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Systematics of the sycoecine fig wasps (Agaonidae, Chalcidoidea, Hymenoptera), IV (*Philocaenus*, in part)

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ABSTRACT

Philocaenus Grandi, an African genus of sycoecine fig wasps is revised in part. *Phagoblastus* Grandi is synonymised with *Philocaenus* resulting in two new combinations. *Crossogaster silvestrii* Grandi is transferred to *Philocaenus*. *Philocaenus* has broad host associations similar to those of *Crossogaster* Mayr. The *Philocaenus silvestrii* and *P. barbatus* species-groups are treated here. Species in these groups are associated with the *Ficus* subsections *Galoglychia, Platyphyllae* and *Chlamydodorae* of section *Galoglychia* and therefore occur together with a number of agaonine genera, viz. *Allotriozoon* Grandi, *Elisabethiella* Grandi and *Alfonsiella* Waterston. Nine new species are described: *Philocaenus comptoni* (Cameroun, ex *Ficus chlamydocarpa* Mildbr. & Burr.), *P. cavus* (Ivory Coast, ex *F. saussureana* D.C.), *P. comorensis* (Comoros Islands, ex *F. antandronarum bernardii* Berg), *P. geminus* (Uganda, ex *F. 'natalensis'*), *P. jinjaensis* (Uganda, ex *Ficus* sp. K), *P. insolitus* (Gabon, ex *F. craterostoma* Mildbr. & Burr.), *P. medius* (South Africa & Malawi, ex *F. natalensis natalensis* Hochst and *F. thonningii* Bl.), *P. ugandensis* (Uganda, ex *F. 'natalensis'*, *F. 'thonningii'* and *F. 'dekdekena'*), and *P. hippopotomus* (South Africa, Madagascar, Zambia and Malawi, ex *F. trichopoda* Baker).

INTRODUCTION

Philocaenus Grandi as here defined incorporates *Phagoblastus* Grandi, which is recognised as a junior synonym. The delimitation of these two genera was based solely on differences in female morphology (Grandi, 1955), which with the acquisition of material of new species has proven to be only the extremes of a continuum of variation. In addition the synonymy is strongly supported by male morphology. No males were available when Grandi described these genera, but if they had been it seems unlikely that he would have separated *Phagoblastus barbarus* and *Philocaenus barbatus* at the generic level, since the males are difficult

to separate at the species level. The genus thus encompasses a broad range of female morphological variation, whereas the males are morphologically conservative. This is typical of sycoecines, as female variation is a result of adaptations that have evolved to facilitate entrance through the fig ostiole, whereas the males have not been subjected to this selective pressure.

Philocaenus consists of a number of distinct species-groups, usually only recognisable in the female sex. An exception is the *P. silvestrii* group which is defined by male characters. This latter species-group is also the most distinct and may warrant generic status. However, I have refrained from separating it, as there are no female autapomorphies defining the group, and the cladogram resulting from the phylogenetic analysis of the sycoecine species suggests that this species-group would be better placed within *Philocaenus* (van Noort & Compton, in prep.).

Philocaenus now contains 22 species in total, 17 of which are new. 9 of these are described here. The remaining 8 new species will be dealt with in the second half of the *Philocaenus* revision (van Noort, in press). The *Philocaenus silvestrii* and *Philocaenus barbatus* species-groups are treated here. The species in the first group are associated with the *Ficus* subsection *Galoglychia* (section *Galoglychia*), pollinated by *Allotriozoon* Grandi species. Species in the latter group are associated with the subsections *Platyphyllae* and *Chlamydodorae* (both of section *Galoglychia*), pollinated by *Elisabethiella* Grandi, *Alfonsiella* Waterston, and *Nigeriella* Wiebes species, although no sycoecines have been collected from *Nigeriella* pollinated figs. A key to the species will be provided in the second half of the revision.

Morphological terminology, definitions and abbreviations are as defined in van Noort (1993). All measurements are in millimetres. The following acronyms are used for institutions and collections housing *Philocaenus* specimens:
IEGB - Istituto di Entomologia 'Guido Grandi', Bologna
NHML - The Natural History Museum, London
RMNH - Rijksmuseum van Natuurlijke Historie, Leiden
SAMC - South African Museum, Cape Town
SANC - National Collection of Insects, Pretoria
SGCC - Collection of Dr. S.G. Compton, Leeds

Philocaenus Grandi

Philocaenus Grandi 1952, 38–40. Type species: *Philocaenus barbatus* Grandi, by monotypy.
Phagoblastus Grandi 1955, 100–102, **syn. nov.** Type species: *Phagoblastus barbarus* Grandi, by monotypy. Bouček *et al.* 1981, 168–170 (classification of *Crossogaster* and *Phagoblastus*; key to two species of *Phagoblastus*).

FEMALE. Head as broad as long, or distinctly longer than wide, slightly to extremely dorso-ventrally compressed; smooth, without sculpture; clypeus narrow to broad, shape very variable. Compound eyes large. Malar sulcus ranging from being present for the full cheek length to being completely absent. Vertex with an occipital carina situated dorsal to a broad invagination of the ventral margin of

the vertex, the vertex may have shallow lateral excavations; strong setae present. Antennae with two anelli, four funicle segments and three club segments. Multiporous plate sensilla (MPS) placoid. Ventral tentorial pits usually in close apposition, often difficult to distinguish as paired, usually situated in the posterior end of a short medial depression, ca. a third of the distance from the oral fossa to the foramen magnum; sometimes distinctly separated without a medial depression present. Internally the tentorial beams diverge dorsally such that the dorsal tentorial pits are widely spaced and situated on the clypeal sutures. Hypostoma usually present, but may be absent. Two labial palp segments, segments subequal; three maxillary palp segments. Mandible very variable, with two apical teeth and the ventral armature ranging from a single tooth to a plate of many teeth.

Thorax. Pronotum broad to elongate, with a weak carina present on the dorso-anterior margin; mesonotum subtriangular, parapsidal sulci complete, evenly curved; propodeal spiracles anteriorly situated, may be surrounded by a shallow excavation. Very stout fore femur, subtriangular or cylindrical and elongate; fore tibial armature variable: may be bidentate, a comb of teeth, or a plate of teeth fused along the length of the adaxial face of the tibia. The ventral tooth, situated next to the spur insertion on the fore tibia, may be present or absent. Axial third of forewing glabrous, rest covered in microsetae, fringe present, anal and medial setal tracts present. Postmarginal vein subequal to shorter than stigmal, marginal vein thickened.

Gaster. Posterior tergal edges crenulated (frayed) with three deeper dorsal medial incisions. Eighth urotergite spiracle normal, may have a slightly expanded peritreme. Ovipositor valves from 0.28X to half the length of the gaster.

MALE. Head ranging from broad to elongate; epistomal margin broader than in the females. Toruli usually touching, may be slightly separated. Antennal formula 1124(3), second anellus larger than the first. MPS may be very reduced in number. Dorsal tentorial pits situated about half way between the toruli and the epistomal margin on the clypeal sutures. Strong setae present on the vertex. Ventral tentorial pits separated, may be in close apposition, situated closer to the oral fossa than to the foramen magnum. Two labial palp segments, three maxillary palp segments. Mandibular apical teeth either subequal in length, with the outer tooth slightly longer, or the outer tooth distinctly longer than the inner; no ventral teeth; two glands.

Thorax. Pronotum broad with many strong setae; mesonotum subtriangular, parapsidal sulci may be incomplete posteriorly, evenly curved, strong setae present. Propodeal spiracles anteriorly situated. Fore tibial armature bidentate, rarely absent. Wings pilose, axial third bare, anal and medial setal tracts present, fringe present. Thickened marginal vein.

Gaster, posterior edge of tergites uniformally straight, with a row of strong setae along the edge. Aedeagus small or large.

Comments. Philocaenus females may be recognised by the following combi-

nation of characters: two anelli and four funicle segments; gastral tergites with a crenulated posterior edge; ventral tentorial pits in close apposition; eighth urotergite spiracle normal. Some species of *Crossogaster* also have two anelli and four funicle segments with a crenulated posterior margin to the tergites, but then the tentorial pits are widely spaced and the eighth urotergite spiracular peritremata are expanded. *Philocaenus* males have the outer mandibular tooth longer than the inner, without any ventral teeth present.

