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GENUS *CHRYSOMYA* IN NEW GUINEA (Diptera: Calliphoridae)[1,2]

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Abstract: The species of *Chrysomya* known to occur in New Guinea are reviewed, with a key and distributional information. New species are *C. sulcifrons* and *C. norrisi*, New Guinea, and a subspecies, *C. sulcifrons noonadan*, New Ireland. *C. saffranea* (Bigot) is removed from synonymy with *C. megacephala* (F.), and *C. mallochi* Theowald is synonymized with *C. saffranea*.

The genus *Chrysomya*, the only one in its subfamily known to be present in New Guinea, is very important from the standpoint of medical and veterinary entomology. Zumpt (1965) states that 10 species are known to be involved in myiasis of man and animals, either occasionally or commonly. Five of these occur in the New Guinea fauna. The most important is *C. bezziana* Villeneuve, a major pest of cattle and other domestic animals in that area (Norris & Murray 1964), as well as in other parts of its range. A peculiar type of dermal myiasis in calves, involving *C. rufifacies* (Macquart) in Hawaii, is described by Shishido & Hardy (1969). This species is common in New Guinea, and the same type of myiasis might occur there.

The terminology used in this paper is largely standard. In numbering the abdominal segments, I have used the apparent, rather than the morphological, segmentation, so that the major part of the abdomen will be described as consisting of 4, rather than 5, segments.

This study is based largely on the extensive collections of the Bishop Museum, Honolulu, and the Australian National Insect Collection (CSIRO), Canberra; some material has come from the collections of the University Zoological Museum, Copenhagen; the Swedish Museum of Natural History, Stockholm; The California Academy of Sciences, San Francisco; and the Washington State University Insect Collection.

TAXONOMY

Genus **Chrysomya** Robineau-Desvoidy

Chrysomya R.-D., 1830, *Essai sur les Myodaires* **2**: 444.
Microcalliphora Townsend, 1916, *Proc. U. S. Nat. Mus.* **49**: 618.

1. Scientific paper 3549, College of Agriculture, Washington State University. Work was conducted under Project 9043.
2. Materials examined from the Bishop Museum are partly results of fieldwork supported by grants to the Museum from National Institutes of Health (AI-01723), National Science Foundation (G-2127, G-4774, G-10734, GB-518), and U. S. Army Medical Research and Development Command (DA-MD-49-193-62-G47).
3. Washington State University, Pullman, Washington.

Eucompsomyia Malloch, 1927, *Proc. Linn. Soc. New South Wales* **52**: 325.

The above synonymy is not complete, but gives reference to the nominal taxa discussed here. The spelling *Chrysomyia*, which has been used extensively, is an unjustifiable emendation. Zumpt considers *Microcalliphora* a synonym of *Chrysomya*, and I believe he is right in doing so; also I can see no reason for maintaining *Eucompsomyia* as generically distinct. Perhaps these taxa could be used in a subgeneric sense.

