

New species of *Arpactophilus* from the island of New Caledonia (Hymenoptera, Sphecidae)

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Abstract. Seventeen new species of *Arpactophilus* from New Caledonia are described and figured. These are the first from New Caledonia and bring the number to 37 species of the genus from Australia and nearby islands, all east of Wallace's Line. The new species are *abdominalis*, *arboreus*, *brochus*, *caledonicus*, *concausus*, *cuspidis*, *dolichocara*, *gressitti*, *irwini*, *kraussi*, *nemoralis*, *nigripes*, *propodealis*, *schlingeri*, *scutellaris*, *sylvaticus*, and *webbi*. All of these have an occipital carina, sometimes most evident ventrally. As a rule there are 2 forewing submarginal cells, but in *caledonicus*, *dolichocara*, *nigripes*, and *propodealis* there is only one such cell.

Introduction

The genus *Arpactophilus* F. Smith now contains 37 species from areas of Australasia east of Wallace's Line. According to a recent paper by Menke (1989), he has seen undescribed species from New Guinea, New Britain, New Caledonia, the Solomon Islands, and Fiji. These add to the 12 described species from eastern Australia and one from Misoöl Island off the coast of western New Guinea (Irian). Menke, after describing 3 new species from Papua, New Guinea, the first of the genus from that area, estimated that in addition to perhaps 40 species in Australia many more will be found in its associated islands. Menke suggested a division of the tribe Stigmini into 2 subtribes Stigmina and Spilomenina in which the latter has 5-segmented maxillary palpi instead of 6 as stated in Bohart and Menke (1976). The genera of the subtribe Spilomenina are indicated nicely on one branch of the dendrogram in Fig. 37 of the aforementioned work: *Xysma*, *Spilomena*, *Microstigmus*, and *Arpactophilus*.

Menke also presented a detailed discussion of *Arpactophilus* and its relationship to *Spilomena*. He concluded that the 2 genera can be distinguished by the presence of an occipital carina (at least ventrally) in *Arpactophilus* (Fig. 39d) and its absence in *Spilomena*. Also, the frontal carina in *Arpactophilus* extends at least one-half the distance on the frons to the midocellus but less than one-half in *Spilomena*. Furthermore, hindwing vein cu-a in *Arpactophilus* is usually angled and appendiculate, but not so in *Spilomena*.

A collection of some 60 specimens of *Arpactophilus*, taken from Malaise traps in New Caledonia are the basis for the present paper. These represent about 17 species which can be roughly divided into 3 groups

of different-sized specimens. The largest vary from 6 to 11 mm long. Most of these have the labrum exserted (Fig. 1) and multidentate. Also, the frons is usually coarsely, longitudinally striate (Fig. 24). Included are *schlingeri*, *irwini*, *webbi*, *concausus*, *cuspidis*, *gressitti*, and *brochus*. The second size group are 4 to 5 mm long. These have the frons punctate (Fig. 36), and the labrum not or hardly exserted. They are *abdominalis*, *arboreus*, *nemoralis*, and *sylvaticus*. The third size group are 3 to 4 mm long, and in most respects are similar to *Spilomena* from other areas of the world. The frons of these New Caledonia species is punctate, the clypeus may be mostly yellow (Figs. 41, 51), and legs are often all yellow. Although Bohart and Menke (1976) specified that there were 2 submarginal cells in the forewing of *Arpactophilus*, several of these small species have only one cell (Figs. 46, 47, 48). These are *caledonicus*, *dolichocara*, *nigripes*, and *propodealis*. The 2-celled species of this third size group are *kraussi* and *scutellaris* (Figs. 38, 40). Since *Arpactophilus* usually die with the head thrust forward, the search for the occipital carina where it joins the median suture of the head venter (Fig. 39d) is not difficult. *Spilomena* have no occipital carina, and this genus is not known to occur on New Caledonia.

Acknowledgments

The material of larger specimens collected on New Caledonia was donated to the R.M. Bohart Museum by M.E. Irwin, E.I. Schlinger, and D.W. Webb. Type material of these species is deposited in Museum National d'Histoire Naturelle Entomologie, Paris, France (PARIS); and the R.M. Bohart Entomology Museum of the University of California,

