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The Ceratinid Bees of the Philippine Islands

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Hymenoptera - Apoidea - Apidae - Xylocopinae - Ceratini - Ceratinae
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THE CERATINID BEES OF THE PHILIPPINE ISLANDS

By T. D. A. COCKERELL

(University of Colorado, Boulder)

ONE TEXT FIGURE

The material on which this revision is based was received through the kindness of Professor C. F. Baker.

The family Ceratinidae in the Philippine Islands includes two genera readily separated as follows:

- a*¹. Anterior wings with three submarginal cells..... *Ceratina* Latreille.
*a*². Anterior wings with two submarginal cells; never with metallic color
on body *Allodape* Lepeletier.

Genus *ALLODAPE* Lepeletier

Key to the species.

*a*¹. Females.

- b*¹. With lateral face marks..... *palavanica* Ckll.
*b*². Without lateral face marks.
*c*¹. [Clypeal mark expanded above and below, narrowed in middle
(Formosa) *sauteriella* sp. nov.]
*c*². Clypeal mark not expanded below.
*d*¹. Very small, about 5 millimeters long..... *cupulifera* Vachal.
*d*². Larger, 6 millimeters or over.
*e*¹. Clypeal stripe broader; hair of hind legs whitish.
marginata Smith.
*e*². Clypeal stripe narrower; hair of hind legs reddish.
mindanaonis Ckll.

*a*². Males.

- f*¹. Scape yellow in front..... *mindanaonis* Ckll.
*f*². Scape black.
*g*¹. Yellow clypeal mark much broader below than above.
reversa Ckll.
*g*². Yellow clypeal mark narrower below than above.
*h*¹. Very small, hardly 5 millimeters long; small lateral face marks
present *cupulifera* Vachal.
*h*². Larger; no lateral face marks..... *marginata* Smith.

The Philippine species of *Allodape* are very hard to classify, and the present treatment is obviously subject to revision. The species collected by Sauter, at Takao, Formosa, previously recorded by me¹ as *A. marginata* Smith, differs as stated above, and also has lateral face marks in the male; I accordingly call it *A. sauteriella* sp. nov.

Allodape marginata Smith.

Evidently common at Los Baños (*Baker* 315, 3657). According to Meade-Waldo, *Prosopis hewitti* Cameron, from Borneo, is a synonym. Another synonym is *Prosopis philippinensis* Ashmead, from Manila.

Allodape marginata picitarsis (Cameron).

This form, described from the Laccadive Islands, is not much over 5 millimeters long and is intermediate between *A. marginata* and *A. cupulifera*. A female from Baguio, Benguet (*Baker* 5012), agrees, so far as I can see, with a cotype of *picitarsis* in my collection. However, the form is so close to *A. marginata* that it may well represent an independent variation, unconnected genetically with true *picitarsis*.

Allodape mindanaonis Cockerell.

Typical females (*Baker* 3164), from Dapitan, Mindanao, are as large as *A. marginata* and are very closely allied to it. The variety *a*, from the same locality (*Baker* 3671), has lateral face marks, and the scape is yellow in front. Two females from Tacloban, Leyte (*Baker* 3668), are referred here, but possibly the male will show that the Leyte form is separable. They are of the smaller size, variety *a*. It appears that *A. mindanaonis* is a distinct species, the male being easily distinguished from *A. marginata*. It is possible, however, that the large and small Mindanao forms should be separated, in which case the male referred to will go with the smaller, described as var. *a*. This has the yellow of the upper part of the clypeus much more reduced than in the female of *A. marginata picitarsis*. As the variety *a* is now represented by several specimens, it may well take a name, as *Allodape mindanaonis reducta* var. nov. (type *Baker* 3163).

Allodape cupulifera bakeri var. nov.

Evidently abundant at Los Baños; also found on Mount Maquiling (*Baker* 3656, 3658). It is readily known from *A. marginata* by its smaller size. This Philippine form of *A. cupulifera*

¹ *Ann. & Mag. Nat. Hist.* (1911), VIII, 7, 231.

differs from the typical extra-Philippine insect, from the Asiatic mainland, by having the male scape entirely black. It may, therefore, take the name *A. cupulifera bakeri* var. nov.; type locality, Los Baños (Baker 3655).

Allodape palavanica sp. nov.

Female, 6.5 millimeters long; like *A. marginata*, but clypeus practically all yellow and narrow lateral face marks developed; hair of hind legs whitish as in *marginata*. Perhaps only a variety, but in view of the locality, probably a distinct species.

PALAWAN, Puerto Princesa (Baker 5009).

Allodape reversa sp. nov.

Male, 4 millimeters long, or slightly more; like *A. cupulifera*, but clypeus with the light area broadened below, covering the whole apical part; the vertical band very broad, but not expanded above; no lateral face marks; tarsi ferruginous. The scape is all black.

PALAWAN, Puerto Princesa (Baker 5011).

The accompanying female, from the same place (Baker 5010), does not materially differ from *A. cupulifera*. This may be no more than a variety of *A. cupulifera*. The whole group of *Allodape*, described above, is very compact and is uniform in the principal characters. Differences in the venation do not appear to be constant for particular species and races. In Luzon, Palawan, and Mindanao, as on the Asiatic mainland, large and small forms coexist. It is probable that each island, when well separated from the others or of any considerable size, has a race or species of its own; but if this is true, it may yet be found that the characters of these races are mainly or wholly confined (so far as external appearances go) to one sex, or are such as occur in occasional varieties in the other races. The further study of this problem should be in the hands of a resident naturalist.

Allodape jucunda Smith, which has been erroneously listed from the Philippine Islands, is a South African species.

Genus CERATINA Latreille

Three subgenera of *Ceratina* are represented in the Islands.

Key to the subgenera of *Ceratina*.

α^1 . Very bright emerald green; male abdomen with black spots.

Pithitis Klug.

α^2 . Black, with the thorax and abdomen above conspicuously marked with yellow Ceratinidia Ckll. and Porter.

α^3 . Small black species; thorax and abdomen above not marked with yellow.
Ceratina Latr.

Subgenus *Pithitis* Klug

Ceratina sexmaculata Smith.

Apparently common at Los Baños (*Baker 307, 3659*). I have it also from India and Formosa.

Subgenus *Ceratinidia* Cockerell and Porter

Key to the species.

 α^1 . Males.

- b^1 . Clypeus dark, with a very broad transverse light bar, which has a median rounded lobe above..... *tropica* Crawford.
- b^2 . Clypeus all, or nearly all, yellow.
 - c^1 . Cheeks, occiput, pleura, and legs entirely yellow.. *flavolateralis* Ckll.
 - c^2 . Cheeks dark, with a yellow stripe.
 - d^1 . Flagellum long, pale yellowish fulvous beneath, except the apex, which is broadly black..... *benguensis* Ckll.
 - d^2 . Flagellum short, dark.
 - e^1 . Scape only partly light in front; yellow border of prothorax entire..... *philippinensis* Ashm.
 - e^2 . Scape wholly light in front; yellow border of prothorax interrupted..... *compacta* Sm.

 α^2 . Females.

- f^1 . Lateral face marks divided.
 - g^1 . Lateral face marks each divided into two spots.... *tropica* Crawford.
 - g^2 . Lateral face marks divided, but the upper part elongated.
 - philippinensis humilior* Ckll.
- f^2 . Lateral face marks forming continuous bands.
 - h^1 . Marginal cell and region beyond fuliginous; pleura with a large vertical yellow band, constricted in middle..... *fuliginosa* Ckll.
 - h^2 . Marginal cell not fuliginous; pleura without a vertical band.
 - i^1 . Pleura with a yellow spot behind the tubercles.
 - philippinensis* Ashm.
 - i^2 . Pleura entirely black..... *philippinensis nigrolateralis* Ckll.

Ceratina philippinensis Ashmead.

The records of *C. hieroglyphica* Smith from the Philippines doubtless refer to this species, which is very closely allied. *Ceratina philippinensis* appears to be common at Los Baños (*Baker 5*); but it also occurs at Baguio, Benguet (*Baker 4996*); Butuan, Butuan, Mindanao (*Baker 3653*); Cagayan, Mindanao (*Baker 3654*); and on the Cuernos Mountains, Negros (*Baker 3131*). *Ceratina compacta* Smith was described from a supposed female from the Philippine Islands, but the description agrees almost exactly with the male of *C. philippinensis*. The only apparent differences are indicated in the preceding key to the species. *Ceratina compacta* was doubtless a male, and it is very probable that it is specifically identical with *philippinensis*, in which case it has priority.

Ceratina philippinensis nigrolateralis subsp. nov.

Female.—Rather small; length, 5 to 6.5 millimeters; yellow markings smaller than in *C. philippinensis*, no yellow spot on pleura behind tubercles. The two specimens received are possibly of different species, but probably indicate varieties only; they differ thus:

(a) *nigrolateralis*, type. Length, 6.5 millimeters; lateral face marks continuous; mesothorax with four short linear marks; second submarginal cell broad; first abdominal segment black with three rather small yellow marks (*Baker 3837*).

(b) *humilior* var. nov. Length, 5 millimeters; lateral face marks divided in middle, but upper division elongated (broad median clypeal band as in *philippinensis*); mesothorax entirely black; second submarginal cell very narrow; first abdominal segment yellow with a black mark on each side (*Baker 3836*).

PALAWAN, Puerto Princesa.

This species is close to *C. morawitzii* Sickmann, from Formosa, agreeing in the sculpture of the mesothorax. It differs from *morawitzii* by having, in the typical *nigrolateralis* form, only the fifth abdominal band entire, and in the *humilior* form the segments beyond the third without bands. I find, however, that *morawitzii* varies in the abdominal banding, so that, apart from geographical considerations, I would be inclined to call the Palawan insects varieties of *morawitzii* rather than of *philippinensis*. If the *philippinensis* type of *Ceratina* is derived from *morawitzii* and reached the Islands via the Malay Archipelago and Borneo, it is not surprising to find an intermediate form on Palawan. By the sculpture of the mesothorax, typical *philippinensis* is to be associated with *C. morawitzii* and not with *C. hieroglyphica*.

In this whole series we have to do with variable characters which here and there reach conditions of relative stability, permitting us to separate local races or species; but it may be that large series will show that the ranges of variation overlap or that the normal characters of one form are represented by occasional varieties of another. An easy way out of the difficulty would be to call all these insects by one name and simply remark that the species is variable; but this would obscure the very facts which we are most anxious to investigate. An intensive study of such a series may show that in the formation of allied races or species there has been no modification of the determiners or genes whatsoever, but that they have simply been sorted out in various combinations for heterozygous forms. Thus, supposing that *nigrolateralis* and *humilior*, described above, are

merely "individual varieties" of the same Palawan stock, it would be possible for a breeder in the course of time to sort them out and colonize each one on a separate island, producing what would then be regarded, by all ordinary rules, as two perfectly distinct species. On the other hand, we do not know without further inquiry that these forms have not already been ecologically isolated in some way, or are mutually infertile and now specifically distinct. The local collector, obtaining good series, especially of the males, may be able to decide.

The type of *C. morawitzii* came from China.

Ceratina fuliginosa sp. nov.

Female.—Length, about 9 millimeters; black, marked with yellow in the same manner as *C. philippinensis*, but the greater part of labrum and mandibles yellow; frontal spots little diverging; yellow of upper border of prothorax separated from that of tubercles; mesopleura anteriorly with a very broad, vertical yellow band, constricted in middle; posterior face of metathorax all yellow except triangular basal inclosure; middle and hind tibiae and tarsi without yellow; yellow band on second abdominal segment broad and continuous, of equal width throughout; a narrow apical band on fourth segment, but that on second is basal, as well as that on third. Wings dusky, the marginal cell and beyond strongly fuliginous; scape with the lower half yellow in front; underside of abdomen largely pale; coxae, especially the hind ones, marked with yellow; on underside of thorax yellow bands start from middle coxae and extend forward, converging to the middle line. Mesothorax densely punctured anteriorly.

PALAWAN, Puerto Princesa (*Baker 3838*).

A very distinct species, somewhat related to *C. ridleyi* Ckll., from Singapore, but easily known by the partly fuliginous wings and other characters.

Ceratina tropica Crawford.

Apparently widespread; specimens come from Los Baños, Luzon (*Baker 4*), and Dapitan, Mindanao (*Baker 3130, 3132*). The type locality is Manila.²

Ceratina flavolateralis sp. nov. Fig. 1a.

Male.—Length, about 8 millimeters; shining, bright chrome yellow, with the following parts black: Vertex, middle of front, upper part of supraclypeal area (the supraclypeal mark is very broadly triangular), mesothorax (except a broad yellow band

² See *Proc. U. S. Nat. Mus.* (1911), 38, 119; (1911), 39, 636.

on each side and two stripes on disk), area of metathorax (which is longitudinally impressed in middle), six very broad, entire bands on abdomen (the last with a yellowish patch in middle), and apical segment

(which is strongly bilobed, the lobes rounded and margined with ferruginous). Scape yellow; flagellum broken in type, but dark at base, reddish beneath; lateral face marks ending above, at level of lower ocellus, away from orbital margin; tegulae amber-colored; wings rather dusky; stigma dull ferruginous; second submarginal cell very broad below, narrowed nearly to a point above; a strong keel between antennae.

LUZON, Laguna, Los Baños (*Baker 547*).

This is the species reported from the Philippine Islands as *C. beata* Cameron. It is larger than true *beata* of Ceylon, Burma, and Tenasserim and is, I think, certainly distinct. Unfortunately descriptions of *beata* refer only to the female. *Ceratina kosemponis* Strand, from Formosa, is also allied, agreeing in many details of coloration, but with the end of the abdomen different.

Ceratina benguetensis sp. nov. Fig. 1b.

Male.—Length, about 7.5 millimeters; rather slender; black, with the following parts yellow: Mandibles, labrum, face (which is narrow) up to level of antennae (except upper margin and corners of supraclypeal area), lateral face marks extending nearly halfway up sides of front, scape, narrow, obscure line along posterior orbits, lateral margins of the very smooth and shining mesothorax, prothorax (except a large patch on each side in front of tubercles), very large irregularly triangular patch on mesopleura, scutellum, triangular mark on axillae, postscutellum, most of sides of metathorax (uniting posteriorly), triangular area (crossed by a black bar) beneath hind wings, middle of mesosternum (broadening behind), anterior legs (except reddish small joints of tarsi), middle trochanter (except black patch above), femur (except basal spot) and tibia, hind coxae and trochanters in part, and three broad bands on abdomen, the third at base of third segment, the first (really base of first segment) united by a median yellow line with second. Flagellum long and slender, black above, pale fulvous beneath except the last two joints, which are an intense black, the last joint somewhat enlarged; tegulae testaceous; wings very long,

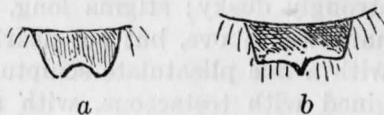


FIG. 1. a, *Ceratina flavolateralis* Ckll., end of male abdomen; b, *Ceratina benguetensis* Ckll., end of male abdomen.

strongly dusky; stigma long, piceous; second submarginal cell narrowed above, but not nearly to a point; area of metathorax with a fine plicatulate sculpture; apex of abdomen broad, margined with testaceous, with a strong median tooth and with salient lateral angles; dorsal abdominal segments 4 to 6 with coarse black hair.

LUZON, Baguio, Benguet (*Baker 4997*).

A distinct and remarkable species, allied by the structure of the abdomen to *C. lepida* Smith (India and Assam) and to *C. ridleyi* Cockerell (Singapore).

Subgenus *Ceratina* Latreille

Ceratina dentipes Friese.

LUZON, Laguna, Los Baños (*Baker 314*).

This species was originally described from Buitenzorg, Java; it is allied to Palearctic species.

ILLUSTRATION

TEXT FIGURE

FIG. 1. *a*, *Ceratina flavolateralis* sp. nov., end of male abdomen; *b*, *Ceratina benguetensis* sp. nov., end of male abdomen.

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