

A Key to Species of the Genus *Primeuchroeus* and Descriptions of New Species (Hymenoptera: Chrysididae)

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Abstract

A key is given to 32 species of *Primeuchroeus* from the Australian, Oriental and Ethiopian Regions. New species are *indiacus* from India, and 6 species from Australia. The latter are *cardaleae*, *commoni*, *gressitti*, *horningi*, *thorpi*, and *uqua*.

Introduction

A total of 32 species of *Primeuchroeus* Linsenmaier are now known worldwide. This includes 9 new species described herein. Distribution is confined to the Oriental and Australian Regions except for the Ethiopian Region form, *ghilianii* Gribodo. *Primeuchroeus* can be separated from somewhat similar species in the genera *Trichrysis* and *Chrysidea* by the mesopleuron, which is not traversed in the lower third or two-fifths by the scrobal sulcus. Also, *Primeuchroeus* is unique in having a long medio-basal point of attachment on male sternum VIII.

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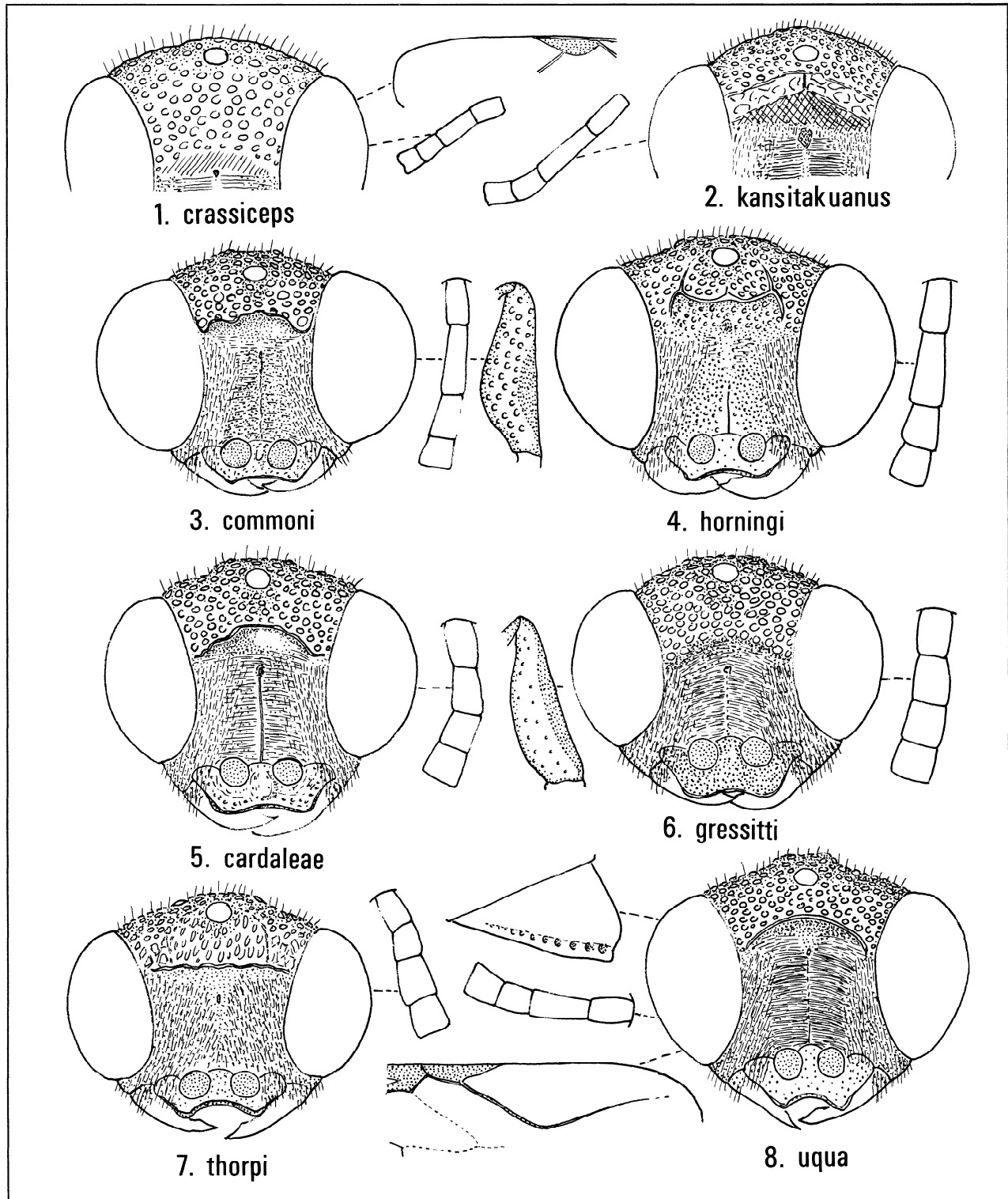
Museum designations are: American Entomological Institute (GAINESVILLE-AEI), Australian National Insect Collection (CANBERRA), Bernice P. Bishop Museum (HONOLULU), British Museum of Natural History (LONDON), Hope Museum (OXFORD), South Australian Museum (ADELAIDE), University of California Bohart Museum (DAVIS), University of Queensland