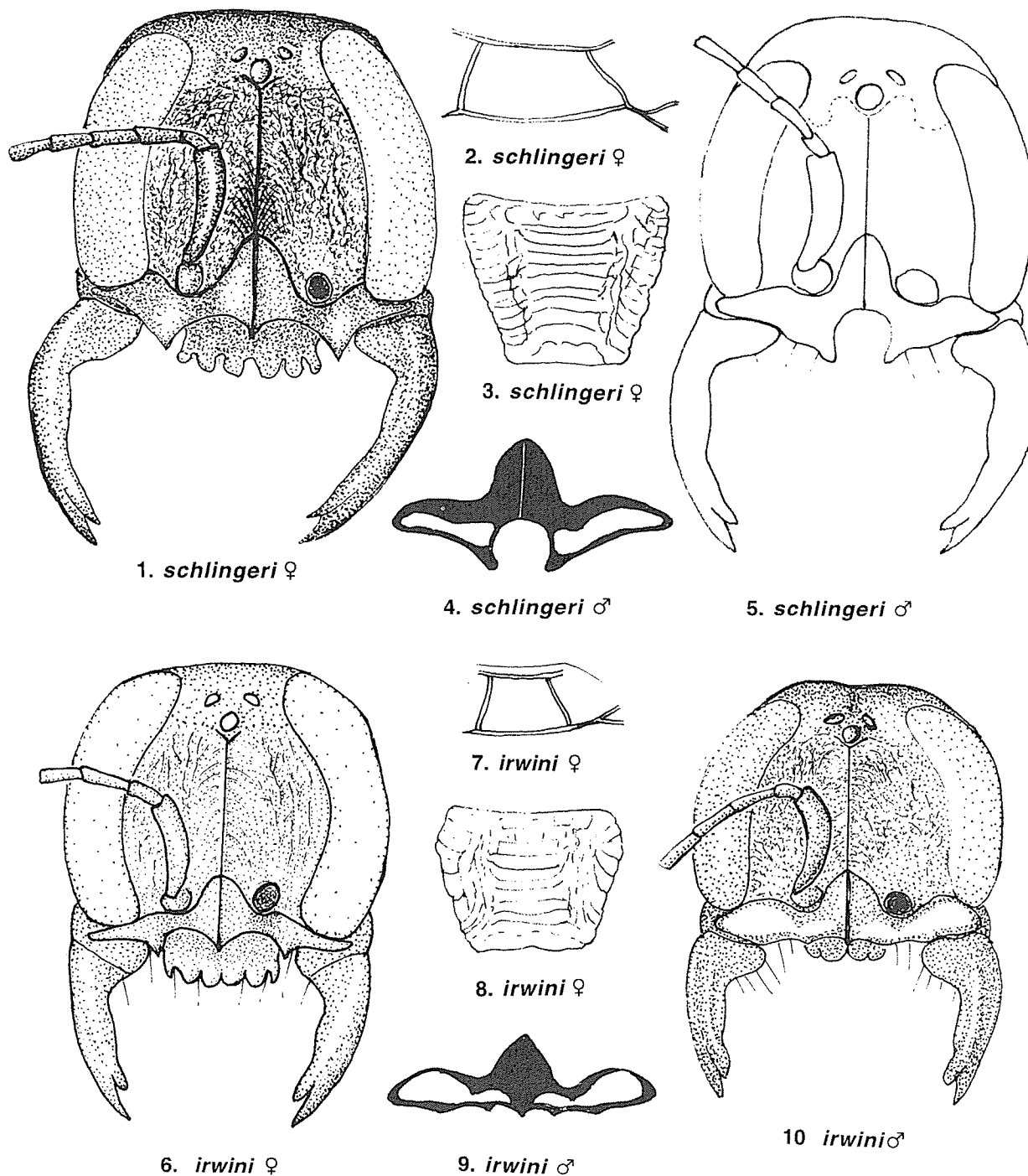
Davis, California (DAVIS). The smaller specimens were borrowed from the Bishop Museum, Honolulu, (HONOLULU) and the holotypes are deposited there.

Abbreviations in key and descriptions: F-I etc.: flagellomeres (antennal segments) beyond pedicel; LID: least interocular distance; MOD: median ocellus diameter; T-I etc.: terga; S-I etc.: sterna.

Key to *Arpactophilus* of New Caledonia (based on females)

1. Labrum exerted and multidentate (Figs. 1, 15, 28), clypeus with apicolateral tooth (Figs. 1, 15) 2
Labrum not exerted, or only slightly so, clypeus various 6
2. Frons punctate but not obviously striate or reticulate (Fig. 15j; lower (longer) mandibular tooth longer than 1/2 LID (least interocular distance) (Fig. 15), labrum all yellow *webbi* R. Bohart, new species
Frons striate and reticulate (Fig. 11), lower mandibular tooth not longer than 1/2 LID, clypeus and labrum not all yellow 3
3. Clypeal apex broadly concave, no sharp apical point medially (Fig. 11), submarginal cell II subtriangular (Fig. 12) *concavus* R. Bohart, new species
Clypeal apex with sharp medial point apically (Fig. 1), submarginal cell II various 4
4. Submarginal cell II 2x as broad as high (Fig. 2), abdomen black and red *schlingeri* R. Bohart, new species
Submarginal cell II not 2x as broad as high (Fig. 7), abdomen black 5
5. Propodeal enclosure reticulate, submarginal cell II 2x as long posteriorly as anteriorly (Fig. 27) *gressitti* R. Bohart, new species
Propodeal enclosure with broad median area of transverse ridges (Fig. 8), submarginal cell II less than 2x as long posteriorly as anteriorly (Fig. 7) *irwini* R. Bohart, new species
6. Frons with longitudinal striae or carinulae (Figs. 20, 24) 7
Frons punctate only 8
7. Clypeus with a spinelike apicolateral tooth next to mandibular base (Fig. 20), teeth at apex of mandible subequal (Fig. 20), clypeal apex not truncate with sharp edges *brochus* R. Bohart, new species
- Clypeus without lateral tooth, lower tooth at apex of mandible much stronger than upper tooth, clypeus truncate with sharp edges and stout but sharp median subapical tooth (Fig. 24) ...
..... *cuspidis* R. Bohart, new species
8. Forewing with only one submarginal cell (Figs. 46, 47, 48) 9
Forewing with 2 submarginal cells (Figs. 38, 40) 12
9. Midline of frons (MOD to clypeus) about 1.2x LID (Fig. 51) 10
Midline of frons 1.5-1.8x LID (Figs. 44, 45) 11
10. Legs all yellow *caledonicus* R. Bohart, new species
Legs mostly black, especially hindleg *nigripes* R. Bohart, new species
11. Clypeus mostly yellow, legs all yellow *propodealis* R. Bohart, new species
Clypeus black, legs (especially femora) partly brown. *dolichocara* R. Bohart, new species
12. Scutellum yellow, face mostly yellow (Fig. 41), pleuron and head venter yellow *scutellaris* R. Bohart, new species
Scutellum black, face mostly black (Fig. 37), pleuron and head venter black 13
13. Propodeal enclosure finely sculptured (Fig. 43), body length about 3 mm, clypeus mostly yellow *kraussi* R. Bohart, new species
Propodeal enclosure coarsely reticulate or striate (Fig. 30, 35), body length about 4.5 mm, clypeus black 14
14. Abdomen red, face with conspicuous silvery, appressed microsetae *abdominalis* R. Bohart, new species
Abdomen black, appressed facial pubescence inconspicuous 15
15. Mandible mostly brown (Fig. 32) *sylvaticus* R. Bohart, new species
Mandible mostly yellow 16
16. F-I-II each at least 2x as long as broad (Fig. 29), flagellum black *arboreus* R. Bohart, new species
F-I-II each about 1.5x as long as broad (Fig. 33), flagellum fulvous in front *nemoralis* R. Bohart, new species

***Arpactophilus abdominalis* R. Bohart
new species
(Figs. 35, 36)**



Figures 1-10. 1-5), *A. schlingeri*, x 25. 1.) face; 2.) submarginal cell II of forewing; 3.) propodeal enclosure; 4.) clypeus; 5.) face; 6-10), *A. irwini*, x 25; 6.) face; 7.) submarginal cell II of forewing; 8.) propodeal enclosure; 9.) clypeus; 10.) face.

Description: Female holotype. Length 4.5 mm. Black, yellow and red; abdomen is red; yellow are: mandible mostly, scape in front, trochanters partly, femora apically, tibiae mostly; fulvous are: flagellomeres, tegula, tarsi; wings nearly clear; stigma light brown. Frons, clypeus with abundant silvery, ap-

pressed pubescence. Frons, mesonotum, mesopleuron with close, fine punctation; propodeum laterally with some fine carinulae, enclosure with coarse reticulae anteriorly (as in Fig. 35), finer ones among transverse carinae posteriorly; gena finely punctate, moderate punctures scattered, about 2 PD

apart; abdomen polished, practically epunctate. Face (Fig. 36), F-I to II each about 1.3x as long as broad; frontal carina complete, extended over clypeus; vertex behind eye about 6 MOD; 2 forewing submarginal cells (as in Fig. 34); no definable pygidial plate.

Holotype female (PARIS), Pindai Forest, New Caledonia, XI-23-92 (D.W. Webb, E. Schlinger).

Discussion: This medium-sized species (4.5 mm long) is characterized by its red abdomen and abundant silvery facial microsetae.

The specific name is a Latin adjective referring to the abdomen.

***Arpactophilus arboreus* R Bohart**
new species
 (Figs. 29, 30)

Description: Female holotype. Length 5.5 mm. Black, marked with yellow and fulvous; yellow are: mandible mostly, scape in front, pronotal lobe partly, fore- and midfemora apically; fulvous are: tegula, legs mostly; wings highly stained. Frons, scutum, mesopleuron densely punctate, propodeal side with some reticulae, propodeal enclosure reticulate in transverse pattern (Fig. 30); gena polished with scattered punctures; abdomen mostly polished, epunctate. Face (Fig. 29); F-I 2.3x as long as broad, II-III 2x; frontal carina strong, sharply raised on lower one-third of frons, continuing onto basal part of clypeus, ending in obtuse angle; distance from compound eye to occipital carina 2/3 as long as scape; wings lightly stained, 2 forewing submarginal cells (as in Fig. 31); no definable pygidial plate.

Holotype female (PARIS), Riviere Bleue Provincial Park, New Caledonia, XI-1992, across forest (M.E. Irwin, D.W. Webb).

Discussion: The black and relatively long F-I to III differentiates *arboreus* from the similarly sized *nemoralis* and *sylvaticus*. These 3 species have the frons punctate, frontal carina continued onto the clypeus where it is raised, and the propodeal enclosure reticulate.

The specific name is a Latin adjective meaning "of trees", referring to its capture in a forested area.

***Arpactophilus brochus* R. Bohart**
new species
 (Figs. 20, 21, 22, 23)

Description: Female holotype. Length 6 mm. Black, brown, and yellow. Yellow are: scape in front, trochanters, femora toward apex, tibiae and

tarsi mostly; brown are: legs partly, especially femora. Pubescence inconspicuous, appressed, silvery. Punctuation of head and thorax mostly fine and close; abdomen mostly polished. Face (Fig. 20), clypeus apically flat between sharp subapical teeth; labrum slightly exerted, bidentate; frontal carina complete, raised between antennae, continued over clypeus; gena multridged on apical one-half, head venter (Fig. 21), with several transverse carinae in front of ventral part of occipital carina which expands laterally into a blunt tooth; F-I 3x as long as broad, II 1.9x; vertex behind compound eye nearly as long as scape; pronotal collar sharp, close to scutum; mesopleuron with many oblique microscopic striae; propodeal enclosure with many small reticules among oblique ridges (Fig. 23); wings nearly clear, 2 submarginal cells (Fig. 22), stigma black; S-II moderately expanded from base; T-VI with slightly flattened area, about 2x as long as broad, not a distinct plate.

Male. Unknown.

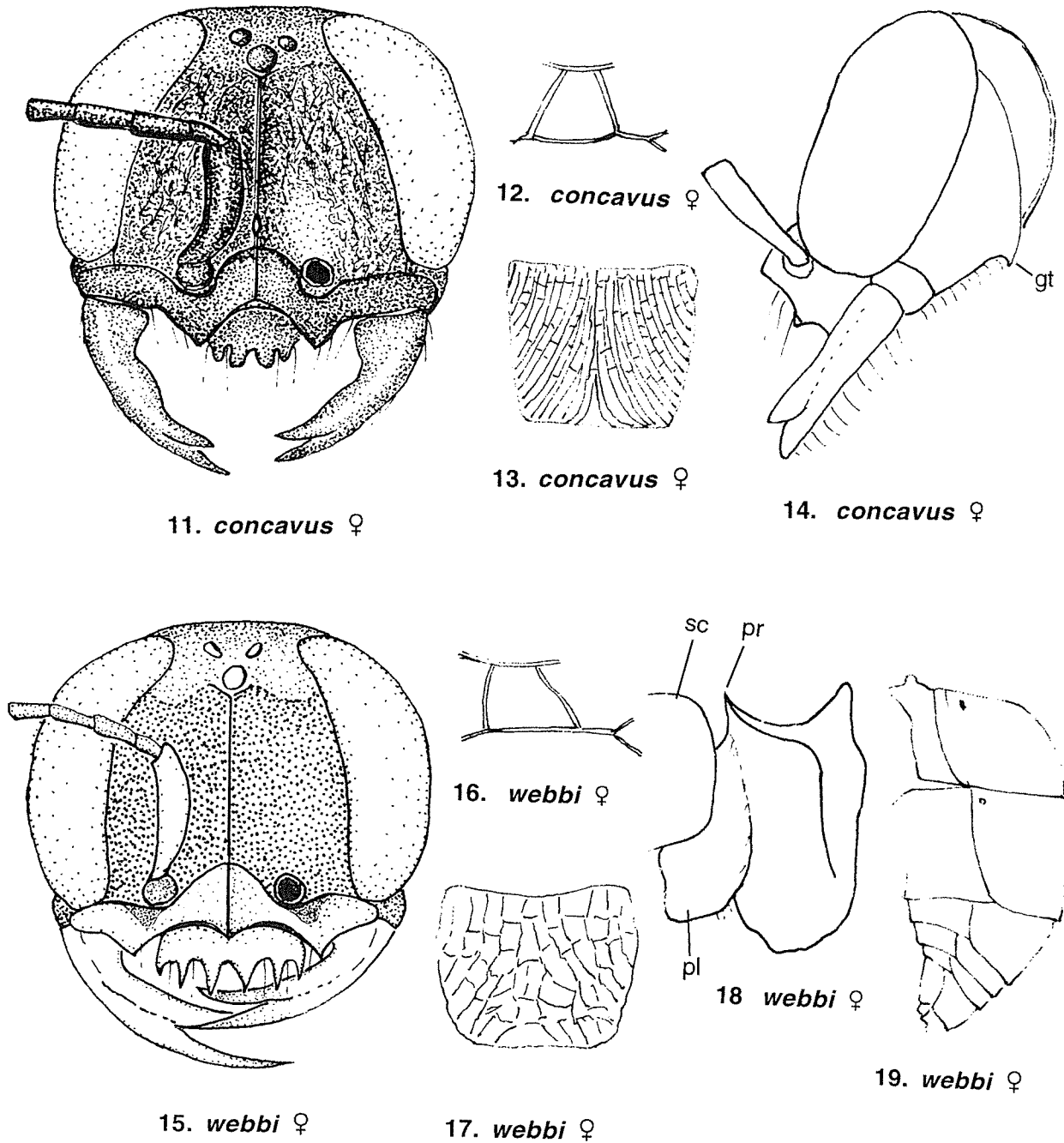
Holotype female (PARIS), 9.1 km nw. Sanamea, Prov. Sud, New Caledonia, 425 m, I-1596 (M.E. Irwin, D.W. Webb).

Discussion: This species appears to be related to *irwini* and *gressitti* because of the striate frons and the posterior clypeal margin with a sharp sublateral tooth. However, it differs from these species because the labrum is not prominently exerted. Also, *brochus* has a series of strong transverse carinae on the head venter (Fig. 21), whereas the others have at most a few short ones.

The specific name is a Latin adjective referring to the projecting sublateral tooth of the clypeus.

***Arpactophilus caledonicus* R. Bohart**
new species
 (Figs. 47, 51)

Description: Female holotype. Length 3 mm. Black, marked with light yellow: mandible mostly, clypeus mostly, scape in front, pronotal lobe, tegula, legs entirely; flagellum fulvous; wings clear, stigma dark brown. Punctuation generally fine, close on frons, scutum, gena, mesopleuron; slightly coarser on propodeal enclosure; abdomen polished, epunctate. F-I 1.2x as long as broad, II 2x; thorax 2x as long as high in lateral view, propodeal enclosure 1.3x as long as broad, frontal carina fine but complete, a little raised below, continued onto clypeus as a ridge; occipital carina fading dorsally; facial details (Fig. 51), head about as long as broad in front view, malar



Figures 11-19. 11-15), *A. concavus*, x 25; 11.) face; 12.) submarginal cell II of forewing; 13.) propodeal enclosure; 14.) head, lateral outline; gt, tooth at end of genal carina; 15-19), *A. webbi*; 15-17, x 37; 18, x 50; 19, x 25; 15.) face; 16.) submarginal cell II of forewing; 17.) propodeal enclosure; 18.) pronotum, lateral; so, scutum; pr, pronotal ridge; pl, pronotal lobe; Fig. 19, abdomen, lateral outline.

space quite short, 1 forewing submarginal cell (Fig. 47); no definable pygidial plate.

Male paratype. About as in female, yellow of clypeus extending across malar space, and broadly a short way up along inner orbit; frons fulvous.

Holotype female (HONOLULU), Koghis Mts., 400 m, New Caledonia, I-1969 (N.L.H. Krauss).

Paratype male (HONOLULU), Col d'Amieu, 650 m, New Caledonia (J.L. Gressitt).

Discussion: Four species of *Arpactophilus* with only a single submarginal cell in the forewing are *caledonicus*, *nigripes*, *propodealis*, and *dolichocara*. They are all quite small (3 mm long), with a punctate propodeal enclosure, and occipital carina fading

dorsally. There is little pubescence, and S-II is not swollen basally. Also, the thorax is fully twice as long as high in lateral view. The species of this one-submarginal cell group differ mainly by details of head shape, clypeal markings, and leg coloration.

