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NEW SPECIES AND RECORDS OF AUSTRALASIAN CALLIPHORINAE, WITH SPECIAL REFERENCE TO THE FAUNA OF NEW GUINEA (Diptera: Calliphoridae)[1, 2]

By **Maurice T. James**[3]

Abstract: The genera *Hemipyrellia, Lucilia,* and *Phumosia,* as they occur in New Guinea, are reviewed, with keys to species, including a key that will supplement Aubertin's key to the known world species of *Hemipyrellia.* Records and new species from other Australasian areas are included. New species are: *Hemipyrellia fijiensis,* Fiji; *H. aureocrura,* New Hebrides; *Lucilia gressitti, Phumosia marginata,* and *Euphumosia elegantina,* New Guinea. The ♂ of *Hemipyrellia expecta* Paramonov is described for the first time. *Lucilia calviceps* Bezzi is tentatively removed from synonymy with *L. papuensis* Macquart.

The purpose of the present paper is to review the genera *Lucilia, Phaenicia, Hemipyrellia,* and *Phumosia,* as they occur in New Guinea, with descriptions of new species from other Pacific areas, and to describe a new *Euphumosia* that has come to my attention since the publication of the revision of that genus by Torgerson & James (1967).

The terminology used here is for the most part standard. In describing the abdomen, I am following the usual procedure in using the apparent rather than the morphological segmentation, that is, I am numbering the 4 principal segments as 1 to 4 rather than 2 to 5.

Of the genera considered here, *Lucilia, Phaenicia,* and *Hemipyrellia* form a closely compact unit. Such authors as Malloch and Bezzi have considered these as constituting but a single genus. Aubertin, who published the only comprehensive accounts of the world species (Aubertin 1931, 1933) recognized 2 genera, *Phaenicia* being treated by her as part of *Lucilia,* and Zumpt, in his various publications on the blow flies, has followed her lead. Hall and James in various publications, and Kano & Shinonaga (1968) have recognized the distinctness of *Phaenicia.* This is the course that is followed

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here. It is my contention that our grounds for recognizing *Phaenicia* as distinct are as firm as those for treating *Hemipyrellia* as a valid genus. Consequently, we should recognize either 1 genus or 3 in this complex. The argument that the recognition of *Phaenicia* necessitates the change in the generic names of at least 2 very important species is not valid; a considerable body of literature has already been published using *Phaenicia* as the generic name of these 2 species, and stability of nomenclature must depend upon more substantial grounds than merely the desire to retain a much used combination.

Phumosia, though more distantly related to the above complex, yet in the same subfamily, shares a character with *Hemipyrellia* that enables one promptly to differentiate these 2 genera from other members of this subfamily, namely, the long erect hairs (as opposed to short pubescence) on the convexity of the metathorax just above the posterior spiracle. This character occurs in Surcouf's nominal genus *Caiusa*, but I am following Zumpt (1954) in considering this a synonym, or at most a subgenus, of *Phumosia*. *Phumosia* is predominantly an Ethiopian genus, but it is amply represented in the Oriental and Australian Regions. It is close to *Euphumosia*, but, in addition to possessing long pile above the posterior spiracle, which *Euphumosia* does not have, it is not known to have the conspicuous tomentose vittae on the thorax that characterize most species of *Euphumosia*.

This study is based on material in the following collections: the Australian National Insect Collection, C. S. I. R. O., Canberra, Australia (CSIRO); the B. P. Bishop Museum, Honolulu, Hawaii (BISHOP); the British Museum (Nat. Hist.), London (BMNH); the California Academy of Sciences, San Francisco (CAS); Cornell University, Ithaca, New York (CU); the Hamburg State Museum, Germany (HSM); the Naturhistoriska Riksmuseet, Stockholm, Sweden (RMS); the National Museum of Natural History, Washington, D. C. (USNM); Washington State University, Pullman (WSU); and the Zoological Museum, Copenhagen, Denmark (ZMC). I am grateful to the curators of these collections for placing this material in my hands for study.

Genus **Hemipyrellia** Townsend

Hemipyrellia Townsend, 1918, *Insec. Insc. Mens.* **6**: 154.

Aubertin (1931), in her revision of the genus *Hemipyrellia*, separated 2 species, namely *rhodocera* (Bezzi) and *fergusoni* (Patton), from the remaining described ones on the basis of the golden tomentum or pollen of the face (including in this term the parafacials and genae). Paramonov (1961) added a new species, *H. expecta*, from New Guinea. Coloration of pollen is variable in many of the Calliphorinae, but in this genus the distinction between golden and silvery pollen is striking and seems to be quite constant. My examination of all the described species confirms Miss Aubertin's judgment in using this as a primary character for dividing the genus into 2 sections in the key. Two additional species with a golden-pollinose face are described here. They may be separated by the following key.

1. Pollen of face, parafacials, and genae golden 2
   Pollen of face, parafacials, and genae whitish to silvery. Refer to couplet 3 in Aubertin's key (either ♂ or ♀). Of the species that trace here, *ligurriens* (Wiedemann) is known to occur in the New Guinea fauna.

