

**THE GENUS *ALFONSIELLA* WATERSTON
(HYMENOPTERA, CHALCIDOIDEA, AGAONIDAE)**

by

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With 37 text-figures

This paper is a tribute to Prof. Dr. L. D. Brongersma, in remembrance of the years
I served as his deputy in the Rijksmuseum van Natuurlijke Historie.

The genus *Alfonsiella* was described by Waterston (1920) for *A. fimbriata*, a series of females of which were collected at Dar es Salaam, Tanganyika. In 1959, Joseph recorded females of *A. fimbriata* from Mt. Nimba, Guinea, and from the same locality he described *A. longiscapa*. Wiebes (1969) recorded *A. fimbriata* from Bingerville, Ivory Coast. More female specimens of both West African forms were caught at light by Dr. J. T. Medler at Ile-Ife, Nigeria; females and males of *A. longiscapa* were reared by him from the receptacles of *Ficus* cf. *leprieuri*.

Dr. D. S. Hill, when at Makerere University, Uganda, obtained males and females of *Alfonsiella* from three species of figs, viz., *Ficus dekdeknena*, *F. natalensis*, and *Ficus* spec. It is peculiar that several samples contained a species of *Elisabethiella* Grandi next to that of *Alfonsiella*. This simultaneous occurrence of two species of Agaonidae in one fig is well worth of further investigation. It is suggestive of the sort of relation described by Galil & Eisikowitch (1969) for *Ceratosolen arabicus* and *C. galili* in *Ficus sycomorus*. There is a similar case with *Ficus capensis*, in the receptacles of which *Ceratosolen capensis* and *C. flabellatus* occasionally are found together. Now that several of these instances have become known from Africa, the few from the Indo-Malayan region (see Wiebes, 1966) may warrant an explanation different from that suggested when they were found. Some instances of American Agaonidae reported from one species of fig were mentioned by Ramirez (1970): only that of *Blastophaga mariae* and *B. carlosi* in *Ficus tuerckheimi* would seem to be genuine, and may be corresponding with relations in our African symbioses.

In the present paper two new species of *Alfonsiella* are described in full (not repeating the characters mentioned in the generic diagnosis), and addi-

tional notes are given on *A. fimbriata* and *A. longiscapa*. Of all four species the males are described and illustrated for the first time. I have seen typical specimens of *A. fimbriata* in the British Museum (Natural History) (abbreviated BM in the text); Dr. Joseph sent types of *A. longiscapa* (eventually to be deposited in the Museum National d'Histoire naturelle at Paris, MP). Material from Ivory Coast is kept in the Musée Royal de l'Afrique centrale at Tervuren (MT); all other specimens mentioned are in the collection of the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH). Of the samples donated by Dr. Hill, more specimens are still in his private collection.

Alfonsiella Waterston

Alfonsiella Waterston, 1920, Ent. monthly Mag. (3), 6: 198 (descr. ♀, type species *A. fimbriata* Waterston); Joseph, 1959, Proc. R. ent. Soc. London (B), 28: 30 (two species from Guinea); Wiebes, 1961, Zool. Meded. Leiden, 37: 238 (♀, in key); Hill, 1967, Zool. Verh. Leiden, 89: 9 (♀, in key); Wiebes, 1969, Ann. Mus. R. Afr. centr. (in 8), 175: 457-458 (two species compared).

Female. — Head one to one and a half times as long as wide. Compound eyes large; lateral ocelli present or absent. Antenna eleven-segmented; the scape rather wide, with or without apical process; the pedicel without axial spines; the third segment simple, without apical appendage; the funicular sensoria long and flexible. Mandibular appendage with hook-like ridges, with or without lateral crenulations.

Thorax with mesosternal pollen pockets. Wings: stigmal vein in fore wing obliquely inclined; the postmarginal vein as long as the stigmal or shorter, fading out indistinctly. Fore coxa with pollen pocket; the tibia with two dorso-apical teeth, the larger of which is hook-like, and with one ventral. Hind leg with two ventral spurs. All tarsi five-segmented, with a distinct plantar fringe.

Gaster. Hypopygium gradually narrowing caudad. Pygostyle rather long, with one long apical seta, two shorter apicals, and one short subapical seta. Spiracle of the eighth urotergite subcircular. The ovipositor and its valves about as long as the gaster.

Total length, 1.15 to approximately 2 mm.

Male (fig. 27). — Head one to one and one-third times as long as wide. Compound eyes prominent, situated in the front part of the head. Antenna inserted into separate pockets above the stomal edge, six-segmented; the scape clavate, the pedicel as long as the combined length of the two or three following segments; the club large, with apical sensoria and setae. Mandible triangular in lateral aspect, rather heavy, with one tooth and one gland.

Labium and maxillae reduced, with ventral setae.

Thorax consisting of two dorsal sclerites, viz., the pronotum (with a frontal hyaline part), and the joined meso- and metanotum and propodeum; the pronotum slightly shorter and wider than the caudal sclerite. The propodeum is indicated as two ear-like lobes, with large spiracular peritremata. Fore leg: the tibia with two dorsal hook-like teeth and one simple ventral (or indistinctly two), the dorsal edge with conical spines in the distal half; the tarsus oligomeric. Mid leg strikingly darker than the other legs; the femur and tibia setose, without (or with indistinct) ventral spurs; the tarsus five-segmented. Hind leg: the tibia with two ventral spurs, the distal half of the dorsal edge with conical spines; the tarsus five-segmented.

Gaster short; the genitalia without distinct claspers or parameres.

Total length, 1.0 to 1.2 mm.

Remarks. — The species, fairly easily distinguished in the female sex, are very much alike in the males. Differences may be found in the shape of some parts of the head, and in the number of spines on the hind leg. These characters are used in the key, but not repeated with the descriptions.

Comparison with other Agaonidae. — Much as in general *Alfonsiella* reminds one of *Agaon* Dalman and *Allotriozoon* Grandi, the presence of both coxal and sternal pollen pockets in the female would rather combine it with *Elisabethiella* Grandi and *Pegoscapus* Cameron (see Ramirez, 1969). The shape of the mandible would make a close relationship with *Pegoscapus* unlikely, thus there remains *Elisabethiella* both as a symbiont and a probable relative. In *Elisabethiella* too, we find the simple female antenna, and the dimorphism of the scape — e.g. in *E. pectinata* (Joseph) as against *E. articulata* (Joseph), reminiscent of the situation in *A. longiscapa* or *natalensis* on the one hand, and *A. fimbriata* or *brongersmai* on the other — to which feature I already drew attention in another context (Wiebes, 1969: 458).

The morphology of the male shows that the relation of *Alfonsiella* and *Elisabethiella* cannot be very close. The insertion of the antennae is quite unlike that in most other Agaonidae, and the shape of the mandibles — especially when seen in lateral aspect — is rather peculiar.

KEY TO SPECIES

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|--|---|
| 1. Females | 2 |
| — Males | 5 |
| 2. Head scarcely longer than wide (figs. 1, 15). Antennal scape without apical projection (fig. 14). Mandibular appendage with 15-20 hook-like ridges (figs. 3, 13) | 3 |
| — Head distinctly longer than wide (almost 3 : 2; fig. 19). Antennal scape with apical projection (figs. 24, 25). Mandibular appendage with about 35-40 hook-like ridges and fine crenulations (fig. 21) | 4 |

3. Longitudinal diameter of the eye more than three times the length of the cheek; no ocelli (fig. 1). Mandibular appendage with about fifteen ridges (fig. 3) *fimbriata*
 — Longitudinal diameter of the eye one and a half times as long as the cheek; two ocelli (fig. 15). Mandibular appendage with about twenty ridges (fig. 13) *brongersmai*
4. Longitudinal diameter of the eye one and one-third times the length of the cheek. Apical projection of the antennal scape wide; the pedicel rather slender: almost three times as long as wide (fig. 23). Mandibular appendage with about forty ridges
 *natalensis*
 — Longitudinal diameter of the eye one and a half times as long as the cheek. Apical projection of the antennal scape narrower; the pedicel wider: about two times as long as wide (fig. 24). Mandibular appendage with about thirty-five ridges (fig. 21)
 *longiscapa*
5. The eye rather large, one-third of the length of the head (fig. 5). Antennal scape (fig. 4) approximately three times as long as wide *fimbriata*
 — The eye shorter, one-quarter of the length of the head (figs. 8, 30). Antennal scape (figs. 11, 29) approximately twice as long as wide 6
6. Head (fig. 8) rather wide in front, the width just behind the eyes little smaller than the maximum width *brongersmai*
 — Head (fig. 30) distinctly narrowing frontad, the width just behind the eyes four-fifths of the maximum width 7
7. Dorsal edge of the tibia (fig. 32) with less than fifteen conical spines . . . *natalensis*
 — Dorsal edge of the hind tibia (fig. 35) with more than fifteen conical spines . . .
 *longiscapa*