In *caledonicus* and *nigripes* the head is about as broad as long in front view, and the clypeus is marked with yellow transversely. However, the legs are all yellow in *caledonicus*, but mostly black in *nigripes*.

The specific name is Latin, meaning "of or from Caledonia".

***Arpactophilus concavus* R. Bohart**

new species

(Figs. 11-14)

Description: Female holotype. Length 10 mm. Black, wings light brown overall. Pubescence short, pale, appressed on clypeus, noticeable beneath head, on mesopleuron, on propodeal side, and on sternum II. Punctuation fine, close on mesonotum, terga. Face (Fig. 11), frontal carina complete, continued over clypeus to emarginate apex; clypeus apicolaterally angulate; labrum exserted, 4lobed apically; mandible bidentate, apical teeth short, sharp; F-I 2.5x as long as broad, F-II-IV 2x; frons punctate, longitudinally rugulose, LID 0.75x scape length; occipital carina complete, genal carina present, ending in a sharp point (Fig. 14, gt); vertex behind eye 4 MOD; pronotum sharp-edged above, appressed to scutum; parapsides weak, short; scutum dull; prescutellar sulcus foveolate; omaulus and short sternaulus present; propodeal enclosure shiny, with many curved longitudinal carinulae (Fig. 13); forewing with 2 submarginal cells, II about as broad as high (Fig. 12); terga mostly polished, somewhat shagreened; S-II slightly depressed basally.

Male. Unknown.

Holotype female (PARIS), New Caledonia: Riviere Bleue Provincial Park, km 25.8 on Riviere Bleue Road (213 m.), XI-3-92, Malaise trap across forest path (M.E. Irwin, D.W. Webb).

Discussion: In some respects (black color, carinate frons, stout mandibles) *concavus* resembles *irwini*. However, the anterior concavity of the clypeus (Fig. 11), and the genal carina which ends below in a sharp tooth (Fig. 14) are obvious distinguishing features. In the other species described herein from New Caledonia there is no genal carina.

The species name refers to the concave apical clypeal margin.

***Arpactophilus cuspidis* R. Bohart**

new species

(Figs. 24, 25, 26)

Description: Female holotype. Length 8 mm. Black, marked with yellow: mandible mostly, clypeus transversely (Fig. 24), scape in front, pronotal lobe, tegula partly, legs mostly except tarsi; fulvous are: tegula mostly, tinges on legs, tarsi entirely; wings lightly brown stained, stigma black. Pubescence on frons inconspicuous, appressed, golden. Vertex, scutum, scutellum finely, closely punctate; frons closely punctate between strong longitudinal ridges (Fig. 24); propodeal enclosure reticulate between diagonal ridging (Fig. 26); pleuron finely, closely punctate and with microscopic striation; gena with scattered punctures and anterior ridging. Facial proportions (Fig. 24); labrum hardly exserted, frontal carina complete, doubled between antennae, extended onto clypeus, ending subapically in sharp, stout erect tooth; F-I-II each 2x as long as broad, malar space as long as 2 MOD; vertex from compound eye to occipital carina as long as 2/3 scape; pronotal collar thin, sharp, closely appressed to scutum which has anterior depressed groove; forewing with 2 submarginal cells (Fig. 25); T-VI broadly flattened dorsally but not as distinct plate.

Male. Unknown.

Holotype female (PARIS), Mt. Khogis, 17 km nne. Noumea, New Caledonia, rainforest, 425 m, I-25-96 (M. Irwin, D. Webb, E. Schlinger).

Discussion: The stoutly truncate clypeus with its sharply raised median tooth (best seen in lateral view), and transverse yellow markings, is distinctive. Also, the double frontal carina is unusual (Fig. 24).

