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PAPUAN-MELANESIAN DIACHLORINI (Diptera: Tabanidae)[1]

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Abstract: Distributional patterns are traced for 4 presumably monophyletic assemblages: *Lissimas* from Philippine Is. to Louisiade Archipelago and NE Australia, *Japenoides* from NW New Guinea to Fiji, *Chasmia* from Waigeu to Solomon Is., and the *sylvioides* group of *Cydistomyia* from N. Celebes to Fiji. The genus *Chasmia* is restored, a new species group (the *nana* group) is recognized in *Cydistomyia*, and *Cydistomyia oudella* Oldroyd is transferred to *Japenoides*. New species described: *Lissimas papuensis* (NW New Guinea), *Japenoides aurea* (New Britain, Umboi I.), *J. nigricosta* (New Britain), *Chasmia nigrifrons* (Louisiade Archipelago), *Ch. orthellioides* (Solomon Is.), *Ch. ornata* (New Guinea), *Ch. lineata* (New Guinea), *Cydistomyia nigrina* (Solomon Is.), *C. nannoides* (Solomon Is.), *C. teloides* (Solomon Is.), *C. parapacifica* (New Britain), *C. rosselensis* (Louisiade Archipelago).

Three collections have been studied since the Tabanidae of the Papuan Subregion were reviewed in 1964, namely: the extensive subsequent accessions of Bishop Museum, Honolulu, from New Guinea and the Solomon Islands; Mr W. W. Brandt's collection from New Guinea, Rossel I. and New Britain, in the Australian National Insect Collection (ANIC), Canberra; and the specimens collected in the Bismarck Archipelago by the Noona Dan 1961-62 Expedition, received from the University Zoological Museum, Copenhagen. They include some particularly interesting Diachlorini which throw fresh light on the local evolution and dispersal of the tribe, and the present paper is limited to that topic. It will be necessary to refer frequently to the earlier revision (Mackerras 1964), so it will be cited hereafter simply as "(1964, p. [or fig.] ...)."

Problems of Phylogeny

The Diachlorini that concern us here have been visualized (1964, p. 96-99) as consisting of a basic generalized stock from which more specialized offshoots have developed at various times and places. The basic stock was believed to have survived, apparently with little change, in the Ethiopian-Oriental "*Tabanotelum*" at one end of the distributional arc and the Austromalayan-Pacific *sylvioides* group of *Cydistomyia* at the other. The more divergent offshoots were treated as separate genera, the less clearly definable ones as species groups and subgroups within the genus *Cydistomyia*. Two aspects require further consideration: the theoretical implications of the arrangement; and the bearing of the new material on its validity. They are relevant here, because both relate to the basic principle that zoogeography, as a theoretical discipline, is

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entirely dependent on phylogenetic inference (e.g., Hennig 1960 ; Brundin 1966 ; Mackerras 1970).

The first task of the phylogenist is to recognize monophyletic assemblages. They are so fundamental to the whole taxonomic structure, at least at the levels with which the zoogeographer is concerned, that I have been seeking for a shorter, more vivid, alternative term to emphasize their nature. *Clone* seems appropriate, for monophyletic assemblages are exactly parallel to the clones of asexually reproducing cells familiar to the microbiologist and immunologist. A genus is a clone of species, a family a clone of genera, and so on. Using essentially the procedures of Hennig and Brundin, though with an inclination to regard the critical synapomorphies more broadly as "evolutionary markers," it has been possible to identify 6 specialized Oriental-Papuan clones of species with sufficient confidence to accept them as discrete genera. Of the 6, *Udenocera* (Ceylon) and *Neobolbodimyia* are monotypic and *Lissimodes* (Ceylon) contains 2 species. The other 3—*Lissimas* (8 spp.), *Japenoides* (7 spp.) and the now restored *Chasmia* (20 spp.)—are of particular interest, in that each shows a clear gradation from species that can be distinguished from quite ordinary *Cydistomyia* only by the essential marker characters, not always in a fully developed state, to others which are so distinctive that they would immediately be set apart by any entomologist. We cannot cut across the flow ; all must be included if we are to have monophyletic genera.

So far, good : we have a series of clones which we can use as zoogeographical tools in a reasonable belief that we are studying realities. That they appear to have been budded off from a continuing clone (just as one may pick off several colonies of a bacterial clone for separate experimental treatment) in no way affects their evolutionary validity, though it may introduce an element of "typology" (a term which appears to include a multitude of sins) into their formal taxonomic treatment.

The second task of the phylogenist, as Hennig demonstrated, is to detect sister-group relationships between clones, and so to construct a phylogenetic pattern in which the apparent discordancies introduced by convergence or parallel evolution can be recognized for what they are. This has proved to be exceedingly difficult in the Diachlorini, largely, no doubt, owing to a tantalizing insufficiency of detectable inter-group synapomorphies in the terminalia and to a lack of information about the immature stages. The result is that one can recognize sister-group relationships with confidence only in the infrageneric groups of *Japenoides* and *Chasmia* and in a number of species pairs in other genera. *Udenocera* and *Lissimodes*, *Lissimas* and *Neobolbodimyia*, *Japenoides* and *Chasmia* may be sister groups at a higher level, but it cannot be asserted, and the relative ages of these 3 pairs can be guessed only from their relative positions on a long distributional arc, that is, as a consequence of the zoogeographical hypothesis, not as evidence for it. On the other hand, the evidence for parallel evolution in frontofacial specialization in at least *Lissimas*, *Japenoides* and *Chasmia* is strong, and the evolutionary model shown in fig. 1 would seem to be as near the truth as is at present attainable. It differs from the classical sister-group diagrams of Hennig and Brundin chiefly in being much more skewed to emphasize the continuity of the basic stock.

The genus *Chalybosoma* is still obscure. The new material strengthens one's feeling that it is a genuine clone, but its relationships have not been resolved. The species groups of *Cydistomyia* are discussed in a later section.

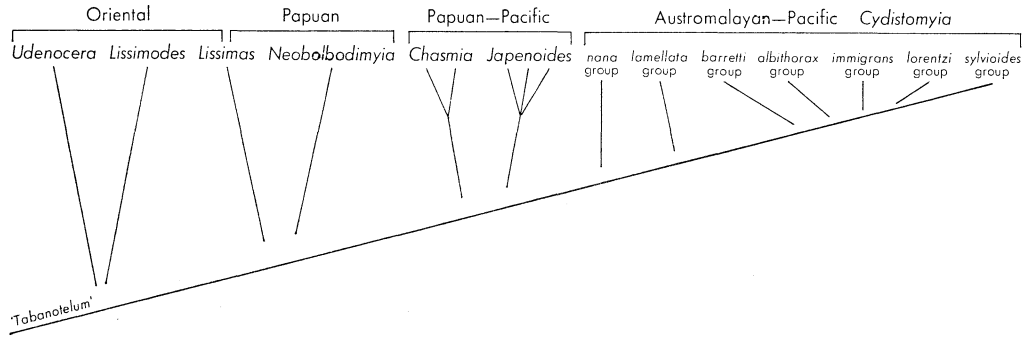

Fig. 1. Diagram to illustrate probable evolution of Oriental-Pacific Diachlorini. The offshoots are separated from the basal stock because, in at least some instances, evolution may have occurred through an intermediate group of *Cydistomyia*.

Genus **Neobolbodimyia** Ricardo

Neobolbodimyia nigra Ricardo

A ♂ from NE New Guinea, Garaina, 800 m, I, J. & M. Sedlacek, differs from those described by Oldroyd (1949, p. 331) in having black notopleural hairs, and from the one described by me (1964, p. 101) in having a narrow but conspicuous apical zone of white hairs on each side of the midline on abdominal tergite 1. As the species still appears to be known only from a few specimens, it is difficult to estimate the significance of the variations that have been recorded.

Genus **Lissimas** Enderlein

The species described below would run to couplet 3 in the key already published (1964, p. 102). It is closely related to *L. australis* (Ric.) from north Queensland, but differs sufficiently to be treated as a sister species rather than a subspecies. The known distribution of *Lissimas* is shown in fig. 2.

Lissimas papuensis Mackerras, new species Fig. 4.

Holotype ♀ (BISHOP 9365), from Ifar, Cyclops Mts, NW New Guinea, 300–500 m, in light trap, 28–30.VI.1962, J. L. Gressitt & J. Sedlacek.

MATERIAL EXAMINED: 1 ♀.