2. Abdomen in part metallic but conspicuously marked with yellow 3
Abdomen metallic, not marked with yellow 4
3. Mesopleura and large parts of propleura, pteropleura, and sternopleura conspicuously orange to yellow in background and in most of their vestiture; 3rd tergum conspicuously marked with orange or yellow ..... **fergusoni** (Patton)
Mesopleura wholly metallic green or blue, vetisture chiefly black; 3rd tergum wholly metallic green or with only a yellow anterior margin ..... **expecta** Paramonov
4. Fourth tergum densely whitish-pollinose, strongly contrasting with lightly-pollinose 3rd ..... **fijiensis***
Third and 4th terga brightly shining, without evidence of pollen except under a very oblique light 5
5. Femora bright orange to golden, legs otherwise mostly brownish ..... **aureocrura***
Femora black ..... **rhodocera** (Bezzi)

Hemipyrellia ligurriens (Wiedemann)

Musca ligurriens Wied., 1830, *Auss. Zweifl. Ins.* **2**: 655.

SPECIMENS EXAMINED: NE NEW GUINEA: 1 ♂, 3 ♀♀, Lae, VII.1944, F. E. Skinner (BISHOP); 1 ♀, Bubia, near Lae, 21.V.1959, C. D. Michener (BISHOP); 1 ♀, Wau, Morobe Distr., 1200 m, 1-4.X.1962, J. Sedlacek (BISHOP); 1 ♀, Jimmi River, VII.1961, W. W. Brandt (CSIRO); 1 ♀, Maprik, 22.III.1964, D. H. Colless (CSIRO). NW NEW GUINEA: 2 ♂♂, Biak, 25.IV.1945, G. E. Bohart (CAS). SW NEW GUINEA: 2 ♂♂, Vogelkop, Fak Fak, S coast of Bomberi, 10-100 m, 11.VI.1959, T. C. Maa (BISHOP); 1 ♂, Vogelkop, Danowaria, ex fresh human excrement, 2.VI.1959, J. L. Gressitt (BISHOP); 6 ♂♂, 1 ♀, Eramboe, 80 km ex Merauke, 29.I.1960, Maa (BISHOP). PAPUA: 1 ♀, Rossiter's, Leron Plains, III. 1962, K. R. Norris (CSIRO); 2 ♂♂, Port Moresby, 25.IV.1959, Michener, and 10 m, 5.X. 1958, Gressitt (BISHOP); 1 ♀, Port Moresby, Bourkes, Brown River, 3.III.1962, Norris (CSIRO); 1 ♀, Moitaka, III.1962, Norris (CSIRO); 1 ♂, 6 ♀♀, Maderi Plantation, X.1961, M. G. Meadows (CSIRO); 1 ♂, Normanby I., Wakaiuna, Sewa Bay, 1-5.XI.1956, Brandt (BISHOP). AMBOINA: 2 ♀♀, IV.1908, F. Muir (BMNH). NEW BRITAIN: 2 ♀♀, Vunabakan, 180 m, 10 km E of Kerawat, 16-20.XI.1959, Maa (BISHOP). NEW IRELAND: 2 ♂♂, 2 ♀♀, Danu, Kalili Bay, 22 & 29.IV.1962, Noona Dan Expedition (ZMC). MANUS I.: 1 ♀, Lorengau, near sea level, 15-29.XII.1959, Maa (BISHOP). DYAUL: 1 ♀, Samuna, 9.III.1962, Noona Dan Expedition (ZMC).

Hemipyrellia expecta Paramonov

Hemipyrellia expecta Par., 1961, *Nova Guinea* **12**: 226.

This species was described from a single ♀ taken at the Sigi Camp of the Third Archbold Expedition to New Guinea. A ♂ in the Bishop Museum obviously belongs to the same species, but this sex has not previously been described.

♂. Frons at narrowest 0.02 head width or approximately as wide as diameter of anterior ocellus; frontal stripe evident though almost obliterated at its narrowest; about 10 frontals, no outer verticals, ocellars rather weak; setulae of facials extending about 2/5 way from vibrissae to

* Described as new.

antennal bases. Hairs of genae and lower occiput golden ; setulae of antennae black[4]. Humeri brownish yellow above, yet still contrasting with mesonotum. Middle and hind legs largely brownish black, like their tarsi ; femora, however, extensively yellow ventrally. Abdomen more nearly like that of *fergusoni*, the 2nd tergum being yellow except its posterior margin and a median extension of this margin in the form of a triangle directed forward; 3rd tergum largely metallic green but with an anterior yellow margin which is almost interrupted medially and which broadens laterally. Length, 7 mm.

SPECIMEN EXAMINED : NE NEW GUINEA : 1 ♂, Finisterre Range, Saidor, Funyende, 1200 m, 24.IX.1958, W. W. Brandt (BISHOP).

Hemipyrellia fijiensis James, new species

♂. Head chiefly yellow ; parafrontals on upper 1/2 becoming brownish, then blackish next to ocellar triangle ; upper 1/2 of occiput blackish, merging through brownish to yellow below ; parafacials next to facials somewhat orange-yellow ; frontal stripe reddish brown, very narrow and almost linear above, but distinct to ocellar triangle ; frons at narrowest about 0.02 head width or about as wide as diameter of anterior ocellus. Pollen of most of head bright yellow to golden yellow, mostly quite dense, only the facial warp medially shining, becoming less intense yellow on upper parafrontals and upper occipital orbits, cinereous with a yellow tinge on upper occiput. Frontal bristles 9-10 ; no outer verticals ; setae of facials extending about 1/2 way from arista to antennal base. Most bristles, setae of facials, and most setae of occipital fringe black ; pile bright yellow, becoming brown to brownish black on ocellar triangle and upper part of occiput. Antenna wholly bright yellow, arista brownish yellow becoming brown apically, its rays brown. Palpi bright yellow with black setulae ; proboscis brownish yellow to brown.

