloof, 5-10 miles E. Wellington, 1. vii. 1951, No. 346, Swedish South Africa Expedition, 1950-1951, BRINCK - RUDEBECK; Frank M. HULL Collection, C. N. C. 1973.

Holotype is deposited in Biosystematic Research Center, Agriculture Canada, Ottawa.

References

- BEZZI, M. 1926. South African Rhagionidae (Diptera) in the South African Museum. *Ann S. Afr. Mus.*, 23: 297-324.
- NAGATOMI, A. 1982. The genera of Rhagionidae. *J. nat. Hist.*, 16: 31-70.

- NAGATOMI, A. 1984. Male genitalia of the lower Brachycera (Diptera). *Beitr. Ent.*, 34: 99-157.
- NAGATOMI, A. and IWATA, K. 1976. Female terminalia of lower Brachycera (Diptera). I. *Beitr. Ent.*, 26: 5-47.
- NAGATOMI, A. and NAGATOMI, H. (in press) The distribution and relationships of *Atherimorpha*, and a revision of the species in South Africa (Diptera, Rhagionidae). *Ann. Natal Mus.*
- NAGATOMI, A. and SOROIDA, K. 1985. The structure of the mouthparts of the orthorrhaphous Brachycera (Diptera) with special reference to blood-sucking. *Beitr. Ent.*, 35: 263-368.
- STUCKENBERG, B. R. 1956. Notes on the genus *Arthroteles* Bezzi, with descriptions of two new species (Diptera: Erinnidae). *Ann. Natal Mus.*, 13: 313-335.

(Accepted November 6, 1989)