Key to species of Chrysomya known to occur in New Guinea

1. Greater ampulla (the larger of the 2 protuberances just below base of wing) with only short, dense pubescence; humeri reddish yellow, strongly contrasting with mesonotum and most of pleura; abdomen with reddish yellow bands or lateral markings on dorsal parts of terga (*Eucompsomyia*) 2
   Greater ampulla, in addition to the pubescence, with hairs that are longer than height of ampulla; humeri not contrasting in color with mesonotum and abdominal terga not marked with reddish yellow dorsally 3
2. Mesopleural pile entirely black; facials black-haired ..... **sabroskyi** (Theowald)
   Mesopleural pile, except on upper 1/3, largely whitish to yellowish; facials yellow-haired ..... **semimetallica** (Malloch)
3. Anterior spiracle black or blackish 4
   Anterior spiracle yellow or white 7
4. Gena black, with blackish hairs..... **pinguis** (Walker)
   Gena orange to reddish yellow, with yellow hairs 5
5. No black setulae on facial or parafacial around the vibrissa, or, rarely, 2 or 3 present; facets of eye of ♂ larger above than below, but without any distinct line of demarcation; squamae brown ..... **saffranea** (Bigot)
   At least several, usually many black setulae around vibrissa, on face and parafacial 6
6. Squamae brown; facets of ♂ eye much enlarged above and sharply demarcated from area of smaller facets below; frontal stripe of ♀ broader at middle of frons, not parallel-sided (cf. James 1948, fig. 29; Zumpt 1965, fig. 114) .....**megacephala** (Fabricius)
   Squamae white; facets of ♂ eye somewhat enlarged above but not sharply demarcated from area of smaller facets below; frontal stripe of ♀ parallel-sided (cf. James 1948, fig. 28; Zumpt 1965, fig. 114) ..... **bezziana** Villeneuve
7. Frons of ♀ narrow, less than 1/4 head width, on its lower 2/3 sulcate, that is, folded into a distinct groove; frontal stripe of ♂ evanescent above, below distinctly depressed below level of lunule..... **sulcifrons***
   Frons of ♀ at least 1/3 head width, not sulcate below; lower frontal stripe of ♂ flush with lunule 8
8. Larger species, usually 7 mm or more in length; eyes of ♂ separated by no more than 1/2 width of 3rd antennal segment; legs wholly black or dark brown, at most slightly reddish at knees.....10
   Smaller species, usually 5-6 mm in length; eyes of ♂ separated by distinctly more than width of 3rd antennal segment 9
9. Face and gena wholly yellow; middle and hind femora broadly reddish basally; ♂ frons extremely broad, almost as broad as in ♀; ♂ front femur mostly whitish

* Described as new.

with prominent, long whitish hairs dorsally ..... **varipes** (Macquart)
Head wholly black; legs black in both sexes and without unusual hairs; ♂ frons exceptionally broad but narrower than in ♀ ..... **nigripes** Aubertin
10. Pollen of face and gena dense, silvery; gena black in ground color; squamae whitish to yellowish ..... **rufifacies** (Macquart)
Pollen of face and gena dense, golden; gena golden in ground color; squamae blackish, sometimes paler at base..... **norrisi***

Chrysomya sabroskyi (Theowald), new combination

Eucompsomyia sabroskyi Theowald, 1959, *Nova Guinea* **10**: 96.

I have seen only a pair of paratypes, deposited through the kindness of Dr Sabrosky in the Entomological Collection of Washington State University.

Chrysomya semimetallica (Malloch)

Eucompsomyia semimetallica Malloch, 1927, *Proc. Linn. Soc. New South Wales* **52**: 325.

Theowald (1959) has recorded this species from Hollandia, NW New Guinea, and from Nadzab in the Markham River Valley and Finschhafen, NE New Guinea. I am accepting his identification of the species, which was described from Queensland. I have the following additional records:

NW NEW GUINEA: 39 ♂♂, 26 ♀♀, Ifar, 300-600 m, from human excrement, 20-25.VI.1959, T. C. Maa; 24 ♂♂, 20 ♀♀, Cyclops Mts, Ifar, 3 ♂♂ m, from human excrement, 21.VI.1959, Maa; 1 ♀, Bodem, 11 km SE of Oerberfaren, 7-17.VII.1959, Maa. SW NEW GUINEA: 3 ♀♀, Vogelkop, Fak Fak, S coast of Bomberi, 100-700 m, 4, 5 & 9.VI.1959, Maa. NE NEW GUINEA: 1 ♀, Wau, 1300 m, 24.XI.1963, J. L. Gressitt; 1 ♀, Adelbert Mts, Wanuma, 800-1000 m, from fresh human excrement, 2.X.1958, Gressitt. PAPUA: 3 ♀♀, Brown River, one from carrion, 25.V.1956, E. J. Ford.

Chrysomya pinguis (Walker)

Lucilia pinguis Walker, 1858, *Trans. Ent. Soc. Lond.* **4**: 213.

I have no New Guinea records of this species; I have seen it from Amboina, however, and because of its wide distribution, it can be expected to occur in New Guinea.

Chrysomya saffranea (Bigot)

Somomya saffranea Bigot, 1877, *Ann. Soc. Ent. France* **1877**: 257.
Chrysomyia mallochi Theowald, 1959, *Nova Guinea* **10**: 95. **New Synonymy** (fide Norris).

I am indebted to Mr K. R. Norris, who examined the Bigot type, for calling my attention to this synonymy, and I am publishing it with his approval. The rule of the International Commission on Zoological Nomenclature concerning *nomina oblita* would place the name *saffranea* in that category, but because of the unsatisfactory nature of that rule, the action of the International Congress of Zoology of 1968 in suspending it and the small amount of literature in which the name *mallochi* has been used, it seems

best to adopt the Bigot name. Bigot recorded the type locality as simply "Australie." Theowald's types were from "North New Guinea, Idenburg River, Bernhard Camp." I have the following records:

NW NEW GUINEA: 9 ♀♀, 7 ♂♂, Eramboe, 80 km ex Merauke, 29.I. and 5.II.1960, T. C. Maa. PAPUA: 1 ♂, Laloki, 3.II.1910, F. Muir; 5 ♀♀, 7 ♂♂, Laloki, near Port Moresby, 30.VIII–2.IX.1959, Maa; 2 ♀♀, Laloki River, near Port Moresby, VII.1962, R. Pullen; 1 ♀, Daradae Plantation, 500 m, 80 km N of Port Moresby, 4.IX.1959, Maa; 3 ♀♀, 2 ♂♂, Kiunga, Fly River, 26–28.X.1957, W. W. Brandt; 6 ♀♀, Moitaka, Port Moresby, III.1962, K. R. Norris; 6 ♀♀, 6 ♂♂, Kila Kila, 5.III.1962, Norris.

Chrysomya megacephala (Fabricius)

Musca megacephala Fabricius, 1784, *Syst. Ent.* **4**: 317.

This is the most common member of the genus in New Guinea and in at least a large part of its very extensive range. Synonyms are numerous (cf. Senior-White, Aubertin & Smart 1940; Zumpt 1956; Kano & Shinonaga 1968), but *C. saffranea*, which has been considered a synonym of this species, should be removed from the synonymy. This is a common scavenger and can be involved secondarily in myiasis of man and domestic animals.

I have records from the following localities: NW NEW GUINEA: Biak; Hollandia; Nabire; Ifar, Cyclops Mts; Vogelkop, Nebar Valley W of Manokwari; Maffin Bay; Wissel Lakes, Enarotadi; Kurubaka, Swart Valley; Nabire, S Geelvink Bay. NE NEW GUINEA: Finisterre Range (Saidor, Moro Village, Damaindi, near Butemu Village); Salawaket Range (Sepalakambang, Tuwep); Wau; Lae; Torricelli Mts (Mobitei, Sugoitei); Highlands, Baiyer River; Maprik; Tapo; Okapa; Kassam; Karimui; Finschhafen; Pindiu, Huon Pen.; Purosa, 20–26 km SE Okapa; Goroka; Kandanggel, Sepik River. PAPUA: West District, Oriomo Government Station; S. Highlands (Aiyurop, near Mendi; Aiyurop-Rumpi; Mendi); Daradae, near Javarere, Musgrove River; Daradae Plantation, 80 km N of Port Moresby; Kila Kila; Doa Estate, 50 miles W of Port Moresby. Taken commonly on human excrement, also in light traps; records are at hand for all months of the year and at elevations from sea level to 2000 m.

Chrysomya bezziana Villeneuve

Chrysomyia bezziana Villeneuve, 1914, *Rev. Zool. Afr.* **3**: 430.

This is one of the world's most important producers of myiasis in man and domestic animals. It is widespread in the tropical and subtropical parts of the Ethiopian, Oriental, and parts of the Australasian Region, including New Guinea. This is an obligatory parasite, and, like its American counterpart, *Cochliomyia hominivorax* (Coquerell), is rarely taken other than in actual cases of myiasis. Consequently, the paucity of records from field collecting is no indication of its comparative abundance. I have only one record from field collecting in New Guinea: SE NEW GUINEA: 1 ♀, Cape Rodney, 2.XI.1960, Malaise trap, J. L. Gressitt.

Chrysomya sulcifrons James, new species Fig. 1.

♀. Parafrontals, vertex, and occiput, except lower part, black in ground color ; frontal stripe reddish brown ; face, genae, and lower part of occiput, below level of eye, reddish orange. Pollen cinereous on black areas, yellow to yellowish on reddish orange areas, mostly dense but becoming thin on vertex, especially adjacent to eyes ; that of frontal stripe concolorous with background and appearing dense under oblique lighting. Frons 0.22 head width at narrowest, 0.26 head width at vertex ; frontal stripe almost 0.50 width of frons at anterior ocellus but narrowing to about 0.25 width of frons just above lunule ; lower 2/3 of frontal stripe folded inward on itself, forming a distinct groove. Face deeply concave, the warp prominent. About 16 pairs of subequal, long and strong frontal bristles ; 1 strong reclinate and no proclinate fronto-orbitals ; ocellars small ; strong inner and outer verticals. All bristles black ; abundant pile on parafrontals, black above, becoming yellow on lower half or more and extending onto upper parafacials ; some appressed black setulae around and several short black bristles below vibrissa ; some setulae and pile on upper part of occiput black, occiput otherwise, genae, and facials with yellow pile. Antenna reddish orange, flagellum outwardly dark brown ; rays of arista blackish. Proboscis brownish black ; palpus clear yellow to orange-yellow, with black setulae.

Thorax bluish green, in places with more distinctly bluish reflections under proper light incidence ; mesonotum and lower parts of pleura, especially sternopleura, with whitish pollen which appears dense under oblique light ; scutellum and upper pleura with only traces of such pollen ; this pollen brownish on median part of postscutum between dorsocentral rows and 2/5 to 1/2 way from suture to base of scutellum, also near anterior margin of prescutum ; from posterior view, a narrow vitta of darker brown pollen on prescutum between each dorsocentral and respective acrostichal row, ending well before suture, and a triangular patch of black pollen between each dorsocentral row and the humerus, ending well before the suture but continuing postsuturally as a vitta that extends more than 1/2 way to base of scutellum. Thoracic bristles and dorsal pile and setulae black ; setulae and hairs of pleura black above, white to yellowish below, extent of black hairs on pleura variable. Acrostichals 0 : 1-2, dorsocentrals 2-3 : 4-5, stigmatal and propleural present, 1-2 accessory propleurals and sometimes an accessory stigmatal present. Anterior stigma pale yellow, posterior one usually brown. Legs brown to brownish black, tibiae brownish yellow. Wing pale brown, darker toward base. Halter brownish yellow. Squamae dark brown with concolorous pile, outer basal corner of each white with a yellowish margin and whitish pile, in strong contrast to rest of squamae.

Abdomen bluish green, terga 1 to 3 with broad black apices ; pollen white, scant except on ventral aspects of terga, somewhat more noticeable dorsally on 4th than on 1st 3 terga. Pile mostly black, that of sterna, ventral aspects of terga adjacent to sterna, and 4th tergum ventrally and, in part, dorsally, whitish to yellowish. Length, 9.5 mm.

♂. Eyes almost contiguous, frons at narrowest about width of diameter of anterior ocellus ; frontal vitta evident only for a short distance anterior to anterior ocellus and above lunule, where it is distinctly sunken below level of lunule. Eye facets distinctly larger above and anteriorly but with no line of demarcation between larger and smaller facets. Frontals 9-10, upper ones small, parafrontals setulose, however, to vertex ; no fronto-orbitals ; outer as well as inner verticals well-developed. Pollinose areas of mesonotum as in ♀ but not so well defined. Length, 7.5 mm.

Holotype ♀ (BISHOP 9371), SW New Guinea : Vogelkop, Fak Fak, S coast of Bomberi, 100-700 m, 4.IV.1959, T. C. Maa. Allotype ♂, NW New Guinea, Biak, Kampong Landbouw, 40 m, 25-28.V.1959, Maa & J. L. Gressitt. Paratype ♀, same data as holotype.

The ♀ is chosen as the holotype because of the very characteristic nature of the frons (fig. 1), which will readily distinguish it from other New Guinea species. In the Ethopian *C. inclinata* Walker the frons is likewise narrow but it is quite a different shape and is not sulcate below.

Chrysomya sulcifrons noonadan James, new subspecies

A ♀ from New Ireland appears to be conspecific with the above species but the frontal stripe is black above, becoming dark brown, then dark reddish brown at the lunule, and the setulae of the lower 1/2 of the facial are semi-erect, black, and in a conspicuous patch of about 4 irregular rows. If these differences, along with the distinct zoogeographical pattern, prove constant, a distinct subspecific designation is justified.

Holotype ♀, (University Zoological Museum, Copenhagen), New Ireland, Lemkamin, 12.IV.1962, Noona Dan Expedition 1961-1962.

Chrysomya varipes (Macquart)

Lucilia varipes Macquart, 1850, *Dipt. Exot.*, Suppl. **4**: 259.

I have the following records: NW NEW GUINEA: 1 ♂, Ifar, 300-600 m, 22.VI.1959, from human excrement, T. C. Maa; 1 ♀, Bodem, 1 km SE of Oerberfaren, 100 m, 7-17.VII. 1959, Maa; 1 ♀, Central Mts, Archbold Lake, 760 m, 26.XI-3.XII.1961, L. W. Quate; 5 ♀♀, Genjam, 40 km W of Hollandia, 100-200 m, 1-10.III.1960, Maa; 2 ♀♀, Nabire, S Geelvink Bay, 0-30 m, 29.VII.1962, J. Sedlacek; 1 ♀, Wailibit, 9.VI.1949, Sten Bergman; 2 ♀♀, Japen I., SSE Sumberbaba, Dawai River, jungle, 28.X.1962, H. Holtman. NE NEW GUINEA: 3 ♀♀, 1 ♂, Finschhafen, IV.1944, F. E. Skinner; 1 ♀, Maprik, 160 m, 15.X. 1957, Gressitt; 1 ♀, Sepik River, Kanddangel, 29.II.1964, D. H. Colless; 1 ♀, Huon Pen., Morobe District, near Pindiu, V.1964, R. D. Hoogland. PAPUA: 2 ♀♀, Brown River, 22 & 25.V.1956, E. J. Ford, Jr.; 1 ♂, Brown River, near Port Moresby, 17.VI. 1957, D. Elmo Hardy; 1 ♀, Port Moresby, III.1962, K. R. Norris; 1 ♀, 1 ♂, Kila Kila, 5.III.1962, Norris.

Chrysomya nigripes Aubertin

Chrysomyia (*Microcalliphora*) *nigripes* Aubertin, 1932, *Ann. Mag. Nat. Hist.* (10) **9**: 26.

I have the following records: NE NEW GUINEA: 12 ♀♀, 6 ♂♂, Finschhafen, IV. 1944, F. E. Skinner; 1 ♂, Lae, VII.1944, Skinner; 1 ♀, 1 ♂, Nabire, S Geelvink Bay, 0-30 m, 2-9.VII.1962, J. Sedlacek. PAPUA: 4 ♂♂, Moitaka, Port Moresby, III.1962, K. R. Norris; 2 ♀♀, Brown River, 21 & 23.V.1956, E. J. Ford, Jr.

Chrysomya rufifacies (Macquart)

Lucilia rufifacies Macquart, 1842, *Mem. Soc. R. Sci. Arts Lille* **1842**: 303.

I have records from the following localities: NW NEW GUINEA: Hollandia; Sentani, Hollandia area; Nabire, S Geelvink Bay; Genjam, 40 km W of Hollandia; Vogelkop, Kebar Valley, W of Mankowari; Japen I., SSE Sumberbaba, Dawai River; Maffin Bay.