(BRISBANE), University of Sydney Macleay Museum (SYDNEY), U.S. National Museum (WASHINGTON).

In the following key and descriptions abbreviations for structural features are: F-I-II etc., flagellomeres (following pedicel); LID, least interocular distance; MOD, median ocellus diameter; TFC, transverse frontal carina; T-I-II etc., terga; S- I-II etc., sterna.

Key to the Genus *Primeuchroeus*

1. Rs stub hardly more than half as long as stigma and ending abruptly (fig. 1), TFC present or absent (*siamensis* group)2
- 1'. Rs stub considerably more than half as long as stigma, TFC various and sometimes absent9
- 2(1). Tibiae and tarsi mostly yellow (Indonesia, n. Borneo, Malaysia)
.....*malayensis* (Linsenmaier)
- 2'. Tibiae, at least, dark3
- 3(2'). T-III with 3 sharp distal teeth, TFC nearly straight (Papua New Guinea)
.....*paradoxus* (Linsenmaier)
- 3'. T-III without 3 distal teeth, TFC various4
- 4(3'). TFC weak or absent5
- 4'. TFC well developed7
- 5(4). Malar space about 2 MOD, head distinctly broader than long, TFC weak and slightly



Figures 1-8. 1-2) upper frons, stigmal area of wing, pedicel and F-I-III; 3-7) face, pedicel and F-I-III, forefemur; 8) T-III lateral, stigmal area of wing, pedicel and F-I-III, face. Drawings 1-2 based on females, 3-8 on male holotypes.

