

ON SOME CONOPIDAE FROM THE EAST INDIES (DIPTERA)

by

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This report is based mainly on a collection received from the Natural History Museum of Basle, Switzerland through the courtesy of Dr. FRED KEISER. This material was accumulated by Dr. M. A. LIEFTINCK while director of the Zoological Museum, Bogor, Java, until 1953.

Since the Conopid fauna of this area is relatively little known, most of the records are of great interest; and a few additional records from other collections are included. These were made available through the courtesy of C. S. SABROSKY (U. S. National Museum), E. S. ROSS and C. D. MACNIELL (California Academy of Sciences), and H. OLDROYD and R. L. COE (British Museum). The latter kindly supplied information on the type of *Conops metaxantha* WALKER in the British Museum.

Conops nubeculosus BIGOT

Conops nubeculosus BIGOT, 1887, Ann. Ent. Soc. France, (6), 7: 36.

West Java: Bandung, 700-750 m, Mar. 2, 1940, June 12-15, 1941, Aug. 1-3, 1941, Dec. 15, 1939, J. OLTHOF, 2 ♂, 2 ♀.

The males are darker than the females, and one of them completely lacks the rufous of the abdomen, except for a trace on the sixth segment near the genitalia. Such specimens would still key to the *nubeculosus*-group because of the red antenna. This same very dark male also has the dark dorsal thoracic stripes united, and keys nearest to *C. rufifrons* DOL and *C. bakeri* KRB. From these species it differs in the color of the abdomen, having the third and fourth tergites mostly black, and the second, fifth and sixth mostly yellow pollinose.

This species has previously been recorded from Ceylon, India, Formosa, Philippines, Malaya, and Australia.

Conops aureofuscus, sp. nov.

Holotype ♂: Off N. W. New Guinea: Numfoor Id., Feb. 1945, H. BLAKEMORE (California Academy of Sciences, San Francisco). There is a slight possibility that this specimen may have come from an adjacent area.

Vertex and front dark reddish brown with opaque black lateral margin. Upper front transversely grooved. Round velvety brown spot near eye on front at facial junction, indistinct in some views. Face and cheeks yellow, gold pollinose except for antennal prominence. Lower keel and adjacent grooves black. Orbits and a wide postvertical stripe gold pollinose. Occiput dark brownish above, rufous below. Antennae rufous. First segment four times as long as wide. Second segment two times length of first. Third segment as long as first. Arista rufous, black at apex, no definite process on second segment. Proboscis dark brown, yellow on distal half, one and one-half times length of head.

Thorax black. Humeri, and apparently the scutellum, dark reddish brown. Thorax with considerable gold pollen especially on scutellum, postnotum, and metapleura. Broad gold pollinose pleural stripe. Legs rufous with considerable gold pollinose areas. Anterior and middle tarsi, and tips of claws black. Pulvilli and claws, except tips, yellow. Wings with yellowish brown pattern, darker at apex. Pattern darkest from costa to third vein and vena spuria. Calypters yellow, halteres rufous.

Abdomen black, gold pollinose on nearly all of first, fifth, and sixth segments. Second and third segments broadly gold pollinose laterally and distally, and on narrow dorsal margin. Fourth segment with narrow gold pollinose distal margin dorsally. In some views, the entire abdomen is covered with gold pollen.

Size: 14 mm (without antenna).

This species should probably be placed in the *nubeculosus*-group because of the rufous antennae, although the abdomen is black. *Conops rufomaculatus* KRÖBER, besides having the frontal spot reddish yellow, has black antennae. The dark form of *nubeculosus* described above, differs by the characteristic lack of pollen on the sides of the third and fourth abdominal segments, rufous front, and no black mark at the base of the facial keel.

***Conops demeijerei* KRÖBER**

Conops seminiger var. *de Meijerei* KRÖBER, 1939, Ann. Mag. Nat. Hist. (11) 4: 599.

E. New Guinea: K. B. Mission, Milne Bay, Mar. 19, 1944, K. V. KROMBEIN (USNM), 1 ♀.

This specimen has some black on the dorsum of the third and fourth tergites but otherwise agrees with KRÖBER's description. This form certainly seems worth recognizing as a species distinct from *seminiger*.

***Conops metaxanthus* WALKER**

Conops metaxantha WALKER, 1864, Proc. Linn. Soc. 7: 225.

Central N. New Guinea: Araucaria Camp, 800 m, Mar. 18, 1939, L. J. TOXOPEUS, at light, 1 ♀ (3rd Archbold Expedition). In the Leiden Museum.

This specimen agrees with the male from Cycloop Mts., N. New Guinea described by KRÖBER (1939, Ann. Mag. Nat. Hist. (11) 4: 598) and kindly loaned for comparison. R. L. COE informs me that the type is a female, with the black serrate area of the theca nearly two and one-half times as long as wide. This agrees with the present specimen in which the black serrate area is about two times as long as wide.

KRÖBER (loc. cit., 5: 230) described a female from Benkulen, Sumatra as "type". Apparently he was designating this as the allotype female, since *Conops metaxanthus* was described as a male. This specimen was also made available to me, and I am referring it to *Conops keiseri* (see below).

***Conops keiseri* CAMRAS**

Conops keiseri CAMRAS, 1957, Verh. Naturf. Ges. Basel, 68: 69.

East Java: Bajukidul Estate, Mt. Raung, 500 m, Nov. 1931, H. LUCHT, 1 ♀. West Sumatra: Benkulen, 1'-50', May 1953 (marked Type, *Conops metaxantha*) (British Museum), 1 ♀.

There are some differences between the two specimens, and from the type, which is a male from Ceylon. More material may show these to be additional species although they are probably geographical races. These specimens have a large robust theca, that is not as long and slender as that of *metaxanