The Muscid Genus Ophyra in the Pacific Region (Diptera)

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The scavenger flies of the genus *Ophyra* R. D. are common, and the species are widely distributed, probably because they breed in decaying vegetation, carrion, or manure. Because of the close resemblance of the species, misidentifications can easily occur, especially when only female specimens are available. It has therefore seemed desirable to review the species of the Pacific region, and to make available a key for their determination. The synopsis by Malloch (1923, Annals & Mag. Nat. Hist., [9], **11**: 664-666) is a sound basis for the study of the genus, and the following key is essentially a modification and enlargement of his work. As accepted here, the genus is a combination of *Ophyra* and *Peronia* as defined by Séguy (1937, Genera Insectorum).

Bryan (1934, Proc. Hawaii. Ent. Soc. **8**: 425, 453) stated that *Ophyra nigra* and *O. chalcogaster* were of general distribution in the Hawaiian Islands, and that *O. aenescens* and *O. leucostoma* probably did not occur there, even though they had been recorded in older literature. I have not seen *nigra* from Hawaii, but *aenescens* has been received for determination several times. Yoshinori Tanada informs me that *aenescens* is the species that has thus far been known in Hawaii as *nigra*. Most of the misidentifications in the genus appear to center about the latter, for I have seen five different species identified under that name.

Although only two species, *chalcogaster* and *aenescens*, are definitely known to me to occur in Hawaii, several others may at any time be found there. The following key has therefore been framed to include all species known to occur anywhere in the Pacific area, together with *O. capensis* which is introduced for comparison with a new species. Two species described by Stein, *hirtitibia* from Java and *simplex* from Formosa, are included in the key to males only on the basis of Stein's descriptions.

The figures have been selected to show sufficient variety in the important characters, so that one can compare other species and better realize the modifications in the several species.

KEY TO THE SPECIES OF OPHYRA OF THE PACIFIC REGION

Males

1. Habitus like a small *Calliphora*, the thorax dull black and abdomen dark metallic blue with whitish pollen, especially on apical segment; frontal lunule not silvery pollinose (*Australophyra*) ..... **O. rostrata** (R. D.) **O. analis** Macq.

   Not so; the thorax and abdomen concolorous, dull black to shining black, abdomen at most with an obscure, fine pollen or bloom..... 2.

2. Palpus yellow or reddish yellow; hind tibia posteroventrally without either bristles or long setaceous hairs, and anteroventrally with only two or three short bristles (fig. 7); both mid and hind femora with some short, stout, erect spines on the ventral surface near the base.....**O. aenescens** (Wd.) (p. 427)
Palpus black; hind tibia posteroventrally with some to many long setaceous hairs, except in *simplex*..... 3.

3. Hind tibia strongly arched beyond the basal third, and densely clothed with long hairs both antero- and posteroventrally; both mid and hind femora with short spines ventrally near the base, hind femur usually with only one spine, mid femur with two irregular rows (fig. 4).....**O. leucostoma** (Wd.) (p. 428)
Hind tibia straight or only gently curved..... 4.

4. Middle femur ventrally near the base with 2-3 short, erect, stout, black spines or spinelike bristles (fig. 5); posterior margin of eye, as viewed in profile, distinctly emarginate (fig. 2)..... 5.
Middle femur without such spines, at most with only fine, slender, erect hairs ventrally near the base (fig. 6); posterior margin of eye not emarginate in *chalcogaster* (fig. 3), but unknown to me for *hirtitibia* and *simplex*..... 7.

5. Mesonotum anterior to suture densely and uniformly covered with long, erect, fine hairs, the dorsocentral and acrostichal bristles weak and scarcely differentiated from hairs; hind femur ventrally near base with an erect but weak, slender, and inconspicuous hair..... 6.
Mesonotum not densely and uniformly haired, with bare stripes between the median group of hairs and each row of dorsocentral bristles; hairs short, dorsocentral bristles strong and conspicuous; hind femur ventrally near base with one, sometimes two, short stout spinelike bristles.....**O. nigra** (Wd.) (p. 428)

6. Parafrontal and upper part of parafacial glabrous and polished black.....**O. capensis** (Wd.) (p. .....)
Parafrontal and upper part of parafacial gray to brownish pollinose.....**O. obscurifrons** Sabr. (p. 430)

7. Hind femur ventrally near base with one row, and a partial second, of short stout spines; segments of fore tarsus with yellow to whitish apices, the pale area most extensive ventrally.....**O. chalcogaster** (Wd.) (p. 431)
Hind femur without spines ventrally near base; fore tarsus black.. 8.

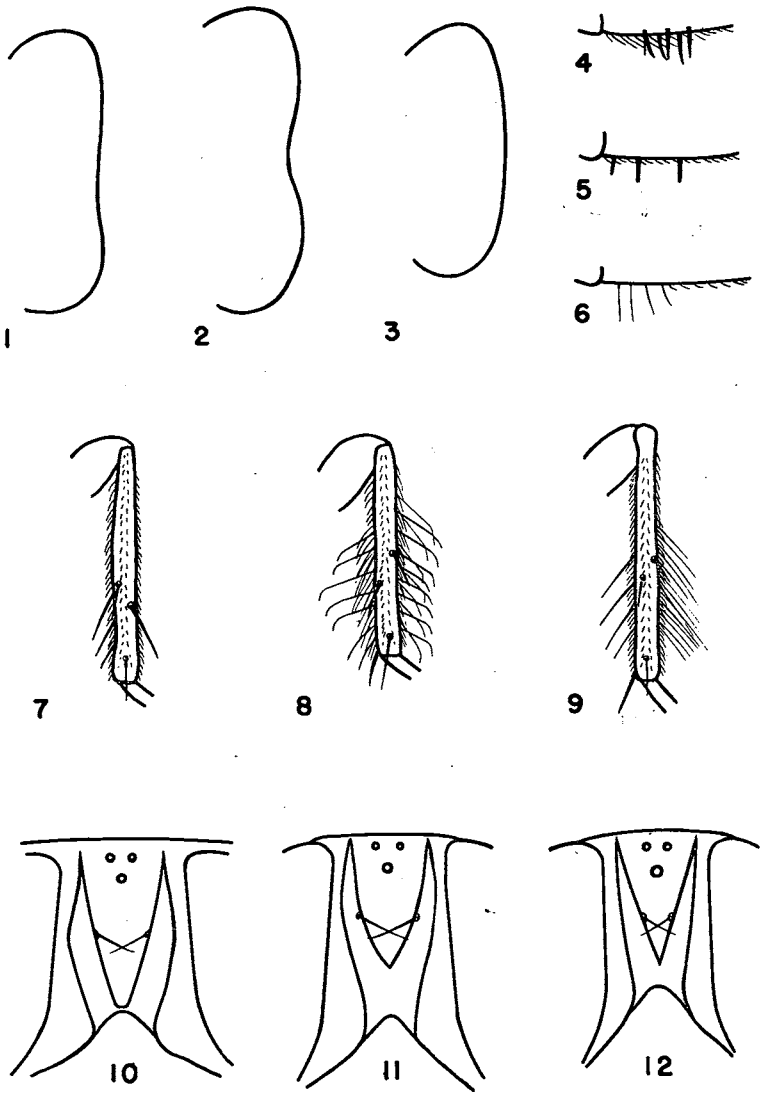
8. Hind tibia both antero- and posteroventrally with long setaceous hairs; antenna of normal length, not elongate as in *simplex*.....**O. hirtitibia** Stein
Hind tibia without long setaceous hairs, with only a few short bristles; antenna elongate, the apex almost opposite the lower margin of an eye.....**O. simplex** Stein

Females

(Unknown, or the characters not known, for *hirtitibia* and *simplex*)

1. Species with blue abdomen and black thorax (see key to males).....**O. rostrata** (R.D.) and **O. analis** Macq.
Thorax and abdomen concolorous ..... 2.

2. Palpus yellow; frontal triangle elongate, extending the full length of the front up to the lunule, apically subtruncate or broadly rounded (fig. 10).....**O. aenescens** (Wd.) (p. 427)
Palpus black; frontal triangle short, ending well before the lunule, or if longer, the apex is acute (figs. 11, 12)..... 3.



Characters of *Ophyra* species

Figs. 1-3, posterior margin of eye, in side view; figs. 4-6, profile of the ventral surface of middle femur of male, toward the base; figs. 7-9, outer aspect of left hind tibia of male, the anterior bristles (anterodorsal and anteroventral) projecting toward the left, the posterior toward the right; figs. 10-12, proportions of the front and frontal triangle of the female.

Figs. 1, 7, and 10, **Ophyra aenescens**; figs. 2, 5, and 11, **O. nigra**; figs. 3, 6, 9, and 12, **O. chalcogaster**; fig. 4, **O. leucostoma**; fig. 8, **O. obscurifrons.**

3. Mesonotum anterior to the suture densely and uniformly covered with long, erect, fine hairs, the dorsocentral and acrostichal bristles weak and scarcely differentiated from hairs; frontal triangle long and broad, the apex attaining the anterior margin of the front, or nearly so ..... 4.

Mesonotum not densely and uniformly covered with long hairs, the hairs short, relatively sparse, and usually with definite bare areas between the median group of hairs and each dorsocentral position, the dorsocentral bristles distinctly developed; frontal triangle short and broad, or if long, it is notably more slender than the above ..... 5.

4. Frontal triangle, parafrontal, and upper part of the parafacial glabrous and polished black.....**O. capensis** (Wd.) (p. 429)

The above portions of the head gray to brownish pollinose.....**O. obscurifrons** Sabr. (p. 430)

5. Frontal triangle broad, its width at the level of the cruciate interfrontal bristles three times the width of the parafrontal directly opposite, the sides of the triangle convex (fig. 11); posterior margin of the eye as seen in profile conspicuously emarginate (fig. 2) .....**O. nigra** (Wd.) (p. 428)

Frontal triangle slender, its width at the interfrontal level usually about twice the width of the parafrontal directly opposite, the sides of the triangle straight, or nearly so (fig. 12); posterior margin of the eye not emarginate (fig. 3), or at most only gently concave over its entire length ..... 6.

6. Arista entirely black; fore tarsus black; hind tibia with two or more anteroventral bristles.....**O. leucostoma** (Wd.) (p. 428)

Arista yellow basally; fore tarsal segments with whitish-yellow apices; hind tibia typically with only one anteroventral bristle, occasionally with two or three.....**O. chalcogaster** (Wd.) (p. 431)

SPECIES OF THE PACIFIC REGION NOT INCLUDED IN THE KEY

Ophyra spinigera Stein (1910, Ann. Mus. Nat. Hung. 8: 555), based on a single male from Singapore, may equal *O. nigra* as Malloch has suggested. Certainly the chaetotaxy of the legs sounds like *nigra,* but Stein's description of the thorax as almost entirely naked, and the acrostichal bristles entirely lacking, suggests the possibility that some other species was actually involved. Only a careful study of the holotype can settle this question.

Ophyra gracilis (Wiedemann) (Auss. Zweifl. Ins., 2: 432), from China, has not been identified.

It may also be noted here that *Ophyra hirtitarsis* Stein (1907, Ann. Mus. Zool. Acad. Sci. St. Petersbourg 12: 335), described from a single male from northeastern Tibet, runs to *nigra* on the basis of Stein's description, but insufficient critical details are given there to place it more definitely. Stein wrote that the orbits are silver gray pollinose, which would suggest *obscurifrons,* but his further statement that the acrostichals are strong and in two rows shows that *hirtitarsis* is something quite different.

The Status of Australophyra Malloch

Australophyra Malloch, 1923, Annals & Mag. Nat. Hist., (9), **11**: 667. Type, *Ophyra analis* Macq.

Peronia Robineau-Desvoidy, 1830, Essai sur les Myodaires, p. 517. Type, *P. rostrata* R. D.

Hardy (1939, Proc. Roy. Soc. Queensland **50**: 38) placed *Peronia* R. D. (= *Australophyra* Mall.) as a synonym of *Ophyra,* on the ground that the distinctions on which the former were based are too weak and variable for generic separation. Certainly the species closely resemble *Ophyra,* though lacking the silvery lunule commonly associated with the genus, and the relation is evident when such a species as *O. obscurifrons* is considered. I agree with Hardy in the synonymy. If *Peronia* is segregated from *Ophyra,* however, as may be done by some authors, *Australophyra* should be used in preference to *Peronia,* for the latter is preoccupied by *Peronia* Fleming (1822) in the Mollusca. This fact was not noticed by Malloch when he sank his genus as a synonym of *Peronia* (1926, Proc. Linn. N. S. Wales **51**: 554), nor by Hardy.

Ophyra rostrata (R. D.) and *O. analis* Macq., which are regarded by Hardy as separate species, are the only known species in the group.

Ophyra aenescens (Wd.)

Anthomyia aenescens Wiedemann, 1830, Auss. Zweifl. Ins., **2**: 435. (Louisiana.)

Ophyra trochanterata Malloch, 1932, Bishop Mus. Bul. **98**: 196 (Marquesas, Tahiti). New synonym.

As the only known species of the genus with yellow palpi, it is easily distinguished by that feature in both sexes. The males are also distinctive in having a dense tuft of long hairs on the ventral surface of the hind trochanter, and in completely lacking any long setaceous hairs on the hind tibia (fig. 7). The posterior margin of the eye as seen in profile is only gently emarginate (fig. 1).

It has been considered that *aenescens* occurs only in the Americas and in southern Europe. It was recorded from the Hawaiian Islands by Grimshaw (1901, Fauna Hawaiiensis, **3**, pt. 1: 30), and again by Illingworth (1923, Proc. Hawaiian Ent. Soc. **5**: 277), but Bryan has stated that it "may not occur in Hawaii" (1934, Proc. Hawaiian Ent. Soc. **8**: 425). The material that I have studied recently, however, indicates that it is found in Hawaii and in a number of the islands of the eastern Pacific.

(1) The Galapagos' *Ophyra* with yellow palpi (*Anthomyia setia* Walker) is definitely *aenescens,* as already recognized by Aldrich and Curran.

(2) Malloch's detailed description of *trochanterata* fits typical

aenescens exactly. A long series of paratypes of the former was available for direct comparison.

(3) I have seen a number of specimens of *aenescens* from the Hawaiian Islands, including eight from Mt. Tantalus, Oahu, May 19 and June 3, 1939, the latter bred from rotten meat by Mr. Tanada.

(4) In the U. S. National Museum collection are two females of *aenescens,* collected on Nauru and Ocean Islands, just west of the Gilbert Islands, in June, 1908 (F. W. Steel), and previously determined by some author as *O. nigra.* This appears to be the westernmost record of *aenescens* up to the present time.

Ophyra leucostoma (Wd.)

Anthomyia leucostoma Wiedemann, 1817, Zool. Mag. 1: 82.

This common North American and European species was recorded from Hawaii by Grimshaw (1901, op. cit., p. 30) and Howard (1901, Proc. Ent. Soc. Wash. 4: 490), but the identifications were probably incorrect.[1] If correct, the species does not appear to have become established in the islands. The strongly bowed hind tibia of the male is unique in the genus, but the females are difficult to separate from other species. The appearance of the front and frontal triangle in the female sex is similar to that of *O. nigra* (cf. fig. 11), but the deeply emarginate eye of *nigra* fortunately is so distinctly different from *leucostoma* that these two should not be confused.

In the collection before me is a male from Japan, and another from Suifu, Szechuen, China (D. C. Graham), which are typical *leucostoma.*

Ophyra nigra (Wd.)

Anthomyia nigra Wiedemann, 1830, Auss. Zweifl. Ins. 2: 432 (China).

Ophyra nigra (Wd.); Stein, 1910, Ann. Mus. Nat. Hung. 8: 555, notes on type; Malloch, 1923, Annals & Mag. Nat. Hist., (9), 11: 664-666.

It is possible that more than one species is really involved and that it should be referred to here as the "*nigra* complex." In males from China, the hind tibia has a row of 3-5 short, well-spaced bristles anteroventrally (as in fig. 9, but shorter), whereas South Pacific and Australian specimens generally have more and longer setaceous hairs on the anteroventral surface, sometimes approaching a densely bushy appearance. There are some intermediates, however, and the evidence is not conclusive. As recognized here, *Ophyra nigra* is a wide-ranging and common species represented

[1] Howard's record was based on four specimens collected in Hawaii by H. W. Henshaw. In the National Museum Collection, there are now ten specimens which were collected by Henshaw in Hawaii on various dates in 1900, and all of these are *Ophyra chalcogaster.*

in the collection by material ranging from China and Japan through many of the western Pacific Islands to Australia.

The deeply emarginate eye (fig. 2) is one of the most distinctive features, and one that will easily distinguish both sexes from *O. chalcogaster,* with which it has been frequently confused. Likewise, the short, broad frontal triangle of the female of *nigra* (fig. 11) will distinguish that sex from the other species of *Ophyra* in the Pacific, as far as known to me.