♀. A slender, 14 mm, chocolate brown species. Distinguished from *L. australis* by more slender build, more diverging frons, darker, more shiny subcallus, the dark pattern of wing extending beyond apex and almost filling cell R_4, the base of vein R_4 distinctly longer than its appendix, and possibly by eye pattern. *Head*: Eyes (relaxation not satisfactory) apparently green with brown reflections but without definite bands. Frons diverging, index 3.3, almost filled by the bulging, pyriform, shining black callus, gray-dusted laterally above and shining black below the callus. Subcallus polished brown-black, parafacials and face similar, some vague gray dusting on cheeks laterally; beard sparse, mixed gray and brown. Antennae long and slender; scape not as long as flagellum, appearing annulate, brown with black hairs; pedicel

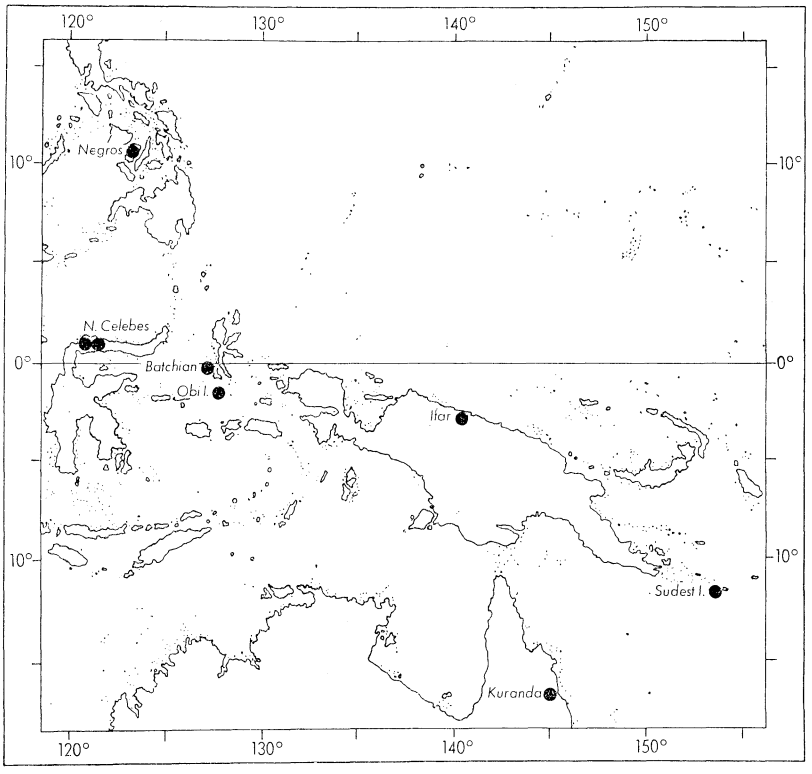

Fig. 2. Distribution of the genus *Lissimas*. Each spot is the record of a different species. The gradient of increasing specialization runs, broadly, from northwest to southeast.

brown with denser black hairs; flagellum deep brown basally merging into blackish brown on style. Palpi acuminate, slightly shining, dark brown with black hairs. *Thorax*: Scutum and scutellum rather shining deep chocolate brown, with vague gray dusting laterally and mixed inconspicuous black and dull grayish white hairs. Pleura similar, with inconspicuous hairs except for a grayish white row on posterior margin of mesopleural convexity. *Legs*: Coxae similar to pleura; remaining segments dull yellowish brown, with inconspicuous dark hairs except for a short but dense fringe anterodorsally on hind femora. *Wings*: Dark brown pattern similar to that of *L. australis* (and of *L. philipi* Mack.-1964, fig. 41), but the color extends somewhat diffusely to fill almost the whole of cell R_4 and also nearer to the wing margin in cells R_5 and M_1 to M_4. *Abdomen*: Rather shining deep chocolate brown, with pale, white-haired apical band on tergite 1, an apical fringe of white hairs on tergite 2, and inconspicuous black hairs on discs of all tergites, becoming longer and denser posteriorly. Venter very deep brown, with some gray dusting and an apical fringe of white hairs on sternite 2, black hairs elsewhere. Terminalia not dissected.

DISTRIBUTION. NW NEW GUINEA: Ifar, Cyclops Mts, 300-500 m, VI, Gressitt & Sedlacek.

Genus **Japenoides** Oldroyd

This genus was established by Oldroyd (1949, p. 341) and reviewed by Mackerras (1964, p. 105–07). Its principal distinctive features are: eyes green, with an oblique purple to brown, usually yellow-margined band (sometimes visible even in dried specimens), upper facets of ♂ not greatly enlarged nor sharply separated (except by the band) from the smaller lower facets; well-developed ocellar tubercle; wedge-shaped, ventrally swollen callus (not visible in *cheesmanae*); large, usually shiny-rimmed tentorial pits and usually a shiny spot, or pair of spots, in center of face; swollen, more or less shiny to highly polished antennal scape and characteristically shaped flagellar plate (1964, fig. 44–46); presence of a strong appendix on vein R_4 (cell CuP is closed); and perceptibly swollen spermathecal bulbs. Most species have rather fusiform, tomentose bodies, with a more or less dense covering of silky hairs, and rather long, more or less deeply infuscated wings. Sexual dimorphism is not marked (♂♂ of *cheesmanae* and *oudella* not known).

A careful study of all the material now available has strengthened the conclusion previously reached that this is a monophyletic assemblage. It is unfortunate that nothing has been recorded about the ecology or behavior of any of the species, other than that they have been taken from near sea level to heights of about 1100 m in the mountains of Japen I. and New Britain.

The distribution of the genus is almost strictly insular (fig. 3), the only known exception being recorded in this paper. It is to be noted, however, that Japen I. is separated from the mainland by a channel less than 20 m deep, as shown on Admiralty charts, whereas the other islands are isolated by depths exceeding 1000 m. Even the relatively narrow passage between New Guinea and New Britain is more than 1300 m deep. Nevertheless, Japen I. does appear to have a curiously unbalanced tabanid fauna, to judge from Miss Cheesman's collections from the mountains, with no less than 3 species of *Japenoides* and 6 of *Chasmia* but only 1 *Cydistomyia* and 2 *Tabanus*, so it may have some environmental peculiarity to set it apart. For the rest, the arc of dis-

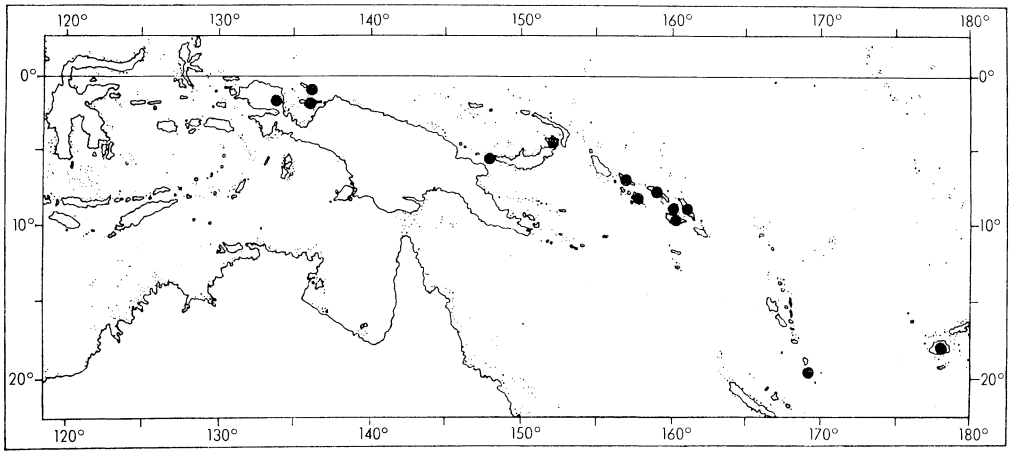

Fig. 3. Distribution of the genus *Japenoides*. See key (p. 410) for individual species.

persal from Biak to Fiji is particularly well defined, and adds usefully to data that have been provided by other groups of insects.

KEY TO THE SPECIES OF JAPENOIDES—♀♀

1. Frons, subcallus, most of parafacials, face and antennal scape shining dark brown to black; a small (8–9 mm), brown-black, rather shining species with dark wings. Japen I., Vogelkop ..... **cheesmanae** Oldr.
   Frons tomentose, with clearly defined wedge-shaped callus; lighter colored, more tomentose species 2
2. Subcallus and antennal scape strikingly swollen and shining dark brown; a relatively large (12–16 mm), brown species with moderately narrow frons (index 5.5–6). New Hebrides, Fiji ..... **veitchi** (Bezzi)
   Subcallus largely or entirely tomentose 3
3. Antennal scape shining brown-black, conspicuous; a relatively large (12–15 mm), olive-brown species with narrow frons (index 7–8). Solomon Is. ..... **ratcliffei** (Mack. & Rag.)
   Antennal scape less shining, yellow-brown, inconspicuous; smaller (8–11 mm), yellow to fawn-brown species with wider frons (index 4.5–6.5) 4
4. Femora dark to blackish brown, with dark hairs; wings more deeply infuscated 5
   Femora yellow-brown, with predominantly yellow or orange hairs; wings less deeply infuscated 6
5. A striking yellow species with yellow beard and the distal abdominal segments contrastingly black. Biak, Japen I. ..... **festiva** (Oldr.)
   A duller, more concolorous olive-brown species, with brown beard, and brownish yellow hairs on abdominal tergites forming at most an incipient pattern. New Britain ..... **nigricosta** Mack.
6. A yellow species, with relatively wide frons (index 4.5), blackish beard, extensive shiny areas around tentorial pits and in center of face, and orange hairs on abdominal tergites. Japen I. ..... **oudella** (Oldr.)
   A golden-yellow species, with narrower frons (index 6–6.5), golden beard, very small shining areas around tentorial pits and in center of face, and bright golden hairs on abdominal tergites. Umboi I., New Britain ..... **aurea** Mack.

Japenoides cheesmanae Oldroyd

A single ♀ from NW New Guinea, Vogelkop, nr. head of Ransiki R., 300 m, VIII, D. E. Hardy, is larger (10 mm) than the type series from Japen I., and has dull golden brown hairs on scutum and abdomen and the wings more diffusely darkened, but I would hesitate to separate it even subspecifically. It is the only *Japenoides* so far known from the mainland of New Guinea.

Japenoides oudella (Oldroyd), new combination

Cydistomyia oudella Oldroyd, 1949, p. 355. — Mackerras, 1964, p. 151.

Mr Oldroyd has re-examined the unique holotype, and agrees that *oudella* is nearly related to *festiva* and *aurea*. It is sufficiently distinguished, on present knowledge, by the characters given in the key.

Japenoides aurea Mackerras, new species Fig. 5, 11.

Holotype ♀ (ANIC), from Mt Sinewit, New Britain, 1100 m, 27.VI-17.IX.1963, W. W. Brandt.

MATERIAL EXAMINED: 26 ♀♀, 22 ♂♂.

♀. Small (10-11 mm), golden brown species, readily distinguished from *festiva* by its bright yellow-brown femora and almost uniformly golden brown abdomen. *Head*: Frons almost parallel-sided, slightly narrowed in middle, index 6-6.5, covered with dense golden brown tomentum and short black hairs; ocellar tubercle dark grayish brown with distinct traces of 3 rudimentary ocellar spots; callus blackish brown, strongly shining and swollen below. Subcallus, parafacials and face bright to pale yellow, with a brownish tinge above; a variable trace of shining rims to the tentorial pits and a pair of shiny spots in center of face; hairs on parafacials and face black to brown; beard golden. Antennae short and wide; scape and pedicel shining brownish yellow with black hairs, a few golden ones below on scape; flagellum orange, black only at tip. Palpi relatively plump, yellow with a brownish tint, hairs black mixed with some golden ones towards base. *Thorax*: Ground color of scutum and scutellum uniformly olive-yellow above, slightly paler marginally, with a relatively dense cover of silky golden hairs mixed with some brown erect ones, especially on notopleural lobes. Pleura paler than dorsum, with longer, finer, paler golden hairs. *Legs*: Coxae yellowish with bright to pale golden hairs; femora brownish yellow with black and some golden hairs; tibiae more brownish, especially on fore legs and distally on others, with black hairs; tarsi dark brown to black with black hairs. *Wings*: Light grayish brown, costal cell and stigma yellowish brown, and a narrow dark infuscation extending behind costa to tip; veins yellowish brown, darker distally. *Abdomen*: Ground color bright brownish yellow, darkening slightly basally on tergites and more extensively on 7th and 8th; a dense covering of bright golden hairs, mixed with some black ones laterally on 6th and 7th tergites and more extensively on distal margin of 8th. Distal sternites darkening more diffusely than corresponding tergites, but all covered with similar golden hairs. Sternite 8 with wider gonapophyses and spermathecal bulbs more swollen and darker than in *festiva* (fig. 13).

♂. Similar to ♀ in general coloration and appearance, but more variable in size (9-12 mm). Eyes with upper facets somewhat more enlarged than in other species of genus, but merging into lower facets and separated from them only by the characteristic oblique band; ocellar tubercle prominent. Subcallus, parafacials and face paler than in ♀, without trace of shiny markings; palpi short, tapering, with more pale hairs than in ♀.

DISTRIBUTION. NEW BRITAIN: Mt Sinewit, 1100 m, VI-IX, Brandt; Yalom and Komgi, 1000 m, V, Noona Dan Expedition. Umboi I., between New Guinea and New Britain (300 and 600 m), in Malaise trap and light trap, II, G. A. Samuelson. These 2 ♀♀ have a single, relatively large shiny spot in center of face, but otherwise are very like the type series; bathymetrically, the island belongs to New Britain rather than to New Guinea.

Japenoides nigricosta Mackerras, new species Fig. 6, 12.

Holotype ♀ (ANIC), from Mt Sinewit, New Britain, 1100 m, 27.VI-17.IX.1963, W. W. Brandt.

MATERIAL EXAMINED : 29 ♀♀, 38 ♂♂.

♀. Small (9-10.5 mm), olive-brown species, with brown beard, black to brown legs, dark brown infuscation behind costa of wing, and incipient abdominal pattern of dull brownish yellow hairs. *Head*: Frons medium, diverging, index 5-5.5, with fawn-brown tomentum and short black hairs; ocellar tubercle shining dark brown; callus brownish black, polished. Subcallus with brownish yellow tomentum, except for a shining median basal triangle and median cleft and an inconstant bare patch on each side; parafacials and face with brownish yellow tomentum and black hairs, tentorial pits large and with shiny dark brown rims and a shiny dark brown triangular spot in center of face; beard dark brown. Scape and pedicel of antennae shining light brown with black hairs; basal plate of flagellum bright brownish orange, style wholly black. Palpi yellowish fawn with dark brown to black hairs. *Thorax*: Scutum and scutellum almost uniformly dull yellowish olive, covered with yellowish silky hairs, densest laterally, and sparse erect dark ones. Pleura fawn-brown with fawn hairs and with yellowish tufts below and behind wing-root. *Legs*: Coxae concolorous with pleura; femora blackish with black hairs, mid and hind brownish at apex; tibiae dark brown, tarsi blackish, all segments with black hairs. *Wings*: Lightly browned, except for dark brown costal cell, most of cell R_1 and stigma; veins brown. *Abdomen*: Ground color olive-brown with large dark brown sublateral patches on all tergites; a dense covering of brownish yellow hairs on all segments, mixed with black on the sublateral darker patches, giving the impression of a vague pattern of relatively pale median triangles, lateral fringe and posterior bands on the tergites. Venter with ground color darker than dorsum and the hairs more brownish gold. Sternite 8 with deeper gonapophyses than in *aurea* and *festiva*; spermathecal bulbs shaped much as in *festiva*, but relatively larger and more extensively pigmented.

♂. Similar to ♀, but slightly darker and more variable in size (10-12 mm). Upper facets of eyes less enlarged than in *aurea* and merging more gradually in lower facets. Ocellar tubercle prominent. No trace of shiny areas in tentorial pits or center of face; a mixture of brownish cream hairs among the black ones on parafacials and in center of face; beard not as dark as in ♀. Palpi thicker than in *aurea*, light brown with dull brownish cream and black hairs. Wings often more extensively darkened anteriorly.

DISTRIBUTION. NEW BRITAIN : Mt Sinewit, 1100 m, VI-IX, Brandt; Yalom, 1000 m, V, Noona Dan Expedition.

Japenoides sp.

A single ♀ from Solomon Is., Santa Ysabel, 0-50 m, in Malaise trap, IX, R. Straatman, appears to be related to, but distinct from, both *aurea* and *nigricosta*, but is not in a fit condition for description.

Japenoides ratcliffei (Mackerras & Rageau)

A series of 19 ♀♀ and 1 ♂ from Choiseul, Kolombangara, Santa Ysabel, Florida, Malaita, and Guadalcanal, some in Malaise trap, III, V-VII, IX, X, Gressitt, Sedlacek, Straatman, C. W. O'Brien, P. Shanahan, extends our knowledge of the geographical and seasonal ranges of the species in the Solomon Is., to which it still appears to be restricted.

Genus **Chasmia** Enderlein

This genus has had a somewhat adventurous history, having been progressively de-

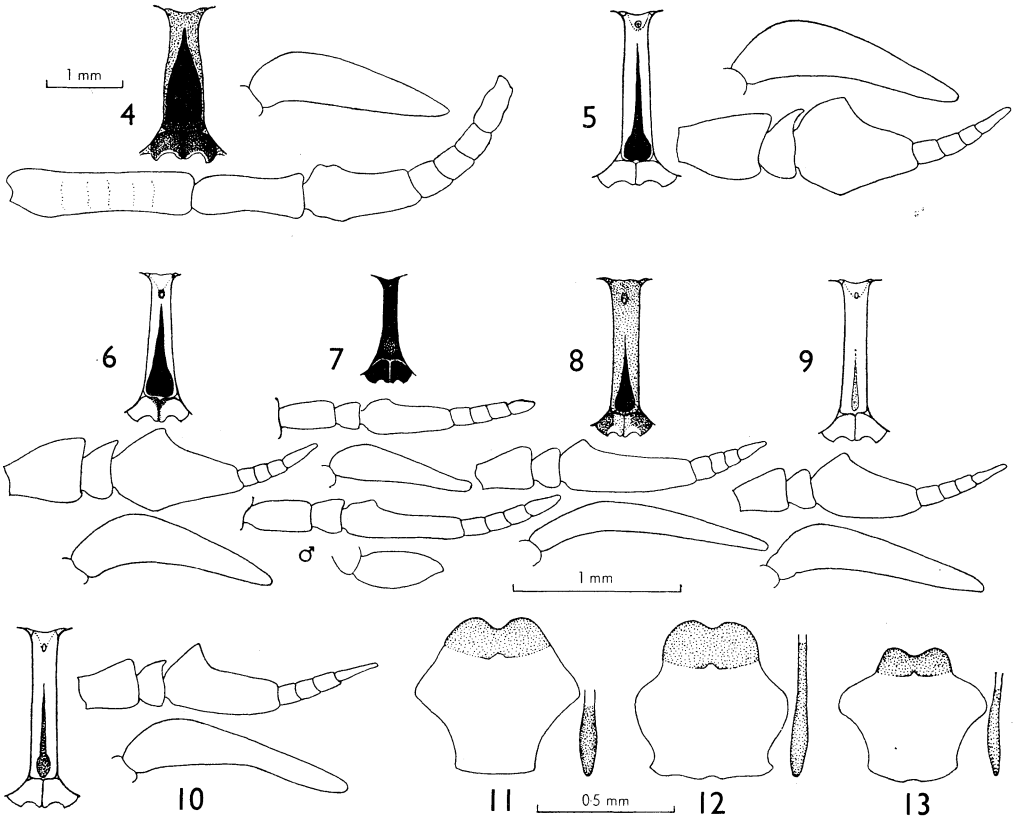

Fig. 4–13. Frons, antenna, palp, sternite 8 and spermathecal bulb of ♀♀: 4, *Lissimas papuensis*; 5, 11, *Japenoides aurea*; 6, 12, *J. nigricosta*; 7, *Chasmia nigrifrons* (incl. ♂ antenna and palp); 8, *Ch. orthellioides*; 9, *Ch. ornata*; 10, *Ch. lineata*; 13, *J. festiva*, terminalia for comparison. Top scale for fronts, middle for antennae and palpi, bottom for terminalia.

graded from subfamily status (Enderlein 1922) to species group in the genus *Cydistomyia* (1964, p. 98, 112). Two of the 3 reasons given for that last action are no longer valid, for the discovery of *Ch. nigrifrons* has placed the group in an almost precisely similar situation to that of *Japenoides*, and its distinctiveness has been further emphasized by the subsequent discovery of the very different *Ch. orthellioides*. It is distinguished from *Cydistomyia* principally by the presence of a well defined ocellar tubercle in both sexes, relatively long, slender antennal scape, generally slender proboscis with small labella, relatively long cell R_4, usually open cell CuP (=Cu_2 of authors) at least in ♀♀, and strong tendency to resemble small rotund muscoid flies. Sexual dimorphism is marked in *atriventer* and *nigrifrons* but of no more than normal degree in the other 9 species of which ♂♂ are known (it would be interesting to discover ♂♂ of *basifasciata*). The principal distinctions from *Japenoides* are the eyes, which are unbanded in ♀ and with markedly enlarged, sharply defined upper facets in ♂, shape of frons, callus, antennae and proboscis, absence of appendix on vein R_1, and usually open cell CuP; but there are possible links in the retention of

an ocellar tubercle and the parallel evolution of *Ch. nigrifrons* and *J. cheesmanae*.

The known distribution (fig. 14) suggests that the genus evolved in northern New Guinea and spread mainly eastwards. It can be divided into 2 probable subclones, one (*Chasmia, sensu stricto*) including the more specialized *nigrifrons*, *basifasciata* (de Meij.) and *atriventer* (Sch. Stk.), and the other ("*Chasmiella*") the remainder of the genus. *Ch. orthellioides* appears to be an aberrant member of the second group.

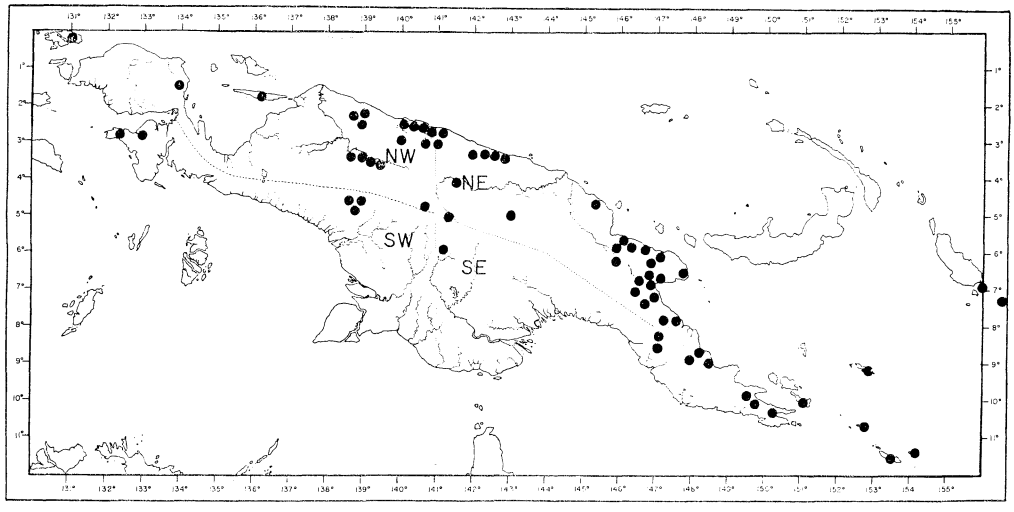

Fig. 14. Distribution of the genus *Chasmia*. Comparison with the earlier map of localities where collections were made (1964, fig. 1) suggests that the northern bias in the distribution of the genus may be real.

Chasmia nigrifrons Mackerras, new species Fig. 7.

Holotype ♀ (ANIC), from Abaleti, Rossel I., SE New Guinea. 2.X–2.XI.1963, W. W. Brandt.

MATERIAL EXAMINED : 1 ♀, 2 ♂♂.

♀. A small (7 mm), rather shining dark brown, brown-winged, sexually dimorphic species, immediately distinguishable from *Ch. basifasciata* (and all other members of the genus) by its entirely shining frons, subcallus and face, and from the superficially similar *Japenoides cheesmanae* by its slender, cylindrical antennal scape, narrow antennal plate, absence of an appendix on vein R_4, and open cell CuP. *Head*: Eyes (relaxed) rich purple with dark bluish reflections, unbanded. Frons diverging, index 5.0, strongly shining blackish brown, with a large shiny depression in lower 1/4; ocellar tubercle well defined; callus not distinguishable. Subcallus highly shining blackish brown, with tomentose ring around bases of antennae; a tomentose fawn line along ocular margins, but rest of parafacials and whole face somewhat swollen and highly polished blackish brown; beard black. Scape of antennae elongate-cylindrical, pedicel short, both light brown with black hairs; flagellar plate brown, darkening distally, style black. Palpi blackish brown with dark brown hairs. *Thorax*: Scutum and scutellum brown, darkening centrally, becoming paler towards margins, with brown and black hairs. Pleura brown, with

some gray dusting posteriorly and ventrally, and with brown and black hairs. *Legs*: Brown, mid and hind tibiae not as dark as other segments; hairs predominantly black, a few golden ones distally on mid and hind femora. *Wings*: Brown, darker anteriorly; veins and stigma dark brown. *Abdomen*: Rather shining deep brown, darkening to blackish distally, and distinctly lighter laterally on tergites 1 to 3; hairs black, with some brown ones distally in median zone of tergites and brown and dull golden ones at lateral margins. Venter shining dark brown to black, with entirely black hairs. Terminalia not dissected.

♂. Slightly larger (length 7.5 and 8 mm) and much paler than ♀. Eyes (relaxed) with upper large facets bright bronze, the lower small ones green, and a purple transition zone in between. Ocellar tubercle elongate, reaching about to level of eyes. Frontal triangle, subcallus, whole of parafacials and face tomentose, brownish yellow with some fawn dusting and black hairs; beard brown. Antennae with plate of flagellum paler than in ♀ and style more contrastingly black. Palpi short, rather plump, fawn-brown with black hairs. Thorax lighter brown than in ♀, with some grayish dusting laterally, and with appressed dull golden and erect black hairs on scutum and scutellum and cream ones on lower part of pleura. Legs lighter in color than in ♀, and with predominantly dull golden hairs on mid and hind tibiae and hind metatarsi. Wings not so infuscated posteriorly as in ♀; cell CuP closed at margin. Abdomen dorsally and ventrally translucent brown proximally, somewhat darker on 4th and subsequent segments, with black hairs on the discs and dull golden ones on apical margins of the segments.

DISTRIBUTION. SE NEW GUINEA: Rossel I., X-XI, Brandt.

Chasmia orthellioides Mackerras, new species Fig. 8.

Holotype ♀ (BISHOP 9366), from Toumoa Village, Fauro I., Solomon Is., 10 m, in Malaise trap, 12.IV.1964, P. Shanahan.

MATERIAL EXAMINED: 2 ♀♀, 1 ♂.

♀. A small (9 mm), rotund, metallic blue-green species. Remarkably like common blue-green muscids of the subregion, and also superficially very similar to the genus *Chalybosoma*, but distinguished by having the essential characters of *Chasmia* in frons, antennae, palpi, and wing venation. It is clear that there has been a good deal of parallel evolution of this kind of "muscoid mimicry" in the Papuan Diachlorini. *Head*: Eyes (relaxed) dark green with brown reflections, unbanded. Frons narrow, slightly converging, index 5.5-6, dull brown (discolored), with well-defined black ocellar tubercle; callus brown-black, bulging, pyriform, with tapering extension. Subcallus rather shining brown, with some grayish bloom centrally; parafacials and face shining brown-black, with a little grayish overlay laterally; tentorial pits large. Antennae slender; scape rather long, yellowish brown with some black hairs; pedicel yellowish brown with black hairs; flagellum yellow-brown basally, darkening progressively to black on distal annuli of style. Palpi very long and slender, deep brown with black hairs. *Thorax*: Scutum and scutellum dark metallic blue-green, humeral and postalar lobes brown, hairs black. Pleura similar, with black hairs except for some brown ones below wing-root and on squame. *Legs*: Entirely rather shining black with black hairs, except for brown knees and pulvilli. *Wings*: Uniformly light grayish brown, costal cell slightly darker; stigma and veins brown; vein R_4 without appendix and cell R_4 characteristically long; cell CuP narrowly open, or closed at margin. *Abdomen*: Dark metallic blue-green, with black hairs dorsally and ventrally, the sternites slightly darker than the tergites. Terminalia not dissected.

♂. Similar to ♀, but more brown and with brown hairs at sides of thorax. Eyes with upper enlarged facets dark red-brown, without any detectable hairs (another distinction from *Chaly-*

bosoma), sharply separated from the very small darker lower facets; ocellar tubercle prominent between eyes; frontal triangle and subcallus with silvery tomentum; parafacials and face dark but not shiny, with black hairs; beard brown. Palpi rod-like, dark brown with dark hairs.

DISTRIBUTION. SOLOMON IS.: ♀, Fauro I., 10 m, IV, Shanahan; ♀, Choiseul, Kolombangara R., 80 m, in Malaise trap, III, Shanahan; ♂, Kolombangara, Gollifer's Camp, 100 m, I, Shanahan.

Chasmia parvicallosa (Oldroyd)

A ♀ in BMNH, from NE New Guinea, Oomsis, Morobe district, bred from larva found in sago trunk, V, J. H. Ardley, differs from specimens previously described in several respects, some of which may be due merely to its freshness and perfect condition. Antennal scape with entirely black hairs (entirely yellow in type of *parvicallosa*, mixed yellow and black in type of its synonym *mackerrasi*); palpi shorter and plumper than illustrated previously (1964, fig. 66); black-brown sublateral vittae on scutum very prominent and converging posteriorly, giving the appearance of a broken "V" which ends well in front of scutellum; wings lightly suffused with brown in cell R_1, along the radial veins and across apices of basal cells; stigma dark brown. If the scutal and wing patterns prove to be as distinctive as they appear, it may be necessary to treat this form as a separate species.

Four species can be readily distinguished in the genus by having the whole scutellum and often the adjacent part of the postalar declivity black or dark brown and covered with relatively dense black hairs (the appearance is quite different from the dark smudge in the center of the scutellum that is often seen in those specimens of *subhastata* and its allies that have the median area of the scutum black), and they may be identified most easily by the following short key.

1. Scutum with 3 longitudinal dark stripes; callus brown [length 7-9 mm] 2
   Scutum with 2 longitudinal dark stripes or none; callus pale yellowish cream or grayish [pleura entirely yellow]. 3
2. Beard black; posterior 1/2 of mesopleuron with a vertical dark brown band covered with dark brown hairs ..... **fasciata** (Oldr.)
   Beard bright yellow; pleura entirely yellow ..... **auribarba** (Mack.)
3. Mesonotum with 2 longitudinal dark stripes (sometimes faint) on a yellow ground; larger species (length 10 mm) ..... **parvicallosa** (Oldr.)
   Mesonotum concolorous yellow, without trace of darkening, smaller species (length 8-9 mm) ..... **ornata** Mack.

Chasmia ornata Mackerras, new species Fig. 9.

Holotype ♀ (BISHOP 9367), from Finschhafen, NE New Guinea, 80 m, in Malaise trap, 16.IV.1963, J. Sedlacek.

MATERIAL EXAMINED: 2 ♀♀, 1 ♂.

♀. Medium sized (8-9 mm), rotund, ornate species; close to *parvicallosa*, but immediately distinguished by the absence of scutal vittae; would run to couplet 11 in the key in Mackerras (1964, p. 115), where it would differ from all following species by the color of its callus and

its abdominal pattern. *Head*: Eyes (relaxed) dark greenish brown, unbanded. Frons slightly diverging, index 5.5-6, covered with cream tomentum and inconspicuous yellow hairs; ocellar tubercle brown, conspicuous; callus translucent pale brownish cream, fusiform, extending to about mid length of frons. Subcallus, parafacials and face cream, with a yellow tint in center of face, and inconspicuous pale yellow hairs on parafacials and face; beard with mixed black and dull yellowish hairs. Antennal scape cream with yellowish brown hairs; pedicel slightly darker and with black hairs; flagellar plate orange basally, becoming brown more distally, style brownish black. Palpi yellow with black hairs. *Thorax*: Scutum almost uniformly orange-yellow, with yellow and some black hairs; scutellum and adjacent part of postalar declivity brownish black, covered with relatively long and dense black hairs. Pleura entirely yellow, with yellow hairs. *Legs*: Coxae like pleura; fore and mid femora yellow with yellow hairs, becoming darker and with black hairs apically, hind femora more extensively brown and with mostly black hairs; tibiae and tarsi dark brown to black with black hairs. *Wings*: Uniformly faintly grayish; stigma and most of veins brown. *Abdomen*: Tergite 1 entirely yellow with creamy yellow hairs; anterior 1/3 of 2 paler, remainder brownish black with black hairs; 3 with a basal, yellow, partly golden-haired band, narrowing in midline, remainder black with black hairs; more distal tergites black with strong black hairs, and each with a narrow, apical, yellow, golden-haired band. Sternites 1 to 3 yellow to grayish cream with relatively sparse black hairs; distal sternites black except for pale apical margins, with long denser black hairs, especially laterally. Terminalia not dissected.

♂. Very similar to ♀, sexual dimorphism being slight. Eyes large, upper facets conspicuously enlarged, sharply separated from the darker smaller facets below; ocellar tubercle clearly visible. Subcallus, parafacials and face paler than in ♀, beard with a greater proportion of dark hairs. Palpi short and plump, fawn-yellow, with mixed creamy yellow and black hairs.

DISTRIBUTION. NE NEW GUINEA: Finschhafen, IV, Sedlacek; Lae, III, Sedlacek. SE NEW GUINEA: ♂, Popondetta, 25 m, in light trap, VI, Shanahan & Lippert.

Chasmia fasciata (Oldroyd)

The following are additional to the records from NW and NE New Guinea previously published. NE New Guinea: 6 ♀♀, Finschhafen, 80 m, in Malaise trap, IV, Sedlacek; 2 ♂♂, 2 ♀♀, Wau, 1200 m, I, II, IX, XI, Sedlacek, Shanahan. The ♀♀ from Wau were collected in Malaise trap and had become badly bleached, but are otherwise identical with the normal specimens.

Chasmia lineata Mackerras, new species Fig. 10.

Holotype ♀ (BISHOP 9368), from Sibil Valley, Star Mts, NW New Guinea, 1245 m, in Malaise trap, 18.X-8.XI.1961, S. & L. Quate.

MATERIAL EXAMINED: 1 ♀.

♀. A relatively large (10 mm), brown species, distinguished from other members of the genus (except those noted below) by having a well-defined pair of narrow paler dorsocentral vittae extending most of the length of the scutum. These would separate it at couplet 8 in the key already mentioned. *Head*: Eyes (relaxed) dark greenish brown, unbanded. Frons almost parallel, index 6.0, covered with dull yellowish fawn tomentum and inconspicuous brown and yellow hairs; ocellar tubercle brown; callus bright brown, fusiform. Subcallus, parafacials and face brownish cream with a yellowish tint and cream hairs: beard light brown with a yellowish tint. Antennal scape brownish cream with brown hairs; pedicel slightly darker with

black hairs; plate of flagellum with prominent tooth, orange basally becoming brown distally, style black. Palpi rather long, dull yellow with dark brown hairs. *Thorax*: Scutum and scutellum dull brown, with narrow, sharply defined, paler median line extending full length of scutum, slightly wider yellowish brown dorsocentral lines which do not reach scutellum, and vague lighter brown areas in lateral zone; hairs brown and dull yellow, darker on notopleural lobes. Pleura yellowish brown with dull yellowish hairs, slightly darker and with brownish hairs on mesopleural convexity, suggesting a possible relationship with *breviuscula* (Walk.). *Legs*: Brown, with brown hairs which become darker on distal tarsi. *Wings*: Faintly brown, very slightly darkened in costal cell; stigma light brown, most of veins darker. *Abdomen*: Brown, darkening rather uniformly on distal part of 2nd and subsequent tergites; hairs brown, mixed with some paler ones in median area basally and more diffusely on 5th and subsequent tergites. Venter similar, but slightly paler on sternites 1 to 4. Terminalia not dissected.

Five ♀♀ from NE New Guinea are similar to the type in size (9–10 mm) and general appearance, but differ in a number of points. Body less plump, more parallel-sided; frons, parafacials and face more yellowish; scutum with the paler dorsocentral lines shorter (about 2/3 of scutal length) and no trace of a pale median line; pleura not darker on upper mesopleural convexity; legs paler; and abdomen not darkening as much distally. The status of the 2 forms cannot be clarified without longer series for comparison.

DISTRIBUTION. NW NEW GUINEA (type): Sibil Valley, Star Mts, 1245 m, X–XI, Quate. NE New Guinea (variant): Upper Watut, 1100–1800 m, IV, Gressitt; Wau, 1200–1300 m, in Malaise trap, II, XI, XII, Sedlacek.

Chasmia parva (Oldroyd)

The following are additional to the records from NW, NE and SE New Guinea previously published. NE New Guinea (6 ♀♀): Finschhafen, 80 m, IV, Sedlacek; Mt Missim, 1200 m, in Malaise trap, XII, Samuelson; Wau, 1200 m, in Malaise trap, I, XII, Sedlacek, H. Holtmann, G. B. Monteith; Garaina, 800 m, I, Sedlacek.

Genus **Chalybosoma** Oldroyd

Chalybosoma luciliaeformis (Schuurmans Stekhoven)

The following are additional to the records from NW and SW New Guinea previously published. NE New Guinea: 1 ♀, 2 ♂♂, Wau, 1200 m, in Malaise trap, V, XI, XII, Sedlacek, Shanahan.

Chalybosoma metallicum (Ricardo)

Previously known only from the holotype (in BMNH) from SW New Guinea. 3 ♀♀, 1 ♂ from NE New Guinea, Wau, 1200–1300 m, some in Malaise trap, IV, VI, X, Sedlacek, Gressitt, agree closely with the description and illustrations (1964, fig. 49), except that they have darker antennal styles and more pale hairs on palpi. The ♂ has brown, rather than silver, hairs on the upper enlarged facets of the eyes, the subcallus and face (as in ♂♂ of other species) covered with tomentum, and the pale humeral and pleural hairs less extensive and conspicuous than in the ♀♀.