- angled up medially (Papua New Guinea)
 *pauoloradialis* (Linsenmaier)
- 5'. Malar space about 1 MOD, head nearly circular, TFC absent 6
- 6(5'). Hindbasitarsus outwardly pale with a little greenish reflection, pronotum weakly angled at broadest point, body length 3.5-4.5 mm. (Taiwan) *crassiceps* (Tsuneki)
- 6'. Hindbasitarsus outwardly all green, pronotum obtusely but sharply angled at broadest point, body length 5.5 mm. (India)
 *indiacus* Bohart
- 7(4'). TFC sharp and strongly projecting, LID much greater than eye breadth, malar space 2.5 MOD (Papua New Guinea) *alces* (Linsenmaier)
- 7'. TFC not strongly projecting, LID about equal to eye breadth, malar space about 1 MOD 8
- 8(7'). Pronotum with lateral margin in dorsal view strongly incised medially (Papua New Guinea, n. Queensland) *incisicollis* (Linsenmaier)
- 8'. Pronotum with lateral margin in dorsal view hardly incised (Thailand, Viet Nam, Laos)
 *siamensis* (Bischoff)
- 9(1'). T-III lateral margin with a subbasal tooth (*ghiliani* group) 10
- 9'. T-III lateral margin without a subbasal tooth 11
- 10(9). Tarsi straw colored, pronotum practically impunctate between and in front of anteromedial (neck) pits, metanotum rounded (Malaysia, Viet Nam, Taiwan)
 *kansitakuanus* (Tsuneki)
- 10'. Tarsi dark, pronotum with distinct punctures between and in front of anteromedial (neck) pits, metanotum pointed apicomediaally (Ethiopian Region) *ghiliani* (Gribodo)
- 11(9'). T-III with a tooth or minute denticle along lateral margin, or if not, very small species with no TFC and LID not greater than eye breadth (*reversus* group) 12
- 11'. T-III without a tooth or denticle along lateral margin, and TFC present, or LID greater than eye breadth 16
- 12(11). T-III with apicomediaal denticle, subantennal space flattened and about 2 MOD, malar space longer than pedicel (Victoria)
 *truculentus* (Buysson)
- 12'. T-III without distinct apicomediaal denticle but sometimes obtusely angled, other characters various 13
- 13(12). TFC absent, brow rounded, LID not greater than eye breadth, T-III nearly always with a minute denticle along lateral margin, T-II a little lighter posteriorly but without a definite light green band, very small species (3-4 mm. long) with rather short Rs stub (Northern Territory to Victoria, Wessel Is.)
 *ambiguus* (Linsenmaier)
- 13'. TFC present, or at least partial along sharp brow, 5 mm. or more long, T-III lateral denticle small but distinct, other characters various 14
- 14(13'). Female: prepit bulge about 2x as long as postpit area; malar space in both sexes generally less than 2 MOD (Australia including Tasmania)
 *reversus* (F. Smith)
- 14'. Female: prepit bulge at least 3x as long as postpit area; malar space in both sexes usually about 2 MOD 15
- 15(14'). TFC absent, brow punctate, body deep purple (Tasmania, Victoria) *viridifrons* (F. Smith)
- 15'. TFC present as a faint carina (seen from in front and below) with upper scapal basin somewhat polished, body usually green to blue (N. Territory and Queensland to New S. Wales)
 *ellipticus* (Linsenmaier)
- 16(11'). Brow either with 2 transverse frontal carinae, or a single one with a transverse and shiny punctate area below it; Rs rather evenly convex and long, subgenal area present (*biroi* group) . . . 17
- 16'. Brow without a TFC, with a simple one, or with a strong medial constriction in an area set off by more than one carina, Rs sometimes a little bent back and/or weak beyond "bend", subgenal area not outlined by carinae (*faustus* group) 20
- 17(16). Brow with 2 transverse carinae of which lower is as strong or stronger than upper one . . . 18
- 17'. Brow with only one transverse carina (TFC) or sometimes with a weak lower one also 19
- 18(17). Propodeal projection slightly convex posteriorly (Papua New Guinea; Australia: N. Territory, Queensland, New S. Wales; Fiji: Viti Levu)
 *papuanius* (Linsenmaier)
- 18'. Propodeal projection evenly concave posteriorly (Papua New Guinea; Australia: Queensland, New S. Wales) *biroi* (Mocsáry)