Thorax mostly metallic blue with purplish reflections ; ground color appears brownish in places, such as notopleura, postalar declivity, and certain pleural areas, but this may be due to the aging of the type specimen. Lower part of humerus, propleuron, prosternum, and corner of mesopleuron between front coxa and anterior spiracle yellow. Pollen gray, mostly inconspicuous, most noticeable on sternopleura. Setulae and bristles of thorax mostly black, but pleura with brownish and yellowish hairs intermixed. Acrostichals 2 : 2 ; dorsocentrals 2 : 3 ; scutellars 3 marginal, 1 apical, 1 discal. Anterior spiracle bright yellow, posterior spiracle brown. Front coxa, trochanter, femur, and tibia bright yellow ; legs otherwise brown, middle tibia more yellowish brown. Some yellowish hairs on anterior surface of front coxa ; hairs, setulae, and bristles of legs otherwise mostly black. Middle tibia with 1 anterodorsal and 2 posterodorsals ; hind tibia with 1 anterodorsal and no posterodorsal ; a fringe of anterodorsal setulae extending from base of hind tibia to the bristle and including 1 or 2 stronger setae that might be interpreted as small bristles ; no posterodorsal fringe. Wing deep brown at base and along costal margin to apex of vein R_1 and posteriorly to cross-vein r-m, then fading through a pale to a very dilute brown at apex and posterior margin. Squamae brown, a little paler at base.

First 3 terga of abdomen blue with purplish reflections and inconspicuous whitish pollen which is, however, evident over most of the surface but only at a very oblique light ; 4th tergum light coppery with conspicuous whitish pollen which is clearly visible under any light and which contrasts strongly with that of the 3rd ; it is possible to turn the specimen in such a way that the contrast largely disappears, but except for a very special lighting, it is conspicuously evident. Sterna as their respective terga but not as strongly shining. Bristles and setulae black. Genitalia not dissected because of the fragile nature of the single specimen. Length, 7 mm.

4. Did Paramonov refer to the hairs and bristles other than on the antennae when he wrote "Antennae orange-yellow, hairs yellow, bristles black ?"

Holotype ♂ (HSM), Viti Levu, Fiji; Museum Godeffroy no. 17277.

This specimen was studied by J. R. Malloch and bears the label "Lucilia (Hemipyrellia) fijiensis, Type" in his handwriting. I find no indication, however, that the name or a description of the type specimen has ever been published. I concur with Malloch that the specimen represents a clearly distinct species.

Hemipyrellia aureocrura James, new species Fig. 1.

♂. Frons at narrowest as wide as diameter of anterior ocellus, parafrontals therefore very narrow at that point and frontal stripe virtually eliminated. Parafrontals mostly brownish black, becoming more brownish toward antennal base; parafacials, genae, and lower part of occiput orange, more orange-brown toward facials; face blackish above, becoming yellowish below; lower part of frontal stripe reddish brown; parafrontals, occiput, and occipital orbits grayish yellow pollinose, becoming yellow below; face, parafacials, and genae with yellow to golden pollen, becoming more deeply golden ventrally. Inner verticals and ocellars long and strong, outer verticals lacking; frontal bristles 7-8; setae on facials strong, reaching 1/2 way to antennal bases; all the above, as well as occipital fringe and most occipital setulae, black; genae, postgenae, and lower part of occiput with fine, golden hairs, those on occiput long; bristles of oral margin mostly black anteriorly, becoming golden posteriorly. Antenna orange, flagellum largely brown; arista brown, rays reaching almost to apex. Proboscis blackish; palpi slender, yellow.

Thorax and abdomen dark blue-green, with brighter greenish reflections on the mesopleura; lower part of humerus near propleuron yellow, propleuron blackish, prosternum brownish black; abdomen tending to purplish at apices of terga 1-3 but this area narrow and not at all clearly differentiated. Entire abdomen and thorax shining; thin pollen present over all or most of the area, though it is not noticeable, as a rule, except under very oblique light, except on lower part of humerus, above front coxa, on posterior part of sternopleuron, and on ventral parts of abdominal terga. Acrostichals 2 : 2, dorsocentrals 2 : 3. All thoracic and abdominal bristles and most setulae and pile black; fine pile on prosternum and some fine pile around stigmatal bristle, on posterior part of sternopleuron, on metapleuron mixed with its blackish pile, and on 1st sternum, yellowish. Anterior spiracle bright yellow, more brownish above; posterior spiracle dark brown. Hairs of ventral aspect of terga and of genitalia dense.