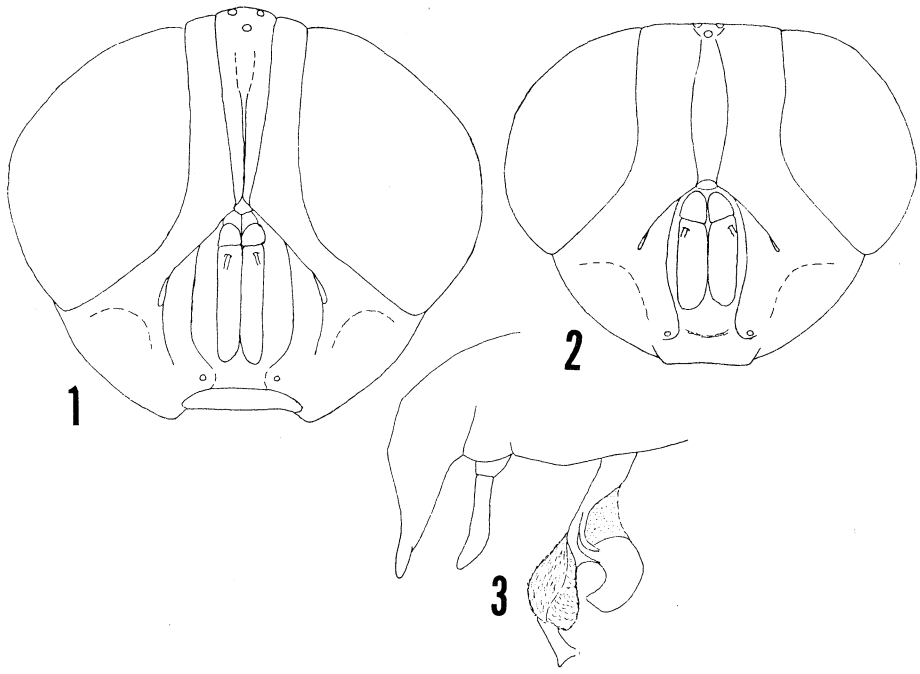

Fig. 1-3. 1, *Chrysomya sulcifrons* n. sp., ♀, head, anterior view; 2, *C. norrisi* n. sp., ♀, head, anterior view; 3, *C. norrisi*, ♂, genitalia. Bristles, setae, and hairs omitted for purposes of simplicity.

NE NEW GUINEA: West Highlands, Baiyer River; Wau; Finschhafen; Zenag; Erap; Lae; Kandanggel, Sepik River; Huon Pen., Morobe District, Pindiu; Baiune; Prince Alexander Range. PAPUA: Laloki, near Port Moresby; Bourkes, Brown River, Port Moresby; Moitaka, Port Moresby; Sogeri, via Port Moresby; Kila Kila; Maderi Plantation, West District; Sigabadu.

These records extend over every month except January and December, and at elevations from sea level to 1250 m. It has been taken at light traps, from human excrement, and from various types of carrion. This is a secondary myiasis-causing fly of some importance, and under certain circumstances may even be primary (cf. Shishido & Hardy 1969). K. R. Norris collected it at Bourkes, Papua "netted around struck tail of cow."

Chrysomya norrisi James, new species Fig. 2 & 3.

♂. Parafacials, facials, gena, and lower part of occiput golden in ground color and covered with dense golden pollen; facial depression more or less blackish especially next to facials and on sides of facial warp, usually distinctly yellow medially for its entire length, but extent of blackish areas variable. Parafrontals and upper occipital orbits black under dense golden to yellow pollen; vertex and upper occiput black, pollen becoming whitish and much less dense than on anterior aspects of head; frontal stripe reddish brown, very small at lunule and completely vanishing 1/3 or less distance to anterior ocellus. Parafrontal very narrow, at narrow-

est eyes separated by less than diameter of anterior ocellus. Facials broad. Eyes with upper facets much larger than lower ones but no line of demarcation between the 2 areas. Frontal bristles and hairs black; bristles weak, about 6–8 pairs but upper ones merging into erect hairs which continue to vertex; abundant black hairs outside the row of bristles on lower part of frons and extending onto upper parafacials to level of arista, a few of the lowermost hairs sometimes yellow. Ocellar bristles present but weak; inner verticals well-developed, no outer verticals or fronto-orbitals. Approximately lower 2/3 of facial with a prominent patch of appressed, stiff, black setulae, about 4 to 6 irregular rows in width; no semi-erect setulae on margin of facial above vibrissa; no bristles along oral margin below vibrissa but rather a fringe of setulae, black above, suddenly becoming golden below facial warp; pile of facial outside patch of black setulae, also of gena and lower occiput, golden, rather dense. Antenna reddish brown at base, flagellum largely blackish, more reddish brown ventrally; arista reddish brown with black rays. Proboscis black, palpi yellow.