- 19(17'). Transverse strip below TFC somewhat raised (Queensland to Tasmania, Norfolk I.)
 *relegatus* (Mocsáry)
- 19'. Transverse strip below TFC receding gradually into scapal basin (New Caledonia)
 *caledonicus* (Mocsáry)
- 20(16'). T-III with an apicomedial denticle, subantennal space about 1.5 MOD, malar space shorter than pedicel (Victoria, A.C.T., New S. Wales)
 *unidens* (Mocsáry)
- 20'. T-III without a distinct apicomedial denticle 21
- 21(20'). Malar space extremely short, 0.5 MOD or less, TFC irregular but often forming a transverse and lopsided figure 8, Rs long and rather evenly curved, color green to purple or rarely rosy (Australia except Tasmania)
 *mocsáryi* (Bischoff)
- 21'. Malar space short to moderate but more than 0.5 MOD, other characters various 22
- 22(21'). Tarsi banded in outer view, each tarsomere basally pale, females unknown (Victoria)
 *maculitarsis* (Linsenmaier)
- 22'. Tarsi not banded in outer view 23
- 23(22'). TFC strongly developed into a projecting, downcurved crescent 24
- 23'. TFC absent, incomplete, parenthesis-like, or irregular and overall straight 27
- 24(23). Terga practically without maculation (Queensland, A.C.T., New S. Wales)
 *uqua* Bohart
- 24'. Terga with rather strong transverse purple bands 25
- 25(24'). F-I in male at most 1.4x as long as broad, in female less than 2x (Australia except Tasmania and S. Australia) *cardaleae* Bohart
- 25'. F-I in male 1.8-2.5x as long as broad, in female 2.3- 3x 26
- 26(25'). T-III margin somewhat convex basolaterally, TFC often approximating a reverse U, tarsi of male much paler than tibiae, Rs usually quite weak near or slightly beyond bend, malar space 1-1.3 MOD (Papua New Guinea, Australia except Tasmania) *kriechbaumeri* (Gribodo)
- 26'. T-III margin nearly straight basolaterally, TFC a simple arc or slightly angled medially, tarsi of male about as dark as tibiae, Rs usually pigmented well beyond bend, malar space 1. 5-2 MOD (Australia except Tasmania)
 *longigenis* (Linsenmaier)
- 27(23'). TFC complete, shaped like a parenthesis, with a short pair of posterior branches (fig. 4), length 6-7 mm. (Queensland) *hormingi* Bohart
- 27'. TFC, if complete, not shaped like a parenthesis, length varying 28
- 28(27'). TFC a little irregular but straight overall (fig. 7); scapal basin weakly concave; male F-I quite short, as broad as long (New S. Wales, S. Australia) *thorpi* Bohart
- 28'. TFC absent or incomplete, its remnants when present not in a straight line, scapal basin moderately concave, F-I considerably longer than broad 29
- 29(28'). F-I not more than 1.5x as long as broad, TFC absent (fig. 6), subantennal space 1.5 MOD, body length 3.5-4.5 mm., tarsi dark (Queensland, N. Territory, A.C.T., New S. Wales, Victoria)
 *gressitti* Bohart
- 29'. F-I 2.5-3.0x as long as broad, TFC partial or irregular (fig. 3), subantennal space about 1 MOD or less, body length 5 mm. or more, tarsi various 30
- 30(29'). Tarsi dark, subantennal space about 1 MOD (Queensland, New S. Wales, A.C.T.)
 *faustus* (F. Smith)
- 30'. Tarsi straw colored, subantennal space less than 1 MOD (fig. 3) (W. Australia)
 *commoni* Bohart

***Primeuchroeus cardaleae* Bohart, new species**

Male holotype: Length 5.5 mm. Green with a slight coppery luster, purplish around middle section of scutum and on basal and subapical bands across T-II; F-I green, wings nearly clear, tarsi brown. Punctuation of head and thorax moderate and close, punctures of T-I a little smaller and separated, those of T-II-III fine and close, outer surface of forefemur somewhat shiny and with fine to moderate punctures. LID a little more than eye breadth, facial hollow finely punctate and very finely crossridged but becoming more polished below sharp and crescentic TFC (fig. 5), malar space 1.3 MOD, subantennal space 1.0 MOD, F-I 1.5x as long as broad, slightly longer than either pedicel or F- II (fig. 5), lateral ocellus 2 diameters from eye, propodeal projection a little convex posteriorly and sharp but short and directed a little outwardly, Rs bent rather sharply at middle but continuing as a fine sclerotized line, discoidal cell faint outwardly, T-III with pit row moderately

impressed, T-II lateral margin gently outcurved from base, T-III posterior margin obtusely angled and rounded medially, S-II with large and long oval spots 2 MOD apart.

Female: Length 5-6 mm. F-I 1.5-1.8 times as long as broad, TFC sometimes a little angled medially, ocellar area and T-III sometimes purplish, T-III laterally almost straight toward base.

Discussion: Diagnostic are the combination of a short F-I (especially in male), sharp and crescentic TFC, long and medially bent Rs, and short as well as posteriorly convex propodeal projection. The species is named for Josephine Cardale, who collected the type as well as many other chrysidids studied.

Holotype male (CANBERRA), Fowler's Gap Research Station, New S. Wales, XII-2-81 (J. C. Cardale). Paratypes, 21 males, 11 females, Queensland: near Bowen, Murarria, near Laura, Eidswold; N. Territory: near Cape Crawford, near Alice Springs, near Borraloola, Areyonga, Katherine Gorge, Yuendumu; New S. Wales: 16 km. N. Mudgee, Morice, Womah, Fowler's Gap, Caldwell, Denticlin, Merrium; A.C.T.: Blundell's, Canberra, Black Mt.; S. Australia: Jamestown; W. Australia: near Galena, Moora, Mitchell's Plateau.

***Primeuchroeus commoni* Bohart, new species**

Holotype male: Length 5.5 mm. Green with crossbands of purple basally and subapically on T-II, basally on T-III: F-I-II green; wings very lightly smoky; tarsi light reddish brown, paler basally. Punctuation moderately coarse and close on head and thorax, moderate on T-I, rather fine and close on T-II-III, outer surface of forefemur with coarse close punctuation. LID a little less than eye breadth; facial hollow deep, with moderate crossridging, polished below sharply projecting brow; TFC area a crescent defined by coarse punctures but TFC itself irregular (fig. 3); malar space 1.0 MOD, subantennal space 0.5 MOD; F-I 2.5x as long as broad (fig. 3); lateral ocellus 1.5 diameters from eye; propodeal projection long, acute and tapering to a sharp point, straight posteriorly; Rs long as in fig. 8 but less bent, discoidal cell with outer veins faint; T-III with pit row well impressed below fairly strong prepit bulge, lateral margin curving outward from base, posterior margin broadly and obtusely rounded, S-II spots large and long, 2 MOD apart.

Female: Length 5.5 mm. T-III angled back at about 130 degrees to a rounded apex.

Discussion: Diagnostic are the combination of the long F-I (fig. 3), outcurved basolateral T-III margin, strong brow but weak TFC, and coarsely punctate forefemur. Also indicative are the short subantennal space, fairly strong prepit bulge of T-III, large ocelli, light colored tarsi in both sexes, long propodeal projection, and posteriorly rounded Rs.

Holotype male (CANBERRA) and paratype female (DAVIS), 145 km. ESE Broome, W. Australia (I. F. B. Common).

***Primeuchroeus gressitti* Bohart, new species**

Male holotype: Length 4 mm. Greenish blue grading to purple in ocellar area, midscutal area, and large basal and central area of T-II, F-I faintly greenish, wings nearly clear, tarsi dark and slightly metallic basally. Punctuation of head and thorax moderate and close, that of T-I similar but a little finer, that of T-II-III quite fine and close, outer surface of forefemur somewhat shiny and with separated fine punctures. LID more than eye breadth and equal to lengths of F-I-III plus pedicel, facial hollow fairly deep and crossridged up to rather sharp brow, no definable TFC (fig. 6), malar space 2.0 MOD, subantennal space 1.3 MOD, F-I 1.25x as long as broad and about as long as pedicel (fig. 6), lateral ocellus 2 diameters from eye, propodeal projection short and acute but straight posteriorly, Rs angled medially and sclerotized only 0.75 of way toward "bend", discoidal cell quite faint outwardly, T-III with pit row moderately impressed, prepit bulge weak, basolateral margin almost straight, posterior margin rounded obtuse, S-II spots round and 4 MOD apart.

Female: Length 3.5-4 mm. Malar space 2.0-2.2 MOD, posterior margin of T-III a little more angled out but still obtuse and rounded medially.