PHILOCAENUS SILVESTRII SPECIES-GROUP

This species-group can be defined in both sexes by the presence of stronger setae on the head and body, although less so in the females and a complete malar sulcus. Additionally, the males have subequal mandibular teeth, an antennal flagellum that is shorter than the scape and a head that narrows anteriorly as in *Sycoecus* Waterston males.

Philocaenus silvestrii (Grandi) comb. nov.
(figs. 23–27)

Crossogaster silvestrii Grandi 1916, 253–264, figs. xli–xliv, holotype ♀, allotype ♂, Senegal (IEGB). [Examined ♀ types, IEGB (in alcohol, in a very poor state of preservation)]; Bouček *et al.*, 1981, 169 (probable host *F. vogelii* (Miq.) Miq. [= *F. lutea* Vahl]); Newton & Lomo, 1979, 25 (*Phagoblastus* spec., Ghana, ex. *F. vogelii* [= *F. lutea*]).

Crossogaster atratus Masi 1917, 125–126, fig. 3, holotype ♀, Seychelles, **syn. nov.** [Holotype not seen]. *Crossogaster* cf. *atratus*, Wiebes 1975, 233–234, figs. 28–32, ♀, Aldabra, ex *F. nautarum* Baker (= *F. lutea* Vahl).

Additional material. Series ♀♀, 1 ♂: Kenya, 4 miles from Embu, 3 March 1968, C.v.S. no. 28, leg. C. van Someren, ex *Ficus* spec.; series ♀♀: Kenya, Forthall, 19 March 1969, C.v.S. no. 29, leg. C. van Someren, ex *Ficus* spec.; 4 ♀♀: Kenya, Nairobi, 12 October 1971, leg. J. Galil, RMNH 1901, ex *F. vogelii* (Miq.) Miq. (= *F. lutea* Vahl); 15 ♀♀, 16 ♂♂: Madagascar, 1000 m, Ambalavao, 11 km S. on RN 7, 14 August 1972, leg. Cremers & Delobal, RMNH 2123, ex *F. baroni* Baker (= *F. lutea*) (Blommers no. 17); 25 ♀♀: Aldabra Island, Bassin Cabri, 10 March 1974, RMNH 2469, leg. S.R.J. Woodell, ex *F. nautarum* Baker (= *F. lutea*); 3 ♀♀: Aldabra Island, Takamaka Grove, 10 February 1974, RMNH 2477, leg. S.R.J. Woodell, ex *F. nautarum* Baker (= *F. lutea*); series ♀♀, ♂♂: Ghana, Kumasi, U.S.T. Campus, January 1981, leg. Newton & Hayford, RMNH 4350, ex *F. vogelii* (Miq.) Miq. (= *F. lutea*); 23 ♀♀, series ♂♂: Seychelles, Cousin Island, July 1981, no. 357 & 361, leg. G.M. Bathe, RMNH 4637, ex *F. nautarum* Baker (= *F. lutea*); 15 ♀♀, 3 ♂♂: Ivory Coast, Taï Forest, 20–22 November 1982, leg. C.C. Berg & J.T. Wiebes, RMNH 4802, ex *F. lutea* Vahl (det. Berg); series ♀♀, ♂♂: South Africa, Natal, Umhlanga Rocks, 3 December 1986, C29, leg. S.G. Compton & A.J. Gardiner, ex *F. lutea*; series ♀♀, ♂♂: South Africa, Natal, Hibberdene, 13 December 1986, C30, leg. S.G. Compton, ex *F. lutea*; 4 ♀♀, 2 ♂♂: South Africa, Natal, Mtunzini, 12 December 1988, C99, leg. S.G. Compton, ex *F. lutea*; series ♀♀, 3 ♂♂: South Africa, Natal, Mselini, 26 January 1990, C255, leg. S. van Noort & A.B. Ware, ex *F. lutea*; 2 ♀♀: South Africa, Eastern Cape, Grahamstown, 1 January 1991, leg. S.G. Compton, C342, ex *F. lutea*; series ♀♀, ♂♂: Comoro Islands, Grand Comore, Maoeni Forest, 24 July 1990, leg. S.G. Compton, C2002, ex. *F. lutea*. Material in SAMC and SGCC.