Coxae, except at base, bright yellow; femora golden; fore tibia yellow, tarsi and other tibiae yellowish brown to brown. Some golden hairs on anterior face of each coxa, hairs, setulae, and bristles of legs otherwise black. Middle tibia with 1 anterodorsal and 2 posterodorsals; hind tibia with 1 anterodorsal and 1 posterodorsal; a fringe of anterodorsal setulae extending entire length of tibia and a fringe of posterodorsal setulae from the bristle to apex. Wing lightly infumated with brownish, more nearly clear hyaline in anal area. Squamae brown, thoracic darker than alar. Halter brown, knob yellowish brown. Genitalia as in fig. 1. Length, 7 mm.

♀. Frons 0.28 head width; frontal stripe as wide as combined widths of parafrontals, mostly black with whitish pollen, reddish brown just above lunule. Outer verticals as long as inner verticals; reclinate fronto-orbital strong; 2 proclinate fronto-orbitals, posterior one about 1/2 as long as anterior and weaker, anterior one as long and strong as reclinate fronto-orbitals. Flagellum of antenna larger than in ♂ and predominantly orange. Pile of ventral surface of abdomen not noticeably dense. Otherwise, except sexually, as described for the ♂.

Holotype ♂ (CAS 11,138), Espiritu Santo I., New Hebrides, VIII.1943, W. Bauer. Allotype, ♀, same data. Paratypes, 4 ♀♀, same data.

Genus **Phaenicia** Robineau-Desvoidy

Phaenicia R.-D., 1863, *Hist. Nat. Dipt.* **2**: 750.

I have no records of this genus from New Guinea, but 2 species, *P. sericata* (Meigen) and *P. cuprina* (Wiedemann), are so common and widespread that either of these might be expected to occur in that area. I have seen a female of *P. cuprina* from New Ireland, Danu, Kalili Bay, 29.VIII.1962, Noona Dan Expedition (ZMC).

Genus **Lucilia** Robineau-Desvoidy

Lucilia R.-D., 1830, Essai sur les Myodaires: 452.

This genus is readily distinguished from *Hemipyrellia* by the short pubescence on the convexity above the posterior thoracic spiracle and from *Phaenicia* by the short, stiff, black setulae, in addition to soft pubescence, on the subcostal sclerite. The following key will separate the species known to occur in New Guinea. One extralimital species, *L. fumicosta* Malloch, is included for purposes of comparison and because of its possible occurrence in New Guinea, in which event it might be confused with *L. calviceps* Bezzi.

1. Black species; parafacials, parafrontals, and face golden-pollinose ..... **aureovultu** Theowald
   Metallic green, blue, or purple species; pollen of parafacials, parafrontals, and face white to yellow or brownish yellow, not golden 2
2. Parafacials distinctly haired well below base of antennae 3
   Parafacials bare below antennal bases 4
3. Anterior part of wing strongly infumated to cross-vein r-m and almost to wing apex; small, slender, bright green species, 6-8 mm in length, Philippine Islands; not known to occur in New Guinea ..... **fumicosta** Malloch
   Wing hyaline or uniformly, lightly infumated; larger, robust, purple species, about 10 mm in length ..... **gressitti***
4. Antenna elongated, distance between its apex and vibrissa less than width of 3rd antennal segment; 1st postacrostichal distinctly before 2nd posterior dorsocentral; abdominal terga not margined with black ..... **porphyrina** (Walker)
   Antenna shorter, distance between its apex and vibrissa greater than width of 3rd antennal segment; 1st postacrostichal, with rare exceptions, opposite or a little beyond 2nd posterior dorsocentral; abdominal terga usually distinctly margined with black 5
5. Costal area of wing deeply infuscated and strongly contrasting with rest of wing ..... **calviceps** Bezzi
   Costal area of wing but little, if any, infuscated, at least not strongly contrasting with rest of wing ..... **papuensis** Macquart

Lucilia gressitti James, new species

♀. A large, robust species. Head black, parafacials on lower part, especially next to oral margin, and lower face brownish yellow; frontal stripe dark reddish brown. Frons 0.22 head width; frontal stripe slightly broader than combined widths of parafrontals. Pollen of head rather dense, brownish yellow on parafacials and parafrontals, otherwise mostly whitish with a yellow cast. Hairs and setulae mostly black, those on postgenae and lower part of occiput long and yellow, grading into brownish between postgena and gena; a conspicuous irregular row

* Described as new.

on each parafrontal outside the frontal bristles and a patch on upper parafacial, separated by a bare area from the parafrontal setulae but extending ventrad about 1/2 way to apex of flagellum; setulae of facials extending dorsad above level of lowest parafacial setulae; face medially with some very short, stiff, scattered black setulae. Outer and inner verticals, ocellars, 1 reclinate and 2 proclinate fronto-orbitals, and 8-10 frontals well developed. Apex of antenna distant from vibrissa by about width of flagellum; antenna black, but apex of pedicel and base of flagellum, more extended inwardly, reddish yellow; arista brown; bristle of pedicel and all setulae black. Proboscis brownish black, setulae of labella yellow to whitish, long, setulae otherwise black; palpi orange-yellow with long black setulae.

Thorax blue with strong purple reflection. Mesonotum rather densely whitish-pollinose, the pollen clearly evident at a slight angle; pollen of scutellum more brownish and not at all evident except under very oblique lighting. Pollen of pleura most evident on propleuron and lower part of stenopleuron. Acrostichals 2: 2, dorsocentrals 3: 2. Femora black with metallic reflections; tibiae and tarsi brownish to brownish yellow. Wing hyaline, somewhat brownish yellow at base; veins brownish yellow; squamae brown.