Discussion: Critical characters are the short F-I (fig. 6), no TFC, short but posteriorly straight propodeal projection, finely punctate forefemur, straight basolateral margin of T-III, and incomplete Rs (lower outline bent beyond rather short Rs stub). The species is named for my long-time friend and world-renowned entomologist, the late J. Linsley Gressitt.

Holotype male (HONOLULU), Magill Farm, west of Brisbane, Queensland, I-27-61 (J. L. and M. Gressitt). Paratypes, 3 males, 24 females, Queensland: Fernvaje, Stanthorpe, Gatton, Ebys, near Brisbane; N. Territory: Yuendumu, Areyonga; New S. Wales: near Bulahdelah; A.C.T.: Blundell's, Black Mt., Mt. Coree; Victoria: Warburton.

***Primeuchroeus horningi* Bohart, new species**

Holotype male: Length 6 mm. Green, grading to blue in ocellar area, outside scutal notauli, on T-II in transverse basal and subapical bands, and T-III across base; F-I green, wings nearly clear, tarsi dark and partly metallic. Punctuation of head, thorax and T-I moderate and close; that of T-II-III moderately fine to fine and close, outer surface of forefemur with rather close and moderately coarse punctures. LID a little broader than eye breadth, scapal basin punctate but not crossridged medially, TFC broadly biconcave and with fine posterolateral branches which partly enclose midocellar area, also a short posteromedial branch (fig. 4), malar and subantennal spaces each 0.9 MOD, F-I 1.9x as long as broad (fig. 4), lateral ocellus 2 diameters from eye, propodeal projection long and tapering as well as sharply pointed and concave posteriorly, Rs rounded rather than bent medially and continued almost to wing margin (as in fig. 8 but less bent), discoidal cell with outer veins fine but distinct, T-III pit row well impressed, T-III lateral margin outcurved from base, T-III posterior margin rounded obtuse and slightly indented medially, S-II spots about 3 MOD apart.

Discussion: Diagnostic are the combination of the unusual parenthesis-like rather than crescentic TFC, outcurved T-III basolateral margin, complete forewing discoidal cell, dark tarsi, and absence of crossridging in the shallow scapal basin. Also important are the long propodeal projection, moderately long F-I, posteriorly rounded Rs, and moderately coarse forefemur punctuation. The species is named for my long-time friend, D. S. Horning, Jr., who collected many of the specimens used in this study.

Holotype male (CANBERRA), and paratype male (DAVIS), Queensland: 10 mi. S. Bowen, IX-27-50 (E. F. Riek); paratype female (CANBERRA), Mt. Moffat Homestead, Carnarvon, Queensland, XI-27-83 (G. Walsh).

***Primeuchroeus indiacus* Bohart, new species**

Female holotype: Length 5.5 mm. Green to blue, deeper blue on terga medially, wings light brown, basitarsi all green outwardly. Punctuation moderate, shallow and close, finer on terga, fine and sparse on outer surface of forefemur. LID about equal to eye breadth, facial hollow finely crossridged, brow rounded with TFC absent (as in fig. 1), malar space 1.5 MOD, subantennal space 1.0 MOD, subgenal area defined, F-I twice as long

as broad, lateral ocellus 2.2 diameters from eye, Rs three-fifths as long as stigma and ending abruptly (as in fig. 1), discoidal cell faint, propodeal projection nearly straight posteriorly; T-III strongly saddled, lateral margin straight, prepit bulge strong, pits deep, distal margin convex; S-II spots round, 4 MOD apart.

Holotype female (WASHINGTON), Timri, Dehra Dun, Uttar Pradesh, India, X-24-45 (D. G. Shappirio). Paratype female (DAVIS), Mussporie, 6000-7000 ft., Dehra Dun, Uttar Pradesh, India, V-18-44 (D. G. Shappirio).

Discussion: Along with *crassiceps*, this species has no TFC. Both belong in the *siamensis* group with short Rs and a well defined subgenal area. *Primeuchroeus indiacus* is larger than *crassiceps* and the pronotum is more sharply contoured laterally.