Comments. Grandi in his description of *Crossogaster silvestrii* (Grandi, 1916), incorrectly described *C. silvestrii* as having a single labial palp segment and two maxillary palp segments, whereas there are actually two and three segments re-

Table 1. Comparison of head shape among different geographical populations of *P. silvestrii* and *Allotriozoon heterandromorphum* Grandi, the pollinator of *Ficus lutea* Vahl.

Locality	Head length : width					
	P. silvestrii			*A. heterandromorphum*		
	$\bar{x}$	Range	*n*	$\bar{x}$	Range	*n*
South Africa	0.98	0.933–1.034	7	1.06	1.043–1.094	4
Kenya	1.00	0.960–1.077	6	1.07	1.053–1.090	4
Comoros Islands	0.95	0.900–0.978	9	1.13	1.106–1.158	11
Seychelles (Cousin Island)	1.10	1.068–1.154	6	1.24*	– (Mahé Island)	
Malagasy (Ambalavao)	0.98	0.929–1.035	8	1.10*	– (Tananarive)	
Aldabra Islands	1.01	0.963–1.048	7	–		
Ivory Coast	1.01	0.958–1.046	7	–		
Ghana	1.04	1.000–1.087	8	–		

* Ratio obtained from Wiebes (1974), the pollinator samples as indicated are from different localities to those of the sycoecines.

spectively. Masi (1917) correctly attributed *Crossogaster atratus* with two labial palp segments and three maxillary palp segments in his description of this species. It is possible that Masi did not examine the type of *Crossogaster silvestrii* and was thus mislead by the incorrect description. The difference in the palp segment numbers was the major differential character separating these two species. In addition *C. atratus* has a more elongate head and a corresponding longer cheek relative to eye length, together with slightly shorter ovipositor valves. However, these latter characters are geographically variable (table 1, for head shape variation) and it appears that *C. atratus* is only a different geographical population of *P. silvestrii*. Although I have not seen the holotype specimen of *C. atratus* I have examined material from Cousin Island (Seychelles) which is very near the type locality (Mahé Island, Seychelles) and after assessing all the evidence at hand I have come to the conclusion that *Crossogaster atratus* is a junior synonym of *Philocaenus silvestrii*.

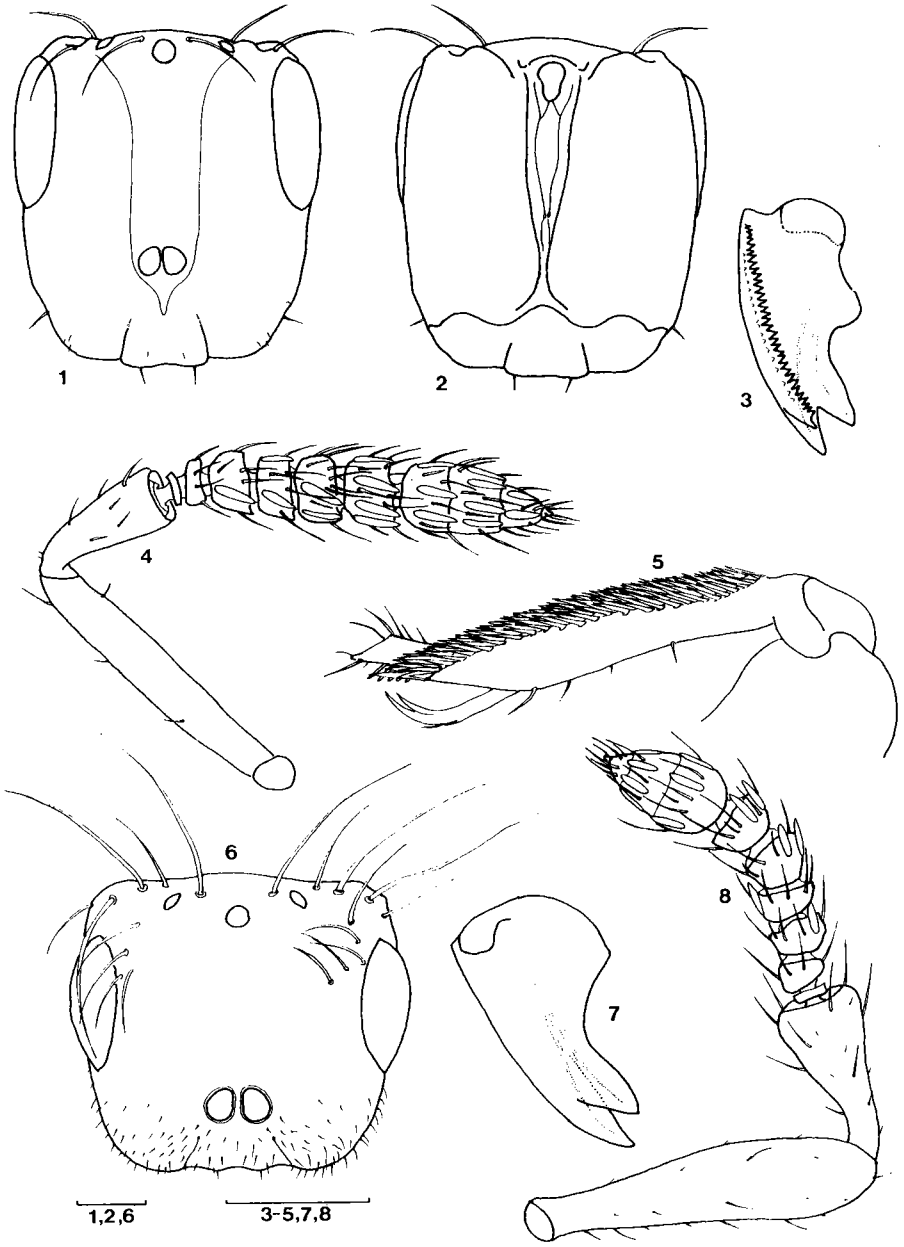
P. silvestrii can be distinguished from the other two members of the species-group by the presence of a medial incision in the epistomal margin and the lack of a plate of teeth on the female fore tibia.