Genus **Cydistomyia** Taylor

The removal of the *basifasciata* group (=*Chasmia*) has made the distinction between groups and subgroups of species in the Papuan-Pacific section of the genus somewhat hair-splitting, so those that remain may be treated more simply as a series of species groups of varying age and distinctness. Our present knowledge of them is summarized below.

lamellata group (5 spp.) : Remains well defined, probably monophyletic, and limited so far to the mainland of New Guinea and Japen I.

barretti group (5 spp.) : One of convenience and probably polyphyletic. Limited to New Guinea as defined in 1964, but with a definite link with New Caledonia in the *imitans* (N. G.)-*colasbelcouri* (N. C.) species-pair.

albithorax group (5 spp.) : Reasonably compact and probably monophyletic ; limited to New Guinea, with extensions to Waigeu in the west and Normanby I. in the east. Further experience with material preserved before pinning makes it very probable that the unnamed ♂♂ previously recorded (1964, p. 142) were merely bleached specimens of *albidosegmentata* (Sch. Stk.).

immigrans group (12 spp.) : A somewhat diffuse assemblage, but showing zoogeographically useful extensions and species-pair relationships. Excluding the doubtful *papouina* (Walk.), known only from ♂♂, there are 7 species—*immatura* Oldr., *pseudimmatura* Oldr., *quasimmatura* Mack., *griseiventer* (Sch. Stk.), *torresi* (Ferg. & Hill), *immigrans* Oldr., *inopinata* Oldr.— in New Guinea, with extensions to Noemfor I. (*inopinata*), to Goodenough I. and Manus (*immigrans*), and to Woodlark I. and the Torres Strait Is. (*torresi*). The group is not known from New Britain, and the record based on ♂♂ from the Solomon Is. (1964, p. 147) remains dubious ; but *risbeci* Mack. & Rag., *kuniae* Mack. & Rag. and *cohici* Mack. & Rag. from New Caledonia are derived from *immigrans* stock. In Australia, *palmensis* (Ferg. & Hill) from NE Queensland is a sister species of *torresi* and *griseiannulata* (Tayl.) from the Northern Territory a possible sister species of *griseiventer*.

lorentzi group (5 spp.) : With the removal of *oudella* to *Japenoides* and *nana* to a new group, this group has become more compact and zoogeographically reliable. There are 3 Papuan species — *crepuscularis* Oldr., *lorentzi* (Ric.), *sol* (Sch. Stk.) — which extend to Waigeu (*sol*), Sudest I. (*crepuscularis*), Woodlark I., Rossel I. and New Britain (*sol*), and Bougainville (*lorentzi*). *C. diazi* Mack. & Rag. from New Caledonia is a sister species of *lorentzi* on the eastern side and *pseudoardens* (Tayl.) from NE Queensland on the southern ; *hyperythrea* (Bigot) may extend the range of the group into N. S. W., but its relationships are not yet clear.

nana group (3 or 4 spp.) : A new group, proposed for *nana* Mack. & Rag. from New Britain and the Solomon Is. and 2 new species from the Solomon Is. ; the small unnamed species from Fiji recorded by Mackerras & Rageau (1958, p. 739) may also belong here. Its evolutionary interest is that its frontal and antennal characters, the presence of an appendix on R_1, and shape of the spermathecal bulbs suggest an ancestry near that of *Japenoides*. It is defined on p. 421.

sylvioides group (14 spp.) : The new material has added notably to our knowledge

of this group, and supported the hypothesis that *Tabanotelum* Oldroyd belongs to it, the new *C. teloides* and *C. rosselensis* agreeing closely with *T. jactum* Oldr. in all essential respects, including details of antennal structure (cf Oldroyd, 1954, p. 59–62). It thus includes 3 species—*jactum* (Oldr.), Mauritius ; *primitiva* (Mack.), India ; *secunda* (Mack.), India (Mackerras 1962)— with a Gondwanaland distribution, and 11 in a long arc from Celebes to Fiji (fig. 15), a good example of what I have regarded as a "Lemurian" distribution of an originally Gondwanaland fauna. In addition, *parapacifica* from New Britain forms a species-pair with *pacifica* (Ric.) from Fiji, strengthening the view that the Fijian tabanid fauna was derived by independent migration unaugmented by local speciation.

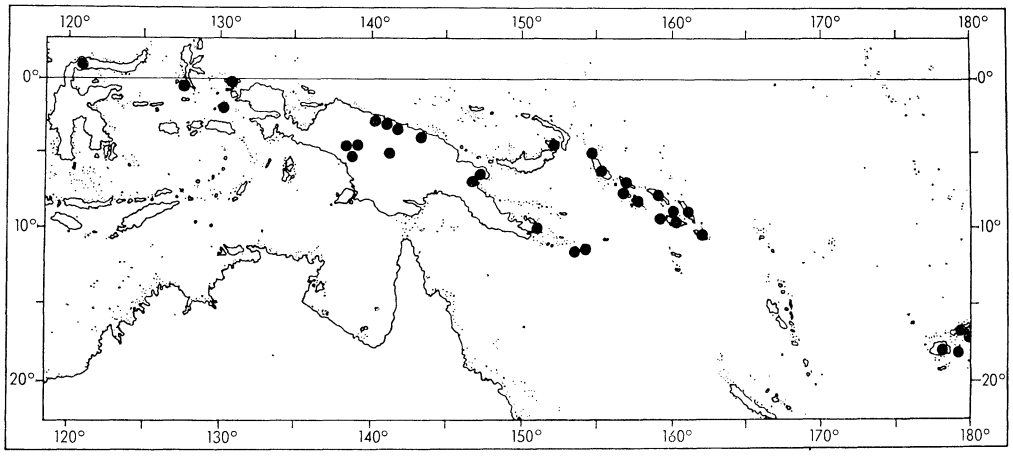

Fig. 15. Distribution of the *sylvioides* group of *Cydistomyia*.

There are other species groups of *Cydistomyia* in other zoogeographical areas. The *longirostris* group in the Sumatran-Philippines sector, to which most of the species described by Philip (1959) belong, is of particular interest in the present context, because, on the one hand it leads rather directly to the Ethiopian "*Amanella*" (Mackerras 1962), and on the other hand it may have shared a proximate common ancestry with *Lissimas*, perhaps *Chalybosoma*, and possibly 1 or 2 of the Papuan species groups listed above. "*Amanella*," in turn, shows some suggestive points of resemblance to certain Neotropical elements (Oldroyd 1954). Thus there may have been 2, presumably concurrent, migrations around the Indian Ocean, one represented by primitive "*Tabanotelum*" stock and the other by derived "*Amanella*" stock.

Turning to the southeastern side, it has already been mentioned that there are Papuan elements derived from the *barretti*, *immigrans* and *lorentzi* groups in New Caledonia. The remaining 5 New Caledonian species (Mackerras & Rageau 1958) do not conform so well, and may have been derived from Australia, possibly by a pathway similar to that illustrated for *Dasybasis* by Mackerras (1970, fig. 9.6). In Australia there are several endemic groups, augmented by the Papuan extensions noted above. The genus is not known from New Zealand.

The **immigrans** Group

Cydistomyia quasimmatura Mackerras Fig. 16.

Previously known only from the holotype ♀ from Aiyura (1964, p. 145), the description may be augmented from 18 ♀♀ from the following additional localities in NE New Guinea : Jimmi R., VII, Brandt ; Wau, 1000–1250 m, some in Malaise trap, some in M. V. light trap, I–V, XII, Sedlacek, Monteith. Mostly larger (11–14 mm) and darker than type, 2 ♀♀ being quite dark brown. Frons narrower, index 3.0–3.5 ; callus better defined, dark brown, but of same shape as the swollen area in the type (1964, fig. 102) ; palpi sometimes plumper. Scutum without trace of paler vittae. Abdominal pattern often stronger and with well defined pale median triangles. Spermathecal bulbs (not previously noted) tubular and pale, barely distinguishable from ducts. The absence of scutal vittae is a better distinction from *immatura* and *pseudimmatura* than the characters given in the key (1964, p. 132), and couplet 11 should be altered to read "Callus absent or very short" contrasting with "Callus clearly defined, elongate."

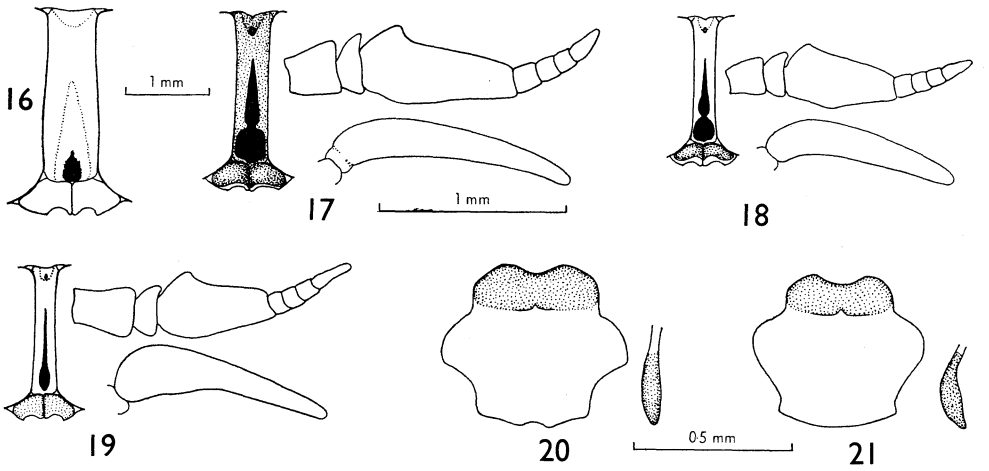

Fig. 16–21. Genus *Cydistomyia*, ♀♀ : 16, *quasimmatura*, frons only ; 17, 20, *nigrina* ; 18, *nannoides* ; 19, 21, *nana*.

The **nana** Group

Small (7–10 mm), parallel-sided species. Eyes unbanded. Frons nearly parallel, with well defined ocellar tubercle ; callus more or less swollen at base and with spear-shaped extension ; subcallus often partly shiny. Antennae relatively large ; palpi slender. Vein R_4 with appendix. Abdomen with or without pale apical bands on tergites ; sternite 8 wide ; spermathecal bulbs distinctly swollen. New Britain, Solomon Is., possibly Fiji.

Cydistomyia nigrina Mackerras, new species Fig. 17, 20.

Holotype ♀ (BISHOP 9369), from Kukugai Village, Bougainville, Solomon Is., 150 m,

XI.1960, W. W. Brandt.

MATERIAL EXAMINED : 34 ♀♀, 1 ♂.

♀. A small (7.5–10 mm), rather slender, blackish species, distinguished by its shining blackish subcallus, dark brown to black antennae and palpi, black legs, and narrow white bands on abdominal tergites. Superficially rather like *C. perdita* Mack. from New Guinea, but distinguished by its less robust build, characters of frons, presence of an appendix on R_4, and shape of sternite 8 and gonapophystes. *Head*: Eyes (relaxed) dark green, unbanded. Frons parallel-sided, index 5, with dark brown tomentum and inconspicuous black hairs; ocellar tubercle well defined, sometimes appearing to show traces of 3 minute ocellar spots: callus robust, shining black, nearly full width of frons at base, with spear-shaped extension. Subcallus pouting, mostly shining black, with brown tomentum around antennal sockets: parafacials and face grayish white, with a black streak above on each side below subcallus, hairs white; beard white. Antennal scape gray with strong black hairs; pedicel black with black hairs; flagellum deep brown to black. Palpi slender, black, with some yellowish gray hairs basally and black elsewhere. *Thorax*: Scutum and scutellum deep to blackish brown with some gray overlay anteriorly, inconspicuous erect black hairs and prominent dull golden recumbent ones, notopleural hairs mostly black. Pleura gray with grayish white hairs on most of surface, mixed white and dull gold on posterior part of upper mesopleural convexity. *Legs*: Deep brown to black with black hairs, fore legs entirely black and with an admixture of dull golden hairs on femora. *Wings*: Faintly brown, vaguely darker anteriorly in some specimens; veins and stigma dark brown, R_4 with short appendix. *Abdomen*: Black with black hairs, tergites 1 to 6 with narrow, grayish white (occasionally yellow), white-haired apical bands, widening into a small median triangle on 2 and more vaguely and extensively on subsequent tergites; 7 entirely dark. Venter similar, the white-haired bands on sternites widening and with conspicuous white (occasionally yellowish) hairs at the tergo-sternal junctions. Sternite 8 with large, well-separated gonapophyses and small wings; spermathecal bulbs distinctly swollen.

♂. Not as dark as ♀, more grayish brown in general color, with entirely black antennae and legs. Upper facets of eyes markedly enlarged, dark red, contrasting with small black lower facets; ocellar tubercle prominent. Frontal triangle and subcallus entirely tomentose, light fawn-brown; parafacials and face grayish cream with white hairs; beard cream. Antennae more slender than in ♀. Palpi fusiform, light yellowish brown with cream hairs. Vein R_4 with appendix. Tergites 1 to 3 of abdomen relatively bright brown, with apical paler bands wider and more diffuse than in ♀ and forming incipient median triangles.

DISTRIBUTION. SOLOMON IS. : Bougainville, Kukugai, 150 m, Kokure, 690 m, Mutahi, 700 m, Torpanos, 200 m, in Malaise trap, II, III, VI, XI, Brandt, E. J. Ford, Straatman; Choiseul, Malangona, 30 m, in Malaise trap, III, Shanahan; Kolombangara, Pepele, 30 m, Gollifer's Camp, 700 m, some in Malaise trap, I, II, IV, Shanahan, M. McQuillan; Santa Ysabel, Tatamba, 0–50 m, in Malaise trap, IX, Straatman; Guadalcanal, Mt Jorapau, III, P. Greenslade.

Cydistomyia nannoides Mackerras, new species Fig. 18.

Holotype ♀ (BISHOP 9370), from Torpanos, Bougainville, Solomon Is., 200 m, 22–29. II.1968, R. Straatman.

MATERIAL EXAMINED : 3 ♀♀.

♀. A small (9 mm), rather slender, fawn-brown species, distinguished from *nana* by its shining dark brown subcallus, shape of callus and antennal plate, and banded abdomen. *Head*:

Eyes (relaxed) brown with green reflections, unbanded. Frons almost parallel, index 5.7, covered with light yellowish fawn tomentum and inconspicuous yellow and black hairs; ocellar tubercle brown, prominent; callus shining dark brown with narrower extension than in *nigrina* and more swollen basal section than in *nana*. Subcallus shining dark brown above, with yellow tomentum around antennal sockets; parafacials and face cream, with a trace of a dark streak on parafacials above, and relatively sparse white hairs; beard cream. Antennal scape and pedicel light brownish yellow with black hairs; flagellum with orange plate and brown style, darkening on distal annuli. Palpi creamy yellow with pale yellow hairs at base, black elsewhere. *Thorax*: Scutum and scutellum olive-brown with some grayish overlay, inconspicuous black erect hairs and dull golden appressed ones, prominent on postalar declivity; notopleural hairs mainly black. Pleura gray with dull cream to faintly yellowish hairs. *Legs*: Light brown with mostly yellow hairs, darkening and with black hairs on fore tibiae and all tarsi. *Wings*: Almost uniformly light brown, slightly paler in cell R_4 near margin; veins and stigma brown, R_4 with appendix. *Abdomen*: Brown, with narrow, almost straight, yellowish apical bands on tergites 1 to 6; hairs appear dark sublaterally on discs, yellow in apical bands and extending forward in median area of first 4 tergites. Venter darker than dorsum and with predominantly yellow hairs. Terminalia not dissected.

The ♀♀ from Florida and Santa Ysabel are smaller (7 mm long) than the type and in bad condition, but probably conspecific with it.

DISTRIBUTION. SOLOMON IS.: Bougainville, Torpanos, 200 m, II, Straatman; Santa Ysabel, Sukapisu, 900 m, in light trap, VI, C. W. O'Brien; Florida, Takopekope, IX, O'Brien.

Cydistomyia nana Mackerras & Rageau Fig. 19, 21.

This species, previously recorded from New Britain and Bougainville and thought to be rare, is represented by 107 ♀♀ and 3 ♂♂ from the following localities in the Solomon Is.: Bougainville, Choiseul, Vella Lavella, Gizo, Kolombangara, Santa Ysabel, Florida, some in Malaise trap and light trap, II–IV, VI, VII, IX–XII, Brandt, O'Brien, Sedlacek, Shanahan, Straatman, Tawi. The specimens vary more in size (7–9 mm) than the few studied earlier, their color ranges from grayish to yellowish fawn, and their antennal styles are either entirely black or darkened only at extreme tip, but otherwise they are very uniform. The species is easily recognized by its generally small size (most specimens 7–8 mm), shape of frons and callus, tomentose subcallus, and absence of pale bands on abdominal tergites. The terminalia were not illustrated previously.

The **sylvioides** Group

This is one of the few groups of Tabanidae in which useful specific differences have been found in the ♂ terminalia.

Cydistomyia teloides Mackerras, new species Fig. 22, 26, 29.

Holotype ♀ (BMNH), from Tatamba, Santa Ysabel, Solomon Is., 27.V.1963, M. McQuillan.

MATERIAL EXAMINED: 1 ♀, 1 ♂.

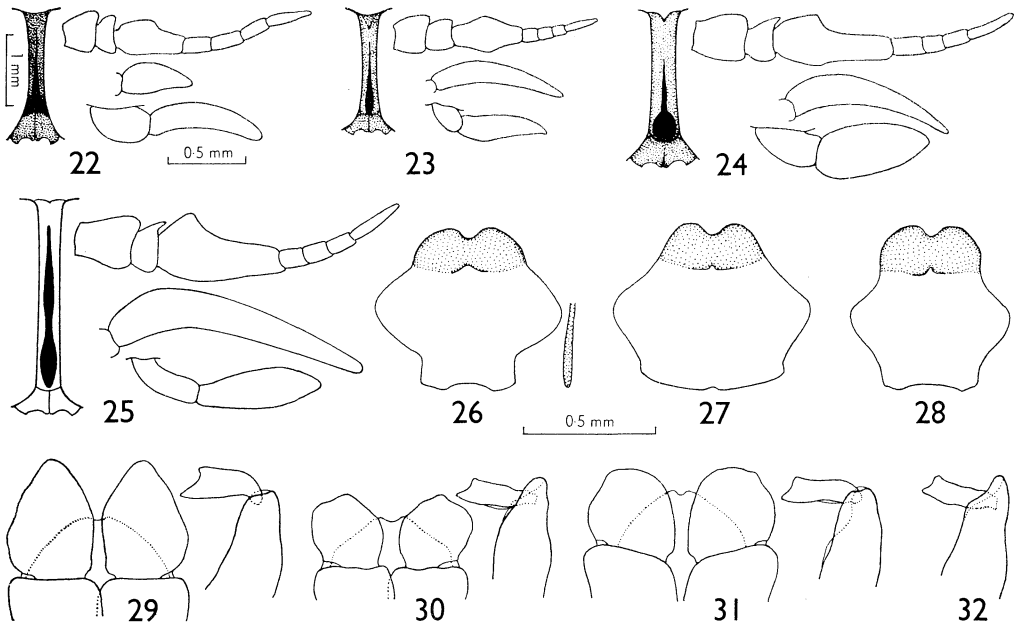

Fig. 22–32. The *sylvioides* group of *Cydistomyia*, ♀♀, plus ♂ palp, cerci and gonostyle: 22, 26, 29, *teloides* (including spermathecal bulb in 26); 23, 27, 30, *parapacifica*; 28, *pacifica*, for comparison; 24, 31, *rosselensis*; 25, 32, *solomensis*. Scales: vertical for fronts, upper horizontal for antennae and palpi, lower horizontal for all terminalia.

♀. A slender, 10 mm, dark, sexually dimorphic species; superficially like *C. parapacifica*, but immediately distinguished by its unusually elongate antennal style (fig. 22). The type is teneral, but the better preserved ♂ has almost identical antennae, supporting the view that the character is not an aberration. *Head*: Eyes (relaxed) dark green, unbanded. Frons narrow, slightly converging, index 7.0, dark brown; callus elongate and appears irregularly fusiform. Subcallus, parafacials and face covered with chocolate brown tomentum and inconspicuous black hairs; beard black. Antennal scape and pedicel dark brown to black, with black hairs; flagellum black, with basal plate only about 1/2 the length of the long style. Palpi short and plump, dark brown with black hairs; proboscis unusually short, scarcely exceeding the palpi in length. *Thorax*: Scutum and scutellum rather dark brown with inconspicuous black hairs. Pleura darker brown with black hairs. *Legs*: Brown (about as dark as pleura) with brown hairs. *Wings*: Brown (showing evidence of immaturity), with dull brown veins and rather indefinite stigma; R_4 sharply curved, but without appendix. *Abdomen* (crumpled): Entirely black dorsally and ventrally, with black hairs except for incomplete white fringes on tergites 2 to 4. Sternite 8 and gonapophyses rather rounded; spermathecal bulbs slender, pale, barely distinguishable from ducts.

♂. Longer (12 mm) and, as in *parapacifica*, more generally brown than ♀ and with a distinctly paler abdomen. Eyes (relaxed) dark green, unbanded; upper facets only slightly enlarged and merging into the lower facets; ocellar tubercle deeply sunken, difficult to detect. Frontal triangle, subcallus, parafacials and face brown with brown hairs; beard dark brown. Antennal scape and pedicel light brown with black hairs, flagellum with brown plate, darkening distally, and black style, proportions of the segments as in the ♀. Palpi brown with a yellowish tint

and yellowish cream hairs. Proboscis short, as in ♀. Thorax brown, not as dark as in ♀. Legs lighter yellowish brown, tibiae and tarsi paler than in ♀. Wings (in better condition than in ♀) brown, with costal cell distinctly darkened; stigma brown; anterior veins dark brown, those from R_{2+3} to hind margin lighter, more yellowish brown; R_4 more angulate than in ♀, but without appendix. Abdomen almost uniformly dull brown, darkening somewhat distally, and with vague indications of paler median triangles on tergites 2 to 5; hairs brown, except for some dull golden ones in median triangles and sublateral apical fringes of tergites 2 to 4. Venter a brighter brown than dorsum and with relatively sparse brown hairs. Tergite 9 and cerci long, gonocoxites without distal lobe, and inner angles of gonostyles drawn out into an unusual angle (fig. 29).

DISTRIBUTION. SOLOMON IS.: Santa Ysabel, ♀, Tatamba, V, McQuillan, ♂, Sukapisu, 900 m, VI, O'Brien.

Cydistomyia parapacifica Mackerras, new species Fig. 23, 27, 30.

Holotype ♀ (ANIC), from Mt Sinewit, New Britain, 1100 m, 27.VI-17.IX.1963, W. W. Brandt.

MATERIAL EXAMINED: 4 ♀♀, 11 ♂♂.

♀. A small (9-10 mm), slender, long winged, concolorous dark brown, sexually dimorphic species. Distinguished from *C. pacifica* by darker general coloration (this may be more apparent than real, because the available specimens of *pacifica* are old), differently shaped callus and antennae, less slender, more acuminate palpi, absence of fringes of pale hairs on abdominal segments, and the terminalia of both sexes. *Head*: Eyes (relaxed) dark green, unbanded. Frons narrow (index 6.5-7), slightly diverging, covered with dark brown tomentum, against which the spear-shaped, almost concolorous callus is somewhat obscure; inconspicuous ocellar tubercle present. Subcallus, parafacials and face dark brown with dark brown to black hairs; beard black. Antennae relatively short; scape and pedicel dull brown with black hairs, flagellum entirely deep brown. Palpi grayish brown with inconspicuous black hairs. *Thorax*: Deep chocolate brown, with dark brown hairs, somewhat paler on humeral lobes and below wing-root. *Legs*: Brown, darkening on tarsi; hairs brown to black. *Wings*: Smoky, darker anteriorly; stigma and veins dark brown; R_4 angulate, with inconstant appendix. *Abdomen*: Almost uniformly dark brown dorsally and ventrally, basal tergites and sternites variably a little paler; hairs black. Terminalia with wider sternite 8 and less deepened gonapophyses than in *pacifica* (fig. 28); spermathecal bulbs of both species lost in dissection.

♂. Length 10-11.5 mm; not as dark nor as uniformly colored as ♀. Eyes (relaxed) green, merging into blue peripherally; upper facets slightly enlarged, bronzy green centrally, not clearly separated from small lower facets; ocellar tubercle not detectable. Frontal triangle, subcallus, parafacials and face bright to somewhat yellowish brown, with brown hairs; beard brown. Antennae with scape and pedicel light translucent brown with dark brown hairs; plate of flagellum more orange-brown, darkening distally, style black. Palpi short, acuminate, color as in ♀, but with mostly light to yellowish brown hairs. Thorax brown, darker on disc of scutum, with short appressed golden and some brown hairs on scutum and scutellum, longer silky ones on pleura. Legs, except tarsi, a much lighter brown than those of ♀, but wings usually more deeply infuscated. Abdomen with 1st 2 to 3 tergites bright, slightly yellowish brown, remainder progressively and strongly darkening to apex; hairs dull golden on basal tergites, sometimes forming vague median triangles, more or less extensively replaced by black on distal tergites, especially in sublateral areas. Venter similar to dorsum, but not so dark on distal sternites and the dull golden hairs more uniformly distributed. Terminalia with relatively small rounded

cerci, tips of gonocoxites produced into a distal lobe, and inner angle of gonostyles projecting, though not as much as in *teloides*. *C. pacifica* (not illustrated) has tergite 9 and cerci rather like those of *teloides*, no lobe on gonocoxite, and inner angles of gonostyles like those of *rosselensis*.

DISTRIBUTION. NEW BRITAIN : Mt Sinewit, 900 and 1100 m, VI–IX, XI, Brandt, Sedlacek.

Cydistomyia rosselensis Mackerras, new species Fig. 24, 31.

Cydistomyia solomensis Mackerras, 1964, p. 156, in part.

Holotype ♀ (ANIC), from Abaleti, Rossel I., 2.X–2.XI.1963, W. W. Brandt.

MATERIAL EXAMINED : 1 ♀, 18 ♂♂.

♀. A medium sized (12 mm), rather slender, dark brown, sexually dimorphic species; distinguished from *nokensis* Oldr. and *solomensis* by color, wider, darker frons, differently shaped callus, narrower antennal plate with more rounded dorsal tooth, and more deeply infuscated wings. *Head*: Eyes (relaxed) brown with dark green reflections, unbanded. Frons of medium width (index 5.3), almost parallel-sided, with dark brown tomentum and obscure black hairs; callus deep brown, swollen below and tapering above. Subcallus, parafacials and face dark brown with brown hairs; beard dark brown. Antennal scape and pedicel light translucent brown, with black hairs; plate of flagellum darker brown, style black. Palpi brown, with black hairs which are relatively long and dense dorsally. *Thorax*: Scutum and scutellum chocolate brown, dorsocentral lines, suture and supra-alar area somewhat lighter; hairs dark brown. Pleura brown with black hairs. *Legs*: Brown, somewhat darker on tarsi, hairs black. *Wings*: Strongly infuscated, especially anteriorly and along radial veins; stigma and veins dark brown; R_4 angulate but without appendix. *Abdomen*: Chocolate brown, with black hairs and a narrow fringe of dull cream hairs at apices of tergites 2 to 5 and a few on 6; lateral fringe barely defined. Venter similar to dorsum, but with fewer pale hairs. Terminalia not dissected.

♂. Length 12–14 mm; considerably lighter in color than ♀, and little darker, except on wings, than ♂♂ of *nokensis* and *solomensis*. Eyes (relaxed) with upper large facets brown, sharply separated by a narrow darker zone from the small green facets below; ocellar tubercle deeply sunken. Frontal triangle brown; subcallus, parafacials and face yellowish brown with some grayish dusting below and with short dark brown hairs; beard dark brown. Antennae even more slender than in ♀, flagellum becoming black only on distal annuli. Palpi short, plump, fawn, with long brown and black hairs. Thorax brown, paler anteriorly, with dull golden and cream hairs on disc of scutum and scutellum, brown ones on notopleural lobes; pleura fawn, gray-dusted, with light brown and cream hairs. Coxae like pleura, with cream hairs; remaining segments of legs yellowish brown to brown, with inconspicuous brown hairs which become denser and darker distally on hind tibiae and all tarsi, and some golden hairs on hind femora ventrally. Wings as in ♀, the degree of infuscation rather variable. Abdomen bright brown, paler yellow-brown in median triangles and at apices of tergites, a little darkened sublaterally on distal tergites; hairs golden, mixed with brown sublaterally. Venter bright brown with paler apical bands on sternites; hairs dull golden to cream, some brown ones on discs of more distal sternites. Tergite 9 and cerci similar to those of *solomensis*, but gonocoxites without distal lobe and gonostyles distinctly wider (4 specimens of each dissected). I have no fresh material of *nokensis* for comparison.

DISTRIBUTION. SE NEW GUINEA : Rossel I., X–XI, Brandt. The ♂♂ from the same locality and those from Wewak and Lae, NE New Guinea, F. H. Taylor, record-

ed as a dark form of *C. solomensis* (1964, p. 159) belong to this species.

Cydistomyia solomensis (Ricardo) Fig. 25, 32.

An abundant species, represented in the new collections by 87 ♀♀ and 54 ♂♂ from the following localities in the Solomon Is. : Buka, Bougainville, Choiseul, Vella Lavella, Gizo, New Georgia, Santa Ysabel, Russell, Florida, Malaita, Guadalcanal, Cristobal, some in Malaise trap, a few in light trap, all months except February, many collectors. Generally larger (10–15 mm), more robust, and with much less sexual dimorphism in color than other members of the group, and distinguished more particularly by the very narrow yellow frons and long dark callus of the ♀, the shape of the antennal plate of both sexes, and the distal lobe on the gonocoxites of the ♂. Terminalia of ♀ undistinguished except for the unexpanded, deeply pigmented spermathecal bulbs. Most specimens show the typical, almost uniform, orange-yellow coloration of both sexes, but some are darker, and 3 large ♀♀ and 1 ♂ from Buka and Bougainville are deep brown, almost black, including the legs. They are structurally typical (including the terminalia), and, in the absence of other evidence, seem to be better treated as melanic *solomensis* than as a separate species.

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