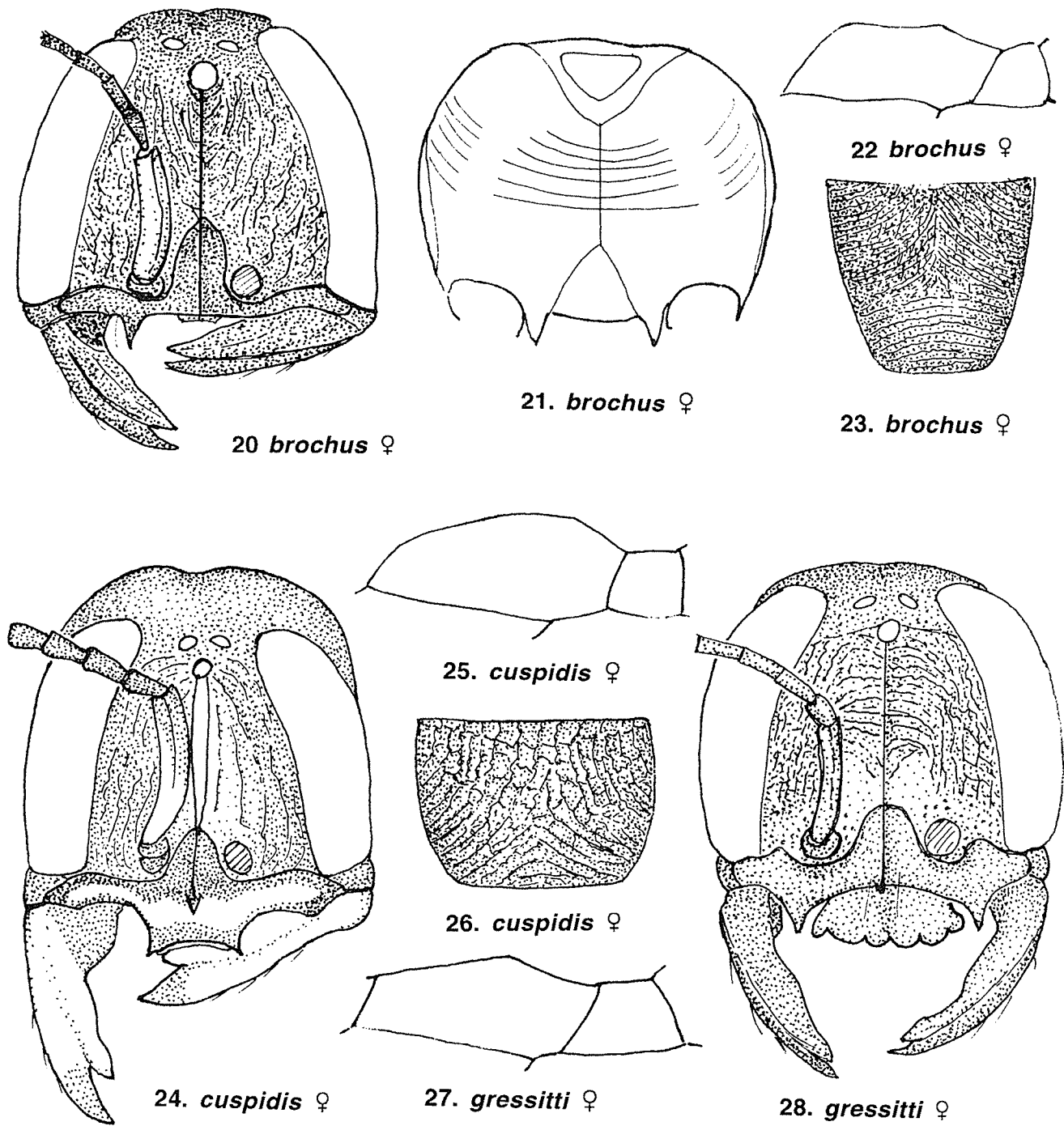
The specific name is a Latin feminine noun in the genitive casen referring to the sharp median clypeal tooth.

***Arpactophilus dolichocara* R. Bohart**

new species

(Figs. 45, 46, 47)

Description: Female holotype. Length 3 mm. Black, marked with fulvous: mandible at base, scape in front, tegula, femora apically, tibiae mostly, tarsi; flagellum brown; wings clear, stigma brown. Punctuation generally fine, close on frons, gena, scutum, propodeal enclosure, mesopleuron; abdomen polished, epunctate. F-I to III slightly longer



Figures 20-28. 20-23) *A. brochus*, x 35; 20.) face; 21) head, ventral (compare with Fig. 39); 22) submarginal cells II-III of forewing; 23) propodeal enclosure; 24-26), *A. cuspidis*, x 35; 24) face; 25) submarginal cells I-II of forewing; 26) propodeal enclosure; 27-28) *A. gressitti*, x 30; 27) submarginal cells I-II of forewing; 28) face.

than broad; thorax 2.2x as long as high in lateral view, propodeal enclosure 1.3x as long as broad (Fig. 49), frontal carina fine but complete, a little raised below, continued onto clypeus as a ridge; occipital carina fading dorsally; facial details (Fig. 45), head

unusually long and narrow, vertex behind compound eye as long as scape, malar space quite short; 1 forewing submarginal cell (Fig. 46); no definable pygidial plate.

Male. Unknown.

Holotype female (HONOLULU), Anse Vata, New Caledonia, X-23-58 (C.R. Joyce). Paratype female (DAVIS), same data as holotype.

Discussion: The 2 species with elongate head are *dolichocara* and *propodealis*. Both have punctate frons and propodeal enclosure, and thorax twice as long as high in lateral view. In *dolichocara* the head in front view is about 1.5x as long as broad (Fig. 45). Adding to the length (as shown in the figure) is the vertex space, which is longer than the width of the ocellar triangle. In addition to the longer head, *dolichocara* differs from *propodealis* by having the clypeus black instead of mostly yellow. Also, the legs of *dolichocara* are less extensively yellow, more brown and fulvous.

The specific name is a Greek noun, meaning long head.

***Arpactophilus gressitti* R. Bohart**
new species
(Figs. 27, 28)

Description: Female holotype. Length 8 mm. Black, wings dark brown. Pubescence inconspicuous. Punctuation fine, close, on vertex, clypeus, gena, scutum, scutellum; weak punctures scattered among shagreening on terminal terga. Face (Fig. 28), frontal carina complete, continued onto clypeus, ending in short point above exerted labrum which has 6 apical lobes; clypeus apicolaterally with sharp tooth; mandible bidentate, teeth short; F-I to IV each about 2x as long as broad; frons rugulose (Fig. 28), LID 0.75x scape length; vertex behind eye 6 MOD; occipital carina complete; prescutellar sulcus foveolate; omaulus and sternaulus present; propodeal enclosure reticulate, many curving carinulae; pronotum sharply edged, a series of short reticulatae in front of scutum, parapsides present but shallow; forewing with 2 submarginal cells (Fig. 27), II a little broader than high; S-II swollen toward base; S-VI broadly flattened but without distinct plate.

Male. Unknown.

Holotype female (HONOLULU), w. of Ponerihauen, New Caledonia, VII-30-71 (J.L. Gressitt). Paratypes, 2 females (DAVIS), upper trail, Riviera Bleue Provincial Park, New Caledonia, 290 m, XI-19-92 (D.W. Webb) and XII-27-91 (M.E. Irwin, D.W. Webb).

Discussion: In some respects *gressitti* is similar to *concausus*. They are about the same size and color. Both have the labrum exerted, frons rugulose, propodeal enclosure reticulate, and forewing venation alike. However, there are several impor-

tant differences. In *gressitti* the clypeal carina is low and ends anteriorly in a small point. The labrum has 6 instead of 4 apical lobes, and there is no genal carina.

The specific name honors the collector of the holotype, J.L. Gressitt, my long-time friend and well known Coleopterist, who died in an airplane accident.

***Arpactophilus irwini* R. Bohart**
new species
(Figs. 6-10)

Description: Female holotype. Length 10 mm. Black, wings brown overall. Pubescence inconspicuous and short, pale on head and thorax, fulvous on abdomen. Punctuation fine and indistinct on vertex, gena, and abdomen; fine on scutum and scutellum, quite fine and close on mesopleuron. Face (Fig. 6), frontal carina complete, continued over clypeus, ending in a sharp point above exerted labrum which has 6 teeth or lobes, outermost one smallest; clypeus also with sharp apicolateral tooth; mandible bidentate, teeth short; F-I to IV each about 2.1x as long as broad, following flagellomeres somewhat shorter; frons punctate, longitudinally rugulose, LID equal to scape length, occipital carina complete, flangelike laterally; vertex behind eye 5 MOD; pronotum sharp-edged, a series of short carinae in front of scutum; parapsides present, not deep; mesonotum dull; prescutellar sulcus foveolate; omaulus and weak sternaulus present, propodeal enclosure (Fig. 8) shiny, a median zone of cross carinae; forewing with 2 submarginal cells, II a little broader than high (Fig. 7); wings brown; terga mostly polished, T-IV-VI somewhat punctate; pygidial plate not defined, S-II abruptly swollen in lateral view (about as in Fig. 19).

Male paratypes. Length 9 mm. About as in female but face (Fig. 10). Clypeus with white markings (Fig. 9), angles of anterior margin less pronounced; labrum less prominent, only 4 apical lobes.

Holotype female (PARIS), New Caledonia: Mt. Khogis (500 m.), 17 km nne. Noumea, XII-27-91, Malaise trap in forest (M.E. Irwin, D.W. Webb). Paratypes (DAVIS), 6 males, 1 female, same data as holotype; 5 females, New Caledonia: Riviere Bleue Provincial Park trail to Upper Riv. Bleue (250 m.), XI-5-92, Malaise trap (D.W. Webb); 1 female, Riviere Bleue Provincial Park, 30 km nw. Yaté (270 m.), XII-27-91, Malaise trap, (M.E. Irwin).

Discussion: This species is somewhat similar to the 3 species described and figured (female face) by Menke (1989). All the latter have a strongly pro-