Philocaenus comptoni spec. nov.
(figs. 1–8)

Etymology. Named after Steve Compton, co-collector of the holotype.

Type material. Holotype ♀, allotype ♂, (slide mounted): Cameroun, South West Province, Bambili, 21 December 1981, leg. S.G. Compton & R.G.E. Baker, no. 6, C1010, ex *F. chlamydocarpa* Mildbr. & Burr. Paratypes, 1 ♀, 1 ♂, (card mounted): same data as holotype; 1 ♂: Cameroun, South West Province, Mt. Koupe, Nyassosso, 7 January 1982, leg. S.G. Compton & R.G.E. Baker, no. 17, C1012, ex *F. chlamydocarpa* Mildbr. & Burr. Holotype, allotype and paratypes in SAMC.

FEMALE. Uniform dark brown, including fore femora and antennae, rest of



Figs. 1–5. *Philocaenus comptoni* spec. nov., female: 1, head, dorsal view; 2, head, ventral view; 3, mandible, ventral view; 4, antenna, axial view; 5, fore tibia and first tarsal segment, antiaxial view. Figs. 6–8. *Philocaenus comptoni* spec. nov., male: 6, head, dorsal view; 7, mandible, dorsal view; 8, antenna, axial view. Scale bars = 0.1 mm.

legs testaceous. Total length, with head in orthognathous position, excluding ovipositor valves = 1.8 mm.

Head (figs. 1 & 2) elongate, narrowing anteriorly (l = 0.50, w = 0.43), height compressed (h = 0.17). Eye elongate (l = 0.23, w = 0.11, h = 0.07), 0.45X as long as head. Cheek length 0.63X as long as eye. Malar sulcus present for full cheek length. Lateral ocelli visible in dorsal view, medial ocellus situated in posterior end of scrobe. Pronounced carina on vertex, with excavation ventral to the carina in which the foramen magnum is situated. POL = 0.15. OOL = 0.07. Toruli in close apposition, situated below the eyes. TE 0.49X as long as scrobe length (TE = 0.15, SL = 0.30). Clypeus equilateral in area. Epistomal margin very slightly convex with shallow medial concavity, ca. a third of head width across compound eyes. Two ventral tentorial pits in close apposition (fig. 2). Mandible (fig. 3) with two apical teeth (each with a gland) and a longitudinal ventral ridge of 32 very small fine teeth (first tooth twice the size of the rest), with a second row of twenty smaller teeth anterior to the first. Two labial palp segments, the basal segment very short; three maxillary palp segments. Antennal funicle segments subequal in size (fig. 4), flagellum length = 0.24. Scape narrow, 5.7X longer than wide (l = 0.22). Pedicel very elongate, half of scape length. MPS placoid, present on all three club, and all four funicle segments.