Alfonsiella fimbriata Waterston

(figs. 1-6)

Alfonsiella fimbriata Waterston, 1920, Ent. monthly Mag. (3), 6: 198-200, fig. 1 (descr. ♀, Dar es Salaam, viii.1914, A. Dampf; BM); Joseph, 1959, Proc. R. ent. Soc. London (B), 28: 30 (♀, Mt. Nimba, x.1951, C. Delamare Deboutteville; MP); Wiebes, 1969, Ann. Mus. R. Afr. centr. (in 8), 175: 457-458, figs. 19-23 (♀, additional descr., Bingerville, iii.1962 and xi.1962, J. Decelle; MT).

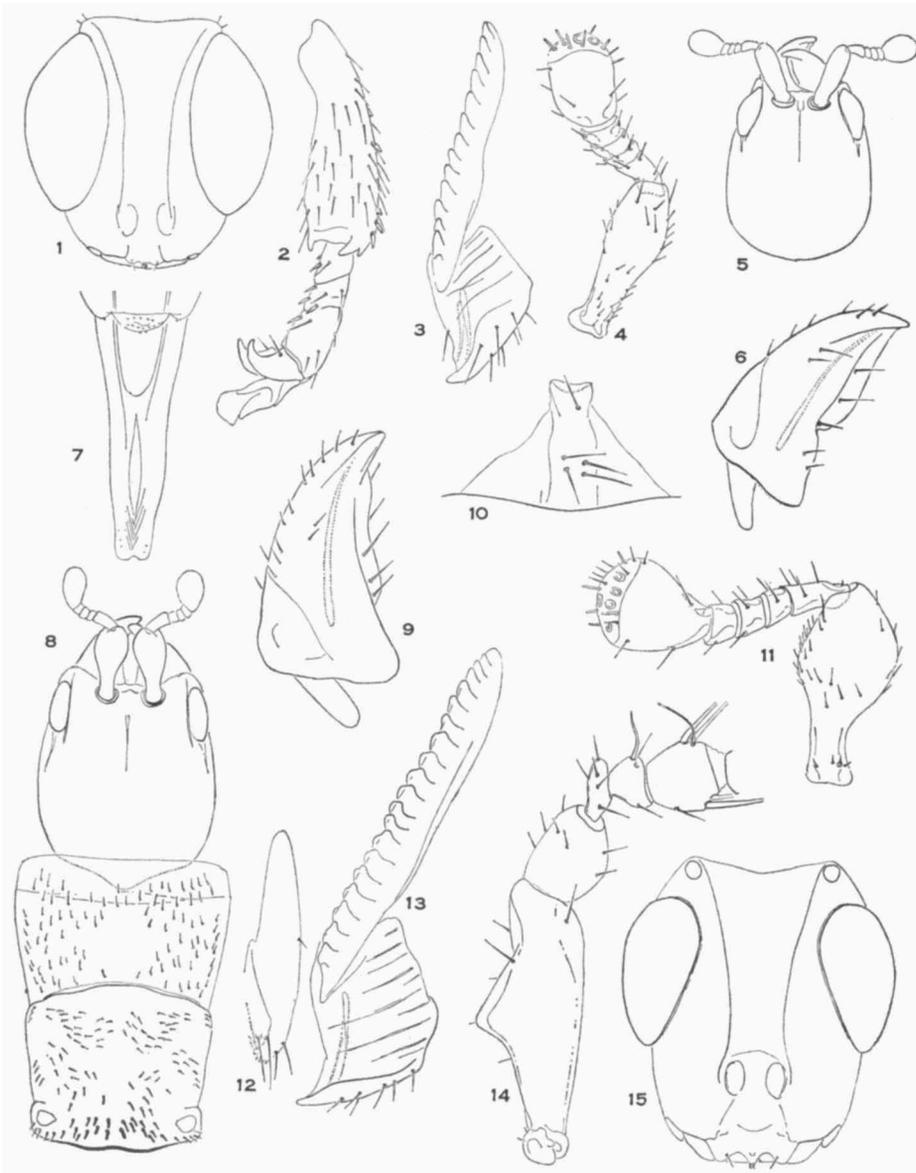
Material. — 1 ♀ holotype and fragments of about 4 paratypes of *A. fimbriata* Waterston, "Dar es Salaam. A. Dampf. Aug. 1914", three slides in BM (type, slide no. 5-1461).