Abdomen green to purple, with strong purple reflections; posterior margins of terga black but the contrast not noticeable except under an oblique light; pollen on dorsal surface also not noticeable except under a very oblique light but more clearly evident ventrally, where it is whitish. Bristles and setulae black. Length, 10 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9331), NW New Guinea, Wisselmeren, Enarotadi, 1800 m, 1.VIII. 1955, J. L. Gressitt.

This species is distinguishable from all other known species of *Lucilia* except *fumicosta* Malloch by the presence of parafacial setulae. It shows close relationships to *L. papuensis* Macquart; the head structure, for example, is much the same. Yet it is so clearly marked that a description of it based on a single ♀ seems justifiable.

Lucilia porphyrina (Walker)

Musca porphyrina Walker, 1857, *J. Proc. Linn. Soc. Lond.* **1**: 24.

This is a common and widespread species, occuring from Japan and China through southeastern Asia, the Philippine Islands, and the East Indies, into Australia. I have records from the following localities: NE NEW GUINEA: Arau, 40 km E of Kainantu; Wagi Valley, Kerowagi area; Adelbert Mts, Wanuma; Wau, Morobe Dist.; Mt Hagen area; Elaptamin Valley; Busu River, E of Lae; rain forest, 9.6 km (6 mi) NW of Lae; Sinofi. NW NEW GUINEA: Ifar; Cyclops Mts, Ifar; Boden, 11 km SE of Oerberfaren; W Sentani, Cyclops Mts, Hollandia area; Swart Valley, Karumbaka; Waris, S of Hollandia; Biak. SW NEW GUINEA: Vogelkop, Fak Fak, S coast of Bomberi; Bomberi. PAPUA: Oriomo Government Station, W Distr.; Kiunga, Fly River; Cape Rodney; Daradae Plantation, 80 km N of Port Moresby; Misima I., SE Papua; Normanby I., Wakaiuna, Sewa Bay. NEW BRITAIN: Gazelle Pen., Mt Sinewit; Yalom. MUSSAU: Talumalaus. MANUS: Lorengau. Records are from May through November, and from sea level to 1500 m. Frequently recorded from human excrement.

Lucilia calviceps Bezzi

Lucilia calviceps Bezzi, 1927, *Bull. Ent. Res.* **17**: 238.

Aubertin (1933) considers *L. calviceps* to be a synonym of *L. papuensis*, and she may be correct. The only tangible distinction appears to be the deeply darkened costal area of the wing of *calviceps*. However, this form appears to have a definite distributional pattern, though overlapping considerably with the much more common *papuensis*, so I am tentatively considering the 2 as separate taxa.

SPECIMENS EXAMINED: NW NEW GUINEA: 2 ♂♂, 9 ♀♀, Ifar, 300–600 m, 20, 22, & 25.VI.1959, ex human excrement, T. C. Maa (BISHOP); 7 ♀♀, Cyclops Mts, Ifar, 300 m, 20–22.VI.1959, Maa (BISHOP); 2 ♀♀, Hollandia-Binnen, 100 m, 1.XI.1958, ex dead African snail, J. L. Gressitt (BISHOP); 1 ♂, Sentani, 90+ m, ex human excrement, 15.VI.1959 (BISHOP); 1 ♂, Nabire, S Geelvink Bay, 0–30 m, 2–9.VII.1962, Gressitt (BISHOP). NEW BRITAIN: 1 ♂, Gazelle Pen., Upper Warangoi, 1250–1450 m, 5.XII.1962, J. Sedlacek (BISHOP); 9 ♂♂, 10 ♀♀, Valoka, 5–12.VII.1962, Noona Dan Expedition (ZMC); 1 ♀, S of Cape Hoskins Aerodrome, 6.VII.1962, Noona Dan Expedition (ZMC); 2 ♂♂, 2 ♀♀, Yalom, 1000 m, 18–22.V.1962, Noona Dan Expedition (ZMC). NEW IRELAND: 1 ♂, Danu, Kalili Bay, 30.IV.1962, Noona Dan Expedition (ZMC); 9 ♂♂, 10 ♀♀, Lemkamin, 9–23.IV.1962, Noona Dan Expedition (ZMC).

Lucilia papuensis Macquart

Lucilia papuensis Macquart, 1842, Dipt. Exot. **2**: 141 (*Mem. Soc. R. Sci. Agric. Arts, Lille* 1842: 298.

This is obviously the most common calliphorid in New Guinea. It is widely distributed through southeastern and eastern Asia, the Philippine Islands, East Indies, and Australia; it extends into Melanesia but apparently not into Micronesia. Despite the commonness of the fly over much of its range, the life history and host relationships apparently have not been worked out (Senior-White et al. 1940, Kano & Shinonaga 1968).