Thorax. Pronotum square (l = 0.33, w = 0.33). Propodeum wider than long (l = 0.19, w = 0.38). Mesoscutum broad (l = 0.26, w = 0.43). Scutellum, including axilla (l = 0.30, w = 0.35). Fore femur 3X as long as wide (l = 0.48). Fore tibial armature consists of a plate of fine teeth fused to tibia for ca. two-thirds of dorsal length (fig. 5), bifurcate spur present, no ventral tooth. Fore leg coxa 0.56X femur length (C = 0.27, TR = 0.10, TI = 0.29, TA = 0.21). Fore wing 2.4X as long as broad (l = 1.5), pilose, fringe long. Postmarginal vein shorter than stigmal (SM = 0.54, M = 0.23, PM = 0.06, S = 0.12). Marginal vein 10X as long as broad. Hind wing 4.4X as long as broad (l = 1.17, w = 0.27).

Gaster, posterior edge of tergites very crenulated, with three medial incisions. Eighth urotergite spiracle normal (l = 0.02). Ovipositor 4.3X longer than the valves (valve length = 0.3).

MALE. Testaceous; mandibles, eyes, flagella, mesoscutum, scutellum, axilla and gaster darker; very setous. Total length with head in orthognathous position 1.75 mm.

Head (fig. 6) broad (l = 0.44, w = 0.49), height normal (h = 0.25). Eye oval (l = 0.20, w = 0.13, h = 0.07), 0.46X as long as the head. Cheek length 0.55X as long as eye. Malar sulcus present for full cheek length, but indistinct. Lateral ocelli visible in dorsal view. POL = 0.16, OOL = 0.11. Toruli situated below the eyes, slightly separated. TE = 0.07. SL = 0.29. Clypeus trapezoid in area. Epistomal margin slightly convex, with medial indentation, 0.29X as wide as head. Ventral tentorial pits slightly separated. Mandible (fig. 7) with apical teeth subequal; two glands. Two labial palp segments, basal segment very short. Three maxillary palp segments, segments subequal. Antenna (fig. 8). Antennal flagellum 2.1X as long as pedicel. Scape 5X longer than wide (l = 0.25). Pedicel

very elongate, 0.48X scape length. MPS present on all four funicle and three club segments.

Thorax. Parapsidal furrows complete. Fore femur 2.6X as long as wide (l = 0.49). Fore tibia without armature, almost twice as long as tarsal length (C = 0.35, TR = 0.14, TI = 0.35, TA = 0.18). Fore wing 2.73X longer than wide, l = 1.75, very pilose. Postmarginal vein shorter than stigmal (SM = 0.56, M = 0.29, S = 0.15, PM = 0.06). Marginal vein thick, 8.5X longer than wide. Hind wing 4.6X longer than wide, l = 1.24.

Gaster. Eighth urotergite spiracle normal. Aedeagus large (l = 0.59). Five teeth on aedeagus claspers.

Comments. P. comptoni is distinguishable from *P. cavus* by the longer plate of teeth on the female fore tibia and broader male head, with a subquadrate vertex as opposed to a more rounded one in the males of *P. cavus*.