11 ♀, 6 ♂, Uganda, Entebbe, 14.xi.1968, leg. D. S. Hill no. 14, ex *Ficus dekdeknena*; RMNH no. 1294, ♂ and ♀, slides 1294 a, and b, c, respectively.

3 ♀, material recorded by Wiebes, 1969 (MT).

8 ♀, Nigeria, Ile-Ife, leg. J. T. Medler, at light, on several data, viz., 2 ♀, 7.i.1970, no. 3 (RMNH no. 1203); 1 ♀, iii.1969 (RMNH no. 1226); 2 ♀, vi.1969 (RMNH no. 1209); 2 ♀, viii.1969 (RMNH no. 1238); 1 ♀, xii.1969 (RMNH no. 1251).

Female. — This was extensively described, and the antenna illustrated, by Waterston (1920). Later, Wiebes (1969) figured the mandible, the hind tibia and metatarsus, the fore wing, the pygostyle, and the shape of the spiraculum of the eighth urotergite. The head is here figured in fig. 1; the mandible, for



Figs. 1-6, *Alfonsiella fimbriata* Waterston. 1, female head; 2, male fore tibia and tarsus; 3, female mandible; 4, male antenna; 5, male head; 6, male mandible.

Figs. 7-15, *Alfonsiella brongersmai* spec. nov. 7-11, male; 12-15, female. 7, genitalia; 8, head and thorax (pubescence of head omitted); 9, mandible; 10, labium and maxillae; 11, antenna; 12, labium and maxilla; 13, mandible; 14, antennal scape, pedicel, and three funicular segments; 15, head.

Figs. 2, 14, antaxial aspect; 4, 5, 8, 9, 11, dorsal aspect; 3, 6, 7, 10, 12, 13, ventral aspect; 1, 15, frontal aspect. Magnification: 1, 15, $\times 100$; 2, 4, 6, 9, 11, $\times 160$; 3, 12-14, $\times 210$; 5, 8, $\times 60$; 7, 10, $\times 250$.

comparison with those of *A. brongersmai* and *A. longiscapa*, in fig. 3.

There is some variation in size, as already indicated by Wiebes (1969: 457), and in the relative proportions of some parts of the legs. It would require more material to analyse this variation; no geographical pattern is apparent from the present samples.

Male. — Head, fig. 5; antenna, fig. 4; mandible, fig. 6; fore tibia and tarsus, fig. 2.

Alfonsiella brongersmai spec. nov.

(figs. 7-15, 36, 37)

Material. — 11 ♀, 4 ♂, Kenya, Nairobi, 10.ii.1968, leg. C. van Someren no. 19, ex *Ficus* spec.; RMNH no. 1326 (ex coll. Hill), holotype ♀, slide no. 1326b, paratypes ♂ and ♀, slides 1326a, and c, respectively.

Female. — Head (fig. 15) a little longer than wide across the compound eyes (12 : 11); the longitudinal diameter of the eye one and a half times as long as the cheek. Two ocelli. Antennae (fig. 14) of the general shape of that of *A. fimbriata*, with normal scape and wide pedicel; the funicle with fewer and shorter sensoria, viz., four or five per segment. Mandible (fig. 13) with about eight ventral ridges; its appendage with about twenty ridges. Labium and maxilla, fig. 12.

Thorax. Fore wing (5 : 2), 1.8 mm long, with dark striae of microtrichae; the postmarginal, stigmal, marginal and submarginal veins approximately in ratio 1 : 2 : 3 : 6. Hind wing (5 : 1), 1.0 mm long. Fore leg: the tarsal segments approximately in ratio 7 : 4 : 4 : 3 : 6. Mid leg: the tarsal segments approximately in ratio 3 : 3 : 3 : 2 : 3. Hind leg: the long tibial spur distinctly curved at tip, the smaller bidentate; the tarsal segments approximately in ratio 7 : 4 : 3 : 3 : 4.