Specimens of *nigra* before me are from China (Ningyuenfu, Chihli, Szechuen), Japan, Vladivostok, Okinawa, Yap, Guam, Ponape, Bismarck Archipelago, the Solomons, the New Hebrides, Queensland (Brisbane, Cairns), and Northern Territory (Darwin).

Hardy (1939, l.c., p. 38) has identified a species from Queensland and New South Wales as *Ophyra fuscocalyptrata* (Macq.), and his species is undoubtedly what I have called *nigra* (see following discussion).

Hydrotaea fusco-calyptrata Macq.

Hydrotaea fusco-calyptrata Macquart, 1855, Dipt. Exot., suppl. **5**: 139 (Australia).

Hydrotaea fuscocalyptrata (Macq.); Stein, 1907, Ztschr. Hym. Dipt. **7**: 275. Notes on holotype.

Ophyra fuscocalyptrata (Macq.): Hardy, 1939, Proc. Roy. Soc. Queensland **50**: 38.

The status of this specific name is of interest in connection with the identity and distribution of *Ophyra nigra* (Wied.).

Hardy has referred Macquart's species to *Ophyra,* and has used the name to replace "*Ophyra nigra* of authors, at least in part," presumably for the Australian form. Macquart's original description, however, mentioned the spine on the fore femur, a characteristic of male *Hydrotaea.* The silvery lunule noted by Macquart, which has apparently influenced the reference to *Ophyra,* is indeed conspicuous in typical *Ophyra,* but it is also present in many *Hydrotaea.* Stein (1907) examined the type, and since that leading specialist in the muscid flies saw no reason to change the species from *Hydrotaea,* I believe that it should be left there.

Ophyra capensis (Wd.)

Anthomyia capensis Wiedemann, 1818, Zool. Mag. **1** (pt. 2): 46 (Cape Colony); 1830, Auss. Zweifl. Ins., **2**: 426.

Anthomyia anthrax Meigen, 1826, Syst. Beschr. **5**: 161 (Europe).

(? Synonym) *Ophyra villosa* Aldrich, 1928, Proc. U. S. Nat. Mus. **74** (Art. 1): 6 (Chile).

This species has commonly been called *anthrax,* apparently because *capensis* was considered to date from 1830. The priority of *capensis* Wiedemann (1818) has recently been recognized by several authors.

True *capensis* may not occur in the Oriental Region (cf. *obscurifrons,* new species), but for the purpose of comparison, the following description is given, based on a series of specimens from Germany:

Male: Shining bluish black or greenish black, with black palpi and white calypteres; posterior margin of the eye as viewed in profile distinctly emarginate; parafrontal and upper third to half of the parafacial glabrous and polished black, highly shining; mesonotum densely and uniformly covered with fine, erect hairs, the presutural dorsocentral and acrostichal bristles scarcely distinguishable, only slightly longer and stronger than the surrounding hairs; middle femur with one or more, typically two, short, straight, spinelike bristles on the mid-ventral surface near the base, but the hind femur with only fine hairs in the corresponding position; hind tibia with rather short and inconspicuous anterodorsal and posterodorsal bristles (one of each) about midway of the tibia, and ventrally with numerous conspicuously long, setaceous hairs, including one row of eight on the anteroventral surface and several rows on the posteroventral, all projecting nearly at right angles to the tibia and curling slightly at the ends (as in fig. 8, of *obscurifrons*).

Female: As described for the male, except as follows: front broad, the frontal triangle glabrous and polished like the parafrontal, long and ending acutely close to the lunule, the width of the triangle at the level of the cruciate interfrontal bristles obviously wider than from the triangle to an eye opposite that point; both mid and hind femora with fine hairs on the ventral surface toward the base; hind tibia with two posterodorsal bristles, and ventrally with a row of three to five anteroventral bristles, the longest of which are only slightly longer than the diameter of the tibia, but without posteroventral bristles.

Ophyra villosa Aldrich may be a synonym. The type and paratype of *villosa,* and another specimen from the type locality, all males, have been compared in detail with European material of *capensis,* and I can find no differences on which to separate them. Some might be found in the characters of the female sex, and until these are known, I do not care to state the synonymy definitely.