I have records from the following localities: NE NEW GUINEA: Wau, Morobe Dist.; Wau, Mt Kaindi; Maprik; Karimui, S of Goroka; Finisterre Range, Saidor (Gabumi, Kiambavi, Aiyawa, Matoko, Funyende); Minj area; Upper Chimbu; Wewak, Sepik Distr.; Kassam; Wampit V., near Gurakor Village; Feramin; Amok; Eliptamin Valley; Mt Hagen area; upper Watut River, 25 km W Bulolo; Kepilam; 11 km S of Laiagam; Huon Pen., Pindiu; Yaibos; Mt Missim, Finschhafen; Minj River Valley. NW NEW GUINEA: Hollandia; Waris, S of Hollandia; Hollandia-Binnen; Biak (Mangrowawa, east coast, beach area, Kampong Landbouw, airport); Sentani; Swart Valley, Karumbaka; Swart Valley (west side, west fork, west ridge); Guega, W of Swart Valley; Vogelkop (Mankowari area, Soavi; Kebar Valley W of Mankowari; Surarai); Eramboe, 80 km ex Merauke; Ifar, Cyclops Mts; Hol Maffen, 22 km E of Sarmi; Wamena; Central Mts, Archbold L.; Star Mts, Sibil Valley; Wisselmeren, Enarotadi; Genjam, 40 km W of Hollandia; Wailibit, Batanta; Bivachi. SW NEW GUINEA: Vogelkop, Fak Fak, Bomberi Coast; Bomberi. PAPUA: Woodlark I. (Murua), Kulumadau Hill; Owen Stanley Range, Goilala (Tapini, Bome, Loloipa); Brown River, near Port Moresby; Milne Bay; Laloki; Kila Kila; Rossiter's, Leron Plains; Central Dist., Otomata Plantation, E of Port Moresby; Port Moresby, Moitaka; Daradae Plantation; Daradae, near Javarere, Musgrove River; Kiunga, Fly River; Kokoda-Pitoki; Cape Rodney; S Highlands, Dimifa; Normanby I., Wakaiuna, Sewa Bay. CERAM: Piroe. AMBOINA: No locality. NEW BRITAIN: Gazelle Pen. (Bainings, St. Paul's; upper Warongoi;

Gaulim; Yalom; Vunabakan; Linga Linga Plantation, W of Willaumez Pen.; Kerawat. NEW IRELAND: Kandan; Schleinitz Mts, Lelet Plateau; 5–50 km from Kavieng; Lower Kait River; Ridge above "Camp Bishop," Kait River; Danu, Kalili Bay. DYAUL: Sumuna. DUKE OF YORK: Manuan.

Collections were made throughout the year, at elevations ranging from sea level to 2400 m. Apparently this species is taken quite readily both at light traps and Malaise traps. There was one record of adult flies from a dead marsupial skull and several from fresh human excrement.

Genus **Phumosia** Robineau-Desvoidy

Phumosia R.-D., 1830, Essai sur les Myodaires: 427.

The following key will separate the 3 species of *Phumosia* (including *Caiusa*) that are known to occur in New Guinea.

1. Two sternopleurals; suprasquamal ridge completely bare; pair of setulae on upper part of oral warp (epistoma of Townsend) minute; hairs of postalar declivity stiff and black. Subgenus *Caiusa* ..... **indica** (Surcouf)
   Three sternopleurals; suprasquamal ridge with fine yellow hairs; pair of setulae on upper part of oral warp small but prominent, usually as long as width of 3rd antennal segment; hairs of postalar declivity finer and yellow. Subgenus *Phumosia* 2
2. Wing feebly infumated on costal margin beyond end of vein R_1; abdomen yellow, terga 3 and 4, sometimes 2, each with a narrow apical brown margin ..... **marginata***
   Wing strongly infumated at costal margin and apex, the infumation reaching basad as far as apex of Sc; abdomen largely dull blue to blue-black ..... **abdominalis** R.-D.

Phumosia indica (Surcouf), new combination

Caiusa indica Surcouf, 1919, *Arch. Mus. d'Hist. Nat. Paris* (5) **6**: 53.

Senior-White et al. (1940) record this species from Ceylon, southern India, Malaysia (Federated Malay States), Taiwan (Formosa), Java, and Celebes. I have seen specimens from the Malay Peninsula (Selangor: Kuala Lumpur and Batu Uga Klang), the Philippine Islands (Luzon: Mt Makiling and San Jose), Sumatra (Lubuksikaping, W coast) and the Solomon Islands (Guadalcanal, Tenaru River), so the distribution seems to be quite broad through parts of the Oriental and Australasian Regions.

SPECIMENS EXAMINED from New Guinea: NE NEW GUINEA: 1 ♀, Lae, III.1962, K. R. Norris (CSIRO). NW NEW GUINEA: 5 ♀♀, Wailibit, Batanta, 13.VI.1949, Sten Bergman (RMS). PAPUA: 2 ♂♂, 3 ♀♀, Port Moresby, Moitaka, III.1962, Norris (CSIRO); 1 ♀, Port Moresby, Boroko, N. T. Talbot (CSIRO); 1 ♂, Port Moresby, 9.V.1956, J. L. Gressitt (BISHOP); 2 ♂♂, Central Distr., Otomata Plantation, SE Port Moresby, 19.V.1956, Gressitt (BISHOP); 1 ♀, Kila Kila, 5.III.1962, Norris (CSIRO); 4 ♂♂, 4 ♀♀, W. Distr., Oriomo Government Station, some on fresh human excrement, 26–28.X.1960, Gressitt (BISHOP); 1 ♀, Cape Rodney, 10 m, 2–4.XI.1960, Gressitt (BISHOP).