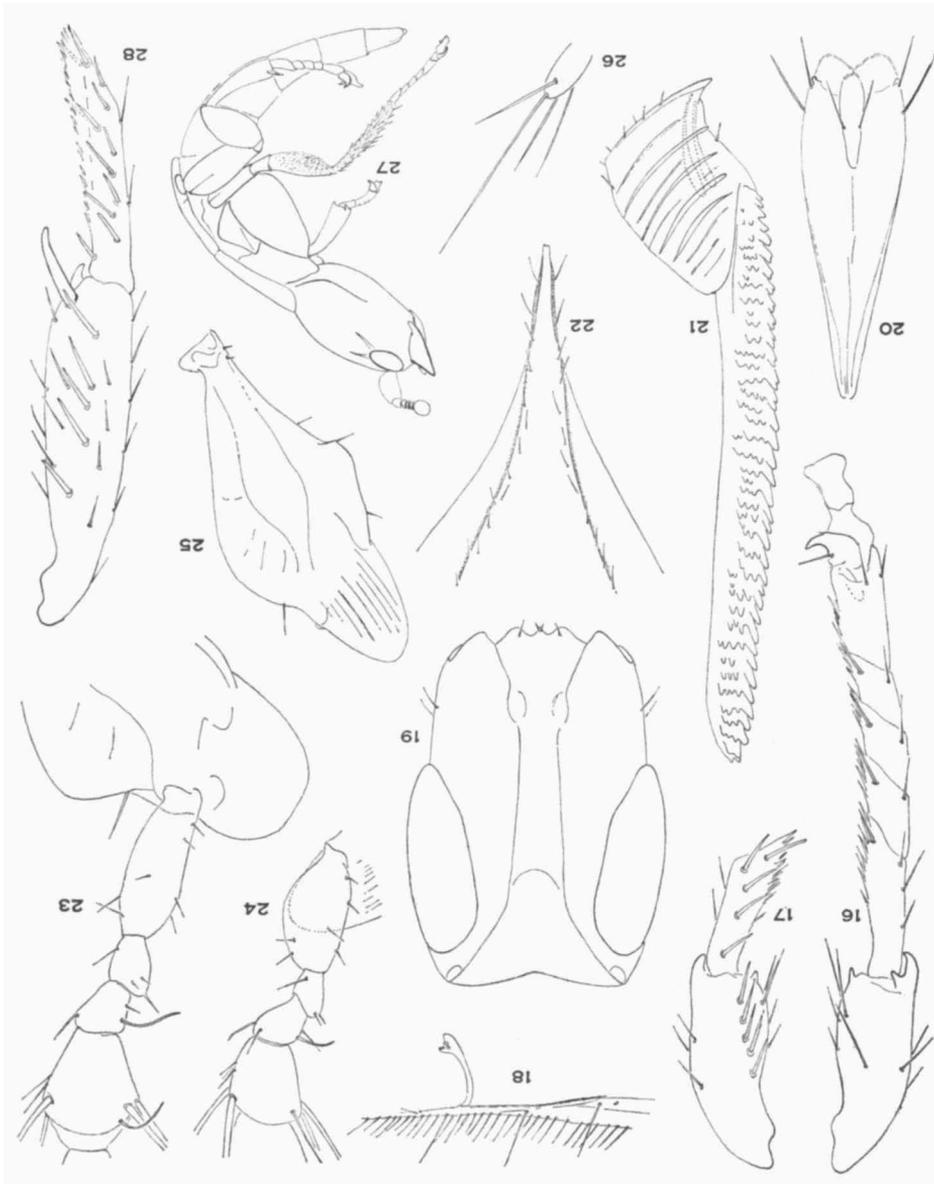
Total length, about 1.8 mm.

Male. — Head and thorax, fig. 8; antenna, fig. 11; mandible, fig. 9; labium and maxillae, fig. 10; mid tibia and tarsus, fig. 37; hind tibia and tarsus, fig. 36; genitalia, fig. 7.

Alfonsiella natalensis spec. nov.

(figs. 16-18, 22, 23, 26-34)

Material. — 8 ♀, 4 ♂, Uganda, Katalemus, 30.vii.1968, leg. D. S. Hill no. 20, ex *Ficus natalensis*; RMNH no. 1305, holotype ♀, slide no. 1305a, paratype ♂, side no. 1305b.