Thorax bluish black with purplish reflections; mesonotum and lower pleura with whitish pollen, quite evident under oblique lighting, pollen much less prominent on upper pleura and scutellum. Pile and bristles of thorax black. Anterior spiracle bright yellow; posterior one dark brown. Mesonotal chaetotaxy reduced; usually no presutural dorsocentrals or acrostichals, postsuturals represented only by the prescutellars and sometimes an additional weak dorsocentral. Legs black; tarsi dark brownish black. Squamae brownish black with concolorous hairs, sometimes a little paler at base.

Abdomen mostly bright bluish green with purplish reflections; 1st segment more blackish, 4th green in ground color; 2nd and 3rd terga with black apical margins which are obscured in some specimens. Pollen scant except on 4th segment, where it is prominent and white, regardless of light incidence, and consequently in strong contrast to that of the preceding segments; 1st 3 segments dorsally, especially 2nd and 3rd, with dense, erect, black hairs, except on the 4th segment these hairs are white with some long, bristle-like, black hairs intermixed; ventral aspects of terga and sterna with more evident pollen and largely white hairs, those of 1st tergum ventrally mostly black, however. Genitalia as in fig. 3. Length, 7–8 mm, of holotype, 7.5 mm.

♀. Profile of frons similar to that of *megacephala*, the frons being wide and the eye margins feebly but distinctly bulged outward; the parafrontals and parafacials (fig. 2) are much broader than in *C. megacephala* and the frontal stripe is correspondingly very narrow. Parafrontals black in ground color, densely covered with golden pollen and with abundant erect to semi-erect black hairs. Head measurements in proportion to head width (1.00), with those of *megacephala* given in parentheses for purposes of comparison: width of frons, 0.36 (0.26); of frontal stripe, 0.08 (0.18); of parafacial at lower end of suture, 0.13 (0.09). Outer verticals, as well as inner verticals, well developed; a pair of strong reclinate but no proclinate fronto-orbitals. Abdominal hairs as in ♂ but shorter and more appressed. Length, 6.5–8.0 mm, of allotype, 7.5 mm.

Holotype ♂ (CSIRO), New Guinea, Western Highlands, Kandep, about 2500 m (8300 ft), I.1963, W. W. Brandt. Allotype ♀, sama data. Paratopotypes, 15 ♀♀, 16 ♂♂, same data.

I take pleasure in dedicating this species to Mr K. R. Norris; he and I independently came to the conclusion that it was an undescribed species.

The type series is quite uniform in structure and general appearance. The reduced mesonotal chaetotaxy is characteristic and will distinguish this species from all others known to occur in New Guinea except the ♂ of *C. nigripes* Aubertin, which differs in its broad frons and many other respects.

A series of 5 ♀♀ from Wau, Morobe District, NE New Guinea, complicates the taxonomic picture. One specimen, from Edie Creek, 2000 m, which was referred to me by Mr Norris as representing a new species, fits the description quite well except that the subshining black of the parafrontals shows distinctly through the pollen and the parafacials are a little narrower, about 0.11 head width. A specimen from a lower elevation (1400 m) is sufficiently different that, were it not for the geographical picture and intergrades, I would consider it as representing a separate species. The size is smaller (6 mm) ; the frons is distinctly shining and the pollen of the entire head is less dense ; the frontal stripe is about the width of the parafacial ; and the 4th tergum is coppery in distinct contrast to the ground color of the rest of the abdomen. Three other specimens, from 1200, 1700, and 1700 m respectively, are intermediate between the 2. Two subspecies or even hybridizing species may exist, with the intergradation or hybridization occurring in this area, but the information at hand is not sufficient to justify a conclusion.

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