Phumosia marginata James, new species Fig. 2.

♂. Head yellow to pale brownish yellow; parafrontals blackish, becoming brown along

* Described as new.

ocellar triangle; upper 1/2 of occiput blackish; lower frontal stripe brown. Lunule yellow, with several black setulae. Frons at narrowest 0.01 head width or definitely less than diameter of anterior ocellus, frontal stripe completely obliterated and parafrontals very narrow at that point. Parafrontals, parafacials on upper part and along eye below to genae, most of face, and occipital orbits with whitish pollen; pollen of head otherwise not noticeable but mostly whitish. Outer verticals absent; about 4 stronger frontal bristles and several weaker ones. Setulae of facials weak, in several irregular rows toward vibrissae, merging into one above, extending 1/3 to 2/5 way from vibrissa to antennal bases. Occiput except upper part and postgena with soft, yellow hairs, setulae and bristles of head otherwise black. Antennae yellow; flagellum somewhat brownish anteriorly; 2nd segment with a strong black bristle, 1st and 2nd mostly with black but with a few yellow hairs; arista yellow, apex and rays brown. Palpi bright yellow; proboscis orange-yellow, hairs of labella mostly yellow to golden.

Thorax yellow, more brownish yellow dorsally. Acrostichals 1: 2, dorsocentrals 2: 3; scutellars, 2 strong laterals and 2-3 weaker ones, 1 apical, 1 discal. Bristles, setulae of mesonotum, scutellum, most of mesopleuron, and pteropleural tuft black; hairs on under side of scutellum, most of pleura, suprasquamal ridge, and postalar declivity fine and yellow. Legs yellow; apical tarsomeres becoming brown; bristles and setulae black, but some fine, yellow hairs on all coxae. Wings subhyaline; stigma (cell Sc) light yellow; most of cells R_1 and R_3 beyond apex of vein R_1 distinctly infumated. Squamae yellow, slightly tinged with brownish.

Abdomen yellow; 3rd and 4th terga each with a distinct brown posterior margin, about 1/5 to 1/3 as broad as length of respective tergum, and distinctly contrasting with the yellow; this margin broader on the 4th than on the 3rd; a similar narrow margin often present on the 2nd. Bristles and setulae of abdomen black. Abdomen devoid of pollen dorsally; some whitish pollen on ventral aspect of terga and on sterna. Genitalia as in fig. 2. Length, 8-9 mm; of holotype, 9 mm.

♀. Head much more extensively black than in ♂, this color taking in much of the parafacials and more conspicuous on the broader parafrontals. Frons at narrowest 0.25 head width, frontal stripe about 3 × as wide as 1 parafrontal. Outer verticals well developed; 1 proclinate and 1 reclinate fronto-orbital; 7 frontals. Margin of 2nd abdominal tergum more prominent than in ♂. Otherwise as described for the ♂. Length, 8 mm.

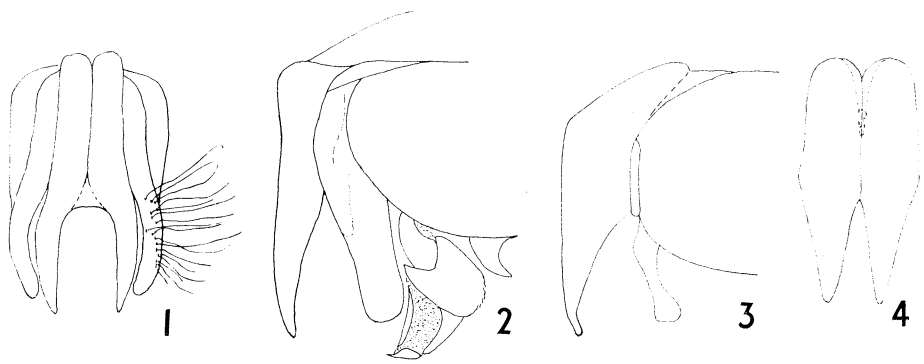

Fig. 1, *Hemipyrellia aureocrura*, ♂ genitalia, dorsal view. Fig. 2, *Phumosia marginata*, ♂ genitalia, lateral view. Fig. 3, *Euphumosia elegantina*, ♂ genitalia, lateral view. Fig. 4, same, inner forceps, dorsal view. Bristles and pile omitted except on outer forceps, on one side, in fig. 1.

Holotype ♂ (RMS), NW New Guinea, Wailibit, Batanta, 1949, Sten Bergman. Allotype, ♀, same data. Paratypes, 5 ♂♂, same data.

Phumosia abdominalis Robineau-Desvoidy

Phumosia abdominalis R.-D., 1830, Essai sur les Myodaires: 427.

Senior-White et al. (1940) erroneously stated that their description, adapted from Surcouf, was that of the ♂. Surcouf described the ♀, and the adapted translation clearly refers to that sex. One problem that arises, as one uses the description for identification purposes, regards the presutural acrostichals. The series that I have seen is highly variable. Senior-White et al. describe these bristles as one strong, preceded by a weaker one. In 1 series of 7 ♂♂ from Biak, there is consistently 1 strong preacrostichal; the preceding one may be absent (2 ♂♂), present but weak (4 ♂♂), and a little less that medium (1 ♂). In 11 ♀♀ of this same series, the single bristle is strong (2 ♀♀), medium (2 ♀♀), weak (1 ♀), or absent (6 ♀♀); it is not preceded by another bristle, however weak, although I have seen specimens that agree with the Senior-White et al. description in this respect. Theowald (1957) had noted this variability, also a variability in abdominal coloration, but did not describe it.