Figs. 16-18, 22, 23, 26, 28, *Alfonsiella natalensis* spec. nov., female, and 27, male. 16, fore tibia and tarsus; 17, fore tibia and metatarsus; 18, veins of fore wing; 22, hypopygium; 23, antennal scape, pedicel, and three funicular segments; 26, pygostyle; 28, hind tibia and metatarsus.

Figs. 19-21, 24-25, *Alfonsiella longiscapa* Joseph, female. 19, head; 20, labium and maxillae; 21, mandible; 24, pedicel and three funicular segments; 25, antennal scape.

Figs. 16, 23-25, antiaxial aspect; 17, 28, axial aspect; 19, frontal aspect; 20-22, ventral aspect; 26, 27, lateral aspect. Magnification: 16-18, 20, 21, 23-26, 28, $\times 210$; 19, 22, $\times 100$; 27, $\times 40$.

10 ♀, 3 ♂, Uganda, Makerere University Campus, 12.viii.1968, leg. J. D. Hill, ex *Ficus natalensis*; RMNH no. 1308, paratypes.

17 ♀, 12 ♂, Uganda, Kampala, 18.vii.1968, leg. D. S. Hill no. 55, ex *Ficus* spec. ("T"); RMNH no. 1299, paratypes ♂ and ♀, slides nos. 1299a, b, and c, respectively.

6 ♀, 2 ♂, Kenya, Nairobi, 30.ii.1968, leg. C. van Someren no. 25, ex *Ficus* spec.; RMNH no 1331 (ex coll. Hill) 1).

8 ♀, 8 ♂, Kenya, Nairobi (Mayfair hotel, 5400 ft alt.), 10.ii.1968, leg. C. van Someren no. 17, ex *Ficus* spec.; RMNH no. 1333 (ex coll. Hill) 1).

Female. — Head almost one and a half times as long as wide across the compound eyes; the longitudinal diameter of the eye one-third longer than the cheek. Two ocelli. Antennal scape (fig. 23) very wide, its apical portion reaching more than half way the pedicel; the pedicel narrow, almost three times as long as wide; third and fourth segments and funicle, much like those of *A. longiscapa*. Mandible like that of *A. longiscapa*, its appendage with about forty ridges of teeth. Labium and maxillae with two setae each.

Thorax. Fore wing (5 : 2), 1.7 mm long, with dark striae of microtrichiae; the postmarginal vein approximately as long as the stigmal, half as long as the marginal (fig. 18). Hind wing (5 : 1), 1.0 mm long. Fore leg (figs. 16, 17): the tibia with a row of five or six axial spines; the tarsal segments approximately in ratio 11 : 5 : 4 : 4 : 7, with axial spines. Mid leg slender, the tibia a little longer than the femur; the tarsal segments approximately in ratio 4 : 2 : 2 : 2 : 3. Hind leg (fig. 28): the axial armature of tibia and metatarsus consisting of rows of spines, as in *A. longiscapa*; the tarsal segments approximately in ratio 18 : 10 : 7 : 6 : 10.

Gaster. Hypopygium, fig. 22; pygostyle, fig. 26.

Total length: about 2 mm.