***Primeuchroeus thorpi* Bohart, new species**

Male holotype: Length 4 mm. Greenish blue, grading to purple in ocellar area, anteromedially on scutum, on basal and subapical bands of T-II, and basally on T-III; F-I green, wings nearly clear, tarsi brown with some metallic green basally. Punctuation of head and thorax moderate and close, that of T-I mostly fine and close, that of T-II-III fine and close; outer surface of forefemur with scattered moderate punctures, shiny between them, LID 1.3x eye breadth and about equal to length of F-I to F-V together; scapal basin shallow, not crossridged, a little polished below irregular TFC which is straight overall (fig. 7), and branches back to nearly enclose midocellar area, latter shiny with elongate shallow punctures; malar space 0.6 MOD, subantennal space 1.0 MOD; F-I as broad as long and a little shorter than pedicel or F-II (Fig. 7); lateral ocellus 2.5 diameters from eye; propodeal projection short, stout, weakly convex posteriorly; Rs rounded at middle, continuing well beyond that point, discoidal cell faint outwardly; T-III with pit row shallow, prepit bulge weak, lateral margin straight, posterior margin very broadly rounded, S-II spots long oval and 3 MOD apart.

Discussion: Important characters are: F-I about as broad as long (fig. 7); frons unusually broad, nearly flat, and with an irregular but overall straight TFC (fig. 7); punctuation below midocellus reflective and longitudinal: Rs evenly curved and long; and propodeal projection weakly convex posteriorly. The species is named for my friend and colleague, R. W. Thorp.

Holotype male (CANBERRA), Carrathool, New S. Wales (W. W. Froggatt). Paratype male, (DAVIS) Sherlock, S. Australia, XII-24-1981 (R. W. Thorp).

***Primeuchroeus uqua* Bohart,
new species**

Male holotype: Length 5 mm. Bluish green, grading to blue, F-I green, wings nearly clear, tarsi dark and faintly metallic, T-II-III without dark markings. Punctuation moderate and close except on T-II-III where it is fine and close, outer surface of forefemur shiny with scattered fine punctures. LID about equal to eye breadth, facial hollow finely crossridged but more polished toward TFC which is distinct and crescentic (fig. 8), malar and subantennal spaces each 0.9 MOD, F-I 2.4x as long as broad (fig. 8), lateral ocellus twice its breadth from eye, propodeal projection straight posteriorly and sharp but stout and directed more posteriorly than outwardly, Rs bent medially but long (fig. 8), discoidal cell weak outwardly, T-III with pit row moderately impressed, prepit bulge moderate (fig. 8), T-III lateral margin nearly straight, T-III posterior margin obtusely rounded and a little angled, black spots of S-II oval and separated by 3 times a spot diameter (6 MOD).

Female: Length 4.5-5.0 mm. F-I about 3x as long as broad, malar space 1.1-1.2 MOD, lateral ocellus 1.4-1.6x its breadth from eye, T-II apical margin more angled out but still obtuse.

Discussion: Distinctive in combination are the unbanded T-II, crescentic TFC, long and medially bent Rs (fig. 8), long F-I, rather weakly punctate as well as shiny forefemur, straight T-III basolateral margin, and widely separated S-II spots. The species name is an acronymic noun in apposition.

Holotype male (BRISBANE), Brisbane, Queensland, IX-30-61 (R. G. Winks). Paratypes: 27 males, 49 females, Queensland: Brisbane, Dunwick, Belmont, Brookfield, Condivan, Tanaga, Nagoorin, Springsure, Sunnybank, Roma, Chatswood, Townsville, Kuranda, Maryborough, GlenAlpin, Glasshouse, Tambourine, Esk, Eidswold, Byfield, Paluma, Condamine, Toowong, Amby, Redlynch, Mt. Glorious, Tibrogargan Creek, Bundaberg, Mackay; New S. Wales: Lismore, Middle Pkt., Northbridge, Rosebank; A.C.T.: Canberra; Victoria: Melbourne.