SPECIMENS EXAMINED: NE NEW GUINEA: 1 ♀, Wewak, 2–20 m, 11.X.1957, J. L. Gressitt (BISHOP); 1 ♀, Torricelli Dist., Sugoitei Village, 900 m, 24.I.–5.II.1959, W. W. Brandt (BISHOP). NW NEW GUINEA: 9 ♂♂, 32 ♀♀, Biak I., Kampong Landbouw, 25–28.V.1959, T. C. Maa (BISHOP); 6 ♂♂, 10 ♀♀, Biak I., Mangrowawa, 50–100 m, ex fresh human excrement, 29.X.1959, Gressitt (BISHOP); 1 ♀, Biak I., 25 km NE of Biak Town, 18.III. 1963, R. Straatman (BISHOP). PAPUA: 1 ♀, Western Distr., Oriomo Government Station, 26–28.X.1960, Gressitt (BISHOP); 1 ♀, Central Distr., Brown River, 25.V.1959, C. D. Michener (BISHOP); 1 ♀, Prince Alexander Range, 860 m (2800 ft), IX.1959, R. Pullen (CSIRO); 1 ♀, Angoram, Sepik River, X.1959, Pullen (CSIRO). CERAM: 1 ♀, Piroe, II.1959, F. Muir (BISHOP).

Genus **Euphumosia** Malloch

Euphumosia Malloch, 1926, *Ann. Mag. Nat. Hist.* (9) **17**: 501.

Euphumosia elegantina James, new species Fig. 3, 4.

Obviously very close to *E. elegans* Paramonov; the original description of that species applies very well in most respects, except that the scutellum in that species is described as dark brown and the calypters as whitish. The median black stripe of the mesonotum, in *elegans*, "only slightly surpasses" the suture; in *elegantina* it extends beyond the 1st postacrostichals. In the keys of Paramonov (1961) and of Torgerson & James (1967), this species traces to *elegans*.

♂. Head black, mostly with yellow pollen, that on lower occipital orbits whitish; a considerable area on lower parafacial adjacent to facial, also a wedge-shaped area on gena and extending from the eye, where it is broadest, to the oral margin, brown-pollinose; face lightly dusted with whitish pollen. Frontal stripe brown; parafrontals extremely narrow above and frontal stripe absent there, the eyes almost contiguous at the narrowest part of frons, separated by about 0.005 head width. Upper eye facets much larger than lower ones but the 2 areas not sharply differentiated. Head measurements in percentage of head width: distance between

vibrissae, 24; vibrissa to prelabrum, 10; vibrissa to eye margin, 18. Hairs and setulae of genae and upper part of occiput black; abundant long golden hairs on lower part of occiput and postgenae; lower part of face with very short black setulae, evident only under high magnification (preferably 60× or more). Bristles black; frontals about 10 pairs; outer verticals long and fine, much weaker than inner verticals. Antenna black, flagellum sometimes reddish at extreme base; palpi slender, yellow; proboscis black.

Mesonotum densely golden-tomentose except 3 longitudinal black stripes; pattern similar to that of *albula* Torgerson (cf. Torgerson & James, fig. 7c) except that the median stripe tapers to a point and ends between the 1st and 2nd postsutural acrostichals; it is consequently much shorter behind the suture than the lateral stripes; these black stripes somewhat velvety, yet subshining; sides of mesonotum behind suture and above wing bases, postalar callus, and scutellum black with blue-purple to blue-green (on the scutellum) reflections; most of mesopleuron densely golden-tomentose, sternopleuron much more lightly whitish-pollinose. Ground color of humerus yellowish, and apparently that under golden tomentose areas also largely yellowish, although this is difficult to determine because of the density of the tomentum; ground color otherwise black to bluish black. Pile and bristles of thorax black. Legs black; femora except apical 1/3 and distinct, strong blue reflections; extreme apex of front femur and all of front tibia brownish to brownish black. Wing subhyaline, slightly smoky; largely but to a variable extent brown at base and also, though usually more lightly so, in costal and subcostal cells. Thoracic squama dark brown; alar squama more lightly so and milky white at base.

Abdomen black except 4th tergum, which is yellowish in background with dense yellow pollen that completely obscures background except in an oblique light; some thin gray pollen usually evident medially at bases of 2nd and 3rd terga; abdomen otherwise with purplish reflections, sometimes in places greenish or coppery in certain lights. Bristles and pile black. Genitalia as in fig. 3 and 4. Length, 9-9.5 mm, of holotype, 9 mm.

♀. Unknown.

Holotype ♂ (BISHOP 9332), NE New Guinea, Wau, Morobe Distr., 1700 m, 20.VII.1965, J. & M. Sedlacek. Paratopotypes, 1 ♂, same data; 11 ♂♂, same data but 9 & 16.VIII, 14 & 20.IX, 6, 11, & 12.X.1965.

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