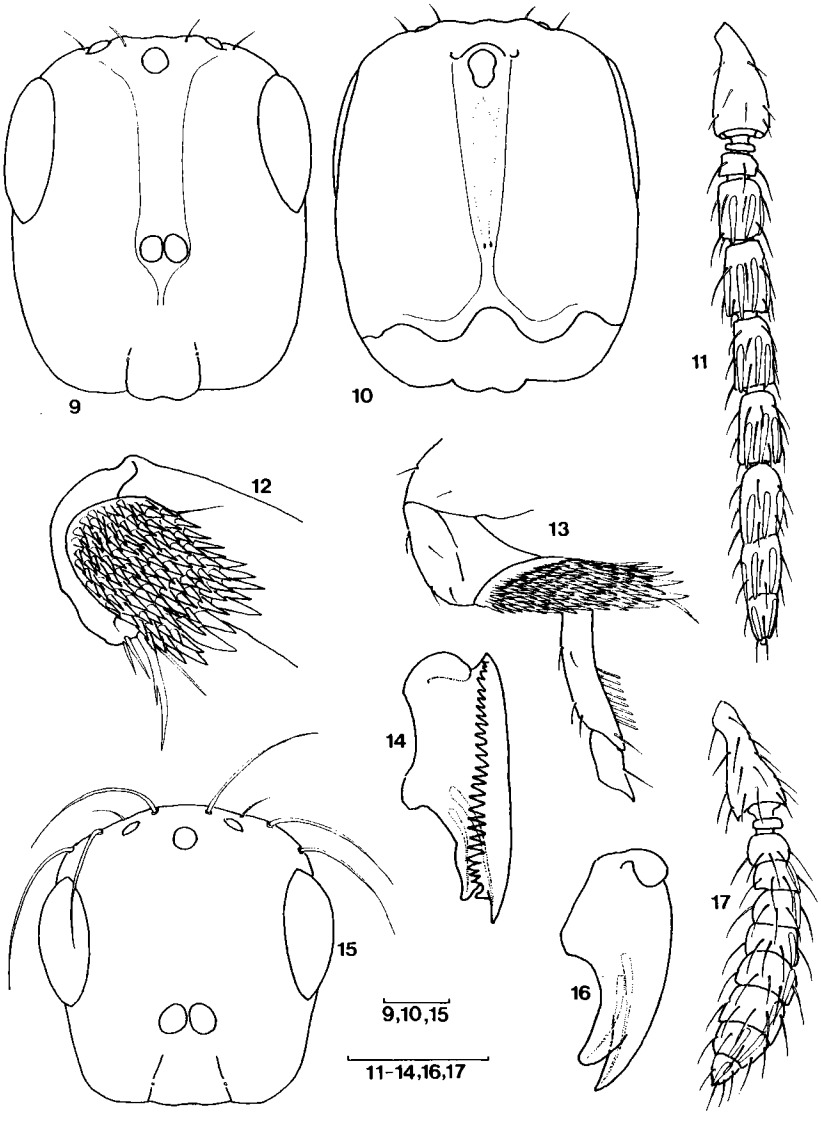
Philocaenus cavus spec. nov.
(figs. 9–17)

Etymology. Cavus (latin) = hollow, concave, referring to the excavation on the ventral surface of the head.

Type material. Holotype ♀, allotype ♂ (slide mounted): Ivory Coast, Taï, Guiglio, 29 November 1982, leg. C.C. Berg & J.T. Wiebes, RMNH 4815, ex *F. saussureana* D.C. (det. Berg). Paratype, 1 ♂: same data as holotype. Holotype, allotype and paratype in SAMC.

FEMALE. Faded due to alcohol storage – head, thorax and gaster dark brown, antennae, mandibles and legs testaceous. Total length with head in orthognathous position, excluding ovipositor valves = 1.59 mm.

Head (figs. 9 & 10) elongate, wedge shaped (l = 0.52, w = 0.42), height compressed (h = 0.15). Eye elongate (l = 0.21, w = 0.10), 0.4X as long as head. Cheek length 0.76X eye length. Malar sulcus present for full length of cheek. Lateral ocelli visible in dorsal view, medial ocellus situated in posterior end of scrobe, strong carina present between lateral ocelli, with a ventral invagination below carina in which the foramen magnum is situated. POL = 0.14, OOL = 0.068. Toruli in close apposition, situated below the eyes. TE 0.68X scrobe length (TE = 0.19, SL = 0.28), scrobe deep, V-shaped. Clypeus equilateral in area. Epistomal margin very slightly convex with shallow medial concavity, 0.24X the head width measured across the compound eyes. Two ventral tentorial pits in close apposition, situated a third of distance between oral fossa and foramen magnum (fig. 10). Ventral anterior two-thirds of head with broad shallow excavation. Mandible (fig. 14) with two apical teeth, each with a gland, and a longitudinal ventral ridge of one large (closest to apex) and 23 very small, fine teeth. Two labial palp segments, basal segment very short; three maxillary palp segments, basal segment longest. Antenna (fig. 11), first funicle segment shortest, rest subequal in size (segments tubular – almost as high as wide); flagellum length = 0.36. Scape narrow, 6.8X longer than wide (l = 0.24). Pedicel relatively