Ophyra obscurifrons, new species

Virtually identical with *O. capensis,* under which it had previously been determined, but distinguished as follows:

Male: parafrontal and parafacial dull or only subshining, not smooth and polished, but entirely gray to brownish pollinose, appearing under high magnification as if covered with a short, fine nap.

Female: Like the male, but the parafrontal viewed in some lights seems rather shining and must be viewed from different angles to be sure that it is entirely pollinose; frontal triangle long and broad, of approximately the same proportion as *capensis*, differing in having the entire surface covered with the same minute brownish nap as the parafrontal, and thus dull or only subshining instead of smooth and polished.

Holotype, male, Tsinan, Shantung, China, May 3, 1922 (A. P. Jacot). Type No. 58675 in the U. S. National Museum. Allotype, Ningpo, China, June 14, 1925 (J. T. Chu). Paratypes, four males, Tsinan, April 13 and 21, May 26, and June 9, 1922 (Jacot); one male, Ningpo, June 22, 1925 (H. A. Jaynes); one male, Suifu, Szechuen, China (D. C. Graham); one male, Kuanshien, Szechuen, China, June 1-14, 1930 (Graham); one male, Okinawa, June 23, 1945 (F. N. Young). Type series in the U. S. National Museum.

All other species of typical *Ophyra* known to me have the parafrontal, the upper third to half of the parafacial, and the frontal triangle in the female, glabrous and highly polished. Only the species formerly placed in *Australophyra* (= *Peronia*), which are rather atypical *Ophyra*, also have the dull, pollinose parafrontal, parafacial, and frontal triangle.

The published records of *capensis* (usually as *anthrax*) from China may actually refer to *obscurifrons*. Typical *leucostoma* has been found in China, however, and true *capensis* may also occur there in addition to the related *obscurifrons*.

Stein (1907) described *hirtitarsis* from Tibet as having "narrow silver gray dusted orbits," possibly like those of *obscurifrons*. The hind tibia of *hirtitarsis* is quite different, however, the bristles being reduced to one long outer and one shorter inner bristle, compared with the rows of long bristles or setaceous hairs in *obscurifrons*. Further, Stein stated that the acrostichals of *hirtitarsis* are rather strong, and in two rows (like those of *chalcogaster*), whereas in *obscurifrons*, as in *capensis*, the notum is thickly and uniformly covered with fine hairs, and the acrostichal bristles are scarcely distinguishable.

Ophyra chalcogaster (Wd.)

Anthomyia chalcogaster Wiedemann, 1824, Analecta Entom., p. 52; 1830, Auss. Zweifl. Ins. 2: 427 (Java).

The best single character for distinguishing this species from the others with black palpi is that the posterior margin of the eye as viewed in profile is straight or slightly convex (fig. 3), though this may sometimes cause confusion with *leucostoma*. The eye profile is certainly the quickest way to distinguish *chalcogaster* from *nigra* (cf. figs. 2 and 3), and these two are the most commonly confused species in the Pacific area.

The character most frequently mentioned in connection with *chalcogaster*, namely, that the segments of the fore tarsi are whitish apically, especially on the ventral surface, can be a very

misleading character and one which should be minimized as a means of recognition. It is true that specimens of *chalcogaster* often have strong, distinct white spots at the apices of the fore tarsal segments, which can sometimes be seen from above, though more clearly from below. There are many specimens of *chalcogaster,* however, in which these spots are less distinct, in varying degrees, and this variation has undoubtedly given rise to many misidentifications.

A number of specimens have been reared from poultry manure at the University of Hawaii Agricultural Experiment Station, Honolulu, by Yoshinori Tanada.

From the published records, the species is widely distributed throughout the Ethiopian, Oriental and Australian Regions. A large number of specimens are before me from the following:

Oriental Region: Ceylon, India (Goa, Coimbatore, Malabar), Cochin China, Penang, China (Szechuen, Nanking, Zakow, Hong Kong, Chihli), Formosa, Okinawa, Philippine Islands (Manila, Mindanao, Samar), Sumatra, Java.

Australian Region: Hawaiian Islands, Marianas (Guam, Saipan), Palaus, Ponape, Dutch New Guinea, Bismarck Archipelago, Solomons, New Hebrides, New Caledonia, Northern Territory (Darwin, Melville Island), and Queensland (Brisbane, Townsville). Most of the Australian specimens were determined as *nigra* by early authors, and redetermined as *chalcogaster* by Malloch.