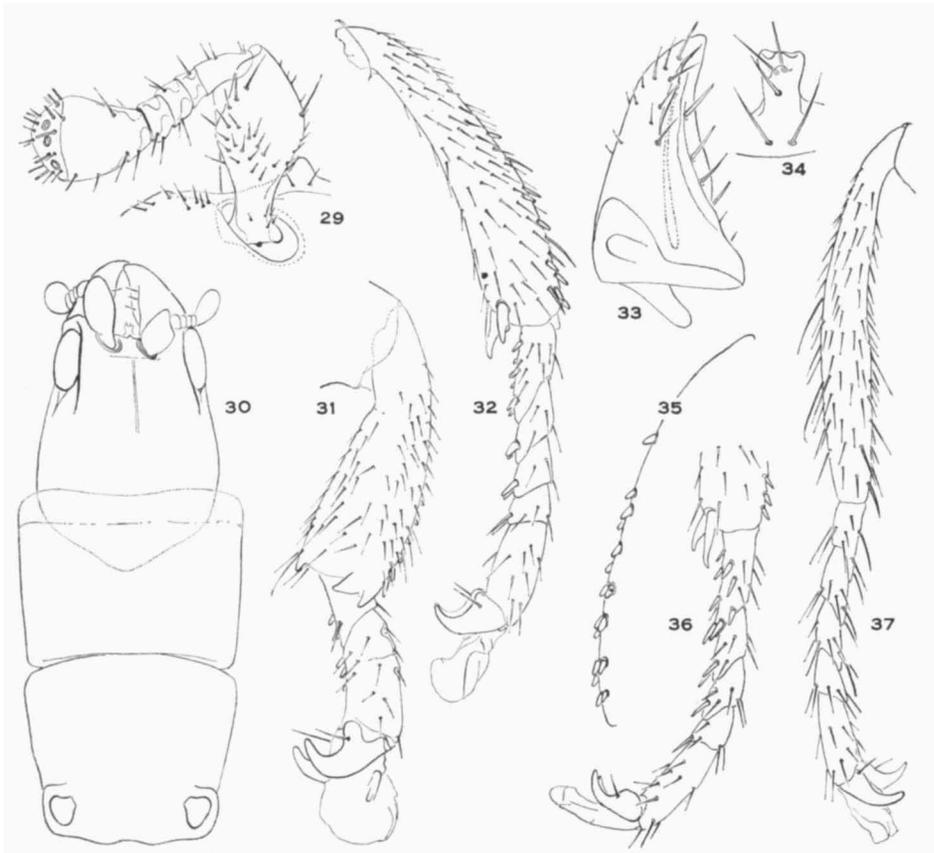
Male (fig. 27). — Head and thorax, fig. 30; antenna, fig. 29; mandible, fig. 33; labium and maxillae, fig. 34; fore tibia and tarsus, fig. 31; hind tibia and tarsus, fig. 32.

***Alfonsiella longiscapa* Joseph**

(figs. 19-21, 24, 25, 35)

Alfonsiella longiscapa Joseph, 1959, Proc. R. ent. Soc. London (B), 28: 30, figs. 1 (7-12) (descr. ♀, Mt. Nimba, x.1951, C. Delamare Deboutteville; MP); Wiebes, 1969, Ann. Mus. R. Afr. centr. (in 8), 175: 457-458 (♀ compared with *A. fimbriata*).

1) I cannot find any differences between these specimens and those of the other samples, although the accompanying species of *Elisabethiella* are widely different.



Figs. 29-34, *Alfonsiella natalensis* spec. nov., male. 29, antenna; 30, head and thorax; 31, fore tibia and tarsus; 32, hind tibia and tarsus; 33, mandible; 34, labium and maxillae.

Fig. 35, *Alfonsiella longiscapa* Joseph, dorsal edge of male hind tibia.

Figs. 36, 37, *Alfonsiella brongersmai* spec. nov., male. 36, apex of hind tibia and tarsus; 37, mid tibia and tarsus.

Figs. 29, 30, 33, dorsal aspect; 31, 32, 35, 37, antiaxial aspect; 34, ventral aspect; 36, axial aspect. Magnification: 29, 31-33, 36, 37, $\times 160$; 30, $\times 60$; 34, $\times 250$; 35, $\times 210$.

Material. — 1 ♀ holotype of *A. longiscapa* Joseph, and fragments of another specimen, "Reg. no. 53" and "Reg. no. 53a", respectively, two slides in MP.

4 ♀, 5 ♂, Nigeria, Ile-Ife, 13.iii.1970, leg. J. T. Medler no. 7, ex *Ficus* cf. *leprieuri*; RMNH no. 1287, 1 ♂, slide no. 1287a; ditto, 9 ♀ without Dr. Medler's no. (RMNH no. 1289).

48 ♀, Nigeria, Ile-Ife, leg J. T. Medler, at light, on several data, viz., 8 ♀, 7.i.1970, no. 3 (RMNH no. 1254, 1 ♀, slide no. 1254a); 6 ♀, iii.1969

(RMNH no. 1227); 2 ♀, vi.1969 (RMNH no. 1200); 18 ♀, viii.1969 (RMNH no. 1239); 5 ♀, ix.1969 (RMNH no. 1244); 5 ♀, x.1969 (RMNH no. 1247); 2♀, xi.1969 (RMNH no. 1220); 2♀, xii.1969 (RMNH no. 1250).

Female. — There is little to add to Joseph's (1959) description of the female. The head is illustrated in fig. 19; parts of the antenna, figs. 24, 25; mouth parts, figs. 20, 21.

Male. — Dorsal edge of hind tibia, fig. 35.

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