Figs. 9–14. *Philocaenus cavus* spec. nov., female: 9, head, dorsal view; 10, head, ventral view; 11, antenna, axial view; 12, fore tibia, anterior view with tarsus missing; 13, fore tibia and first two tarsal segments, antiaxial view; 14, mandible, ventral view. Figs. 15–17. *Philocaenus cavus* spec. nov., male: 15, head, dorsal view; 16, mandible, dorsal view; 17, antenna, antiaxial view. Scale bars = 0.1 mm.

short, a third of scape length. MPS placoid, present on three club and four funicle segments.

Thorax. Pronotum broad (l = 0.27, w = 0.31). Propodeum l = 0.16, w = 0.36 with a slight depression around spiracle. Mesoscutum l = 0.21, w = 0.42. Scutellum, including axillae l = 0.25, w = 0.33. Fore femur 3.4X as long as wide (l = 0.44). Fore tibial armature consists of a plate of many teeth originating half way down the tibia and fused to the distal half of the dorso-antiaxial tibial facet (figs.

12 & 13), extending beyond distal end of the tibia; bifurcate spur present, no ventral tooth. Tibial plate same length as tibia. Fore leg coxa 0.57X femur length (C = 0.25, TR = 0.10, TI = 0.14, TA = 0.25). Fore wing l = ca. 1.4, w = ca. 0.50 (damaged), pilose, fringe long. Postmarginal vein shorter than stigmal (SM = 0.45, M = 0.22, PM = 0.07, S = 0.11). Hind wing 5.6X longer than wide, l = 1.00.

Gaster, posterior edge of tergites crenulated (less so than *S. comptoni*) with three medial incisions. Hypopygial setae extensive (row of setae down each ridge). Eighth urotergite spiracular peritremata expanded (l = 0.043). Ovipositor 2.9X as long as valve (valve l = 0.45).

MALE. Testaceous, mandibles and eyes darker. Total length with head in orthognathous position = 1.5 mm.

Head (fig. 15) approximately square (l = 0.44, w = 0.43), height normal (h = 0.28). Eye oval (l = 0.19, w = 0.12, h = 0.07), 0.43X as long as head. Cheek length 0.55X eye length (l = 0.10). Malar sulcus present for full cheek length, but not well defined. Lateral ocelli visible in dorsal view. POL = 0.12, OOL = 0.09. Toruli situated below the eyes, slightly separated. TE 0.37X as long as scrobe length (TE = 0.10, SL = 0.27). Clypeus trapezoid in area. Epistomal margin slightly convex, with medial indentation, 0.26X as wide as head. Ventral tentorial pits slightly separated. Mandible (fig. 16) with apical teeth subequal, two glands. Two labial palp segments, basal segment short. Three maxillary palp segments, medial segment indistinct. Antenna (fig. 17), flagellum twice as long as pedicel. Scape 4.6X longer than wide (l = 0.23). Pedicel elongate, 0.44X scape length. MPS present on all the funicle and club segments.

Thorax. Parapsidal furrows complete. Fore femur 3.5X longer than wide (l = 0.45). Fore tibial armature bidentate. Fore tibia 1.88X longer than tarsal length (C = 0.32, TR = 0.12, TI = 0.32, TA = 0.17). Fore wing 2.7X longer than wide, l = 1.62, very pilose. Postmarginal vein shorter than stigmal (SM = 0.52, M = 0.27, S = 0.13, PM = 0.10). Marginal vein thick 9X longer than wide. Hind wing 5.2X longer than wide, l = 1.2.

Gaster. Eighth urotergite spiracle normal. Aedeagus large (l = 0.64). Six teeth on aedeagus claspers.

Comments. For a diagnosis see comments under *P. comptoni*.

PHILOCAENUS BARBATUS SPECIES-GROUP

This species-group is characterised by the following combination of characters: female mandible with a ventral row of teeth that with the evolution of subsequent anterior rows has in the extreme form developed into a plate of many teeth; female malar sulcus if present, never for complete cheek length; male mandibular outer tooth distinctly longer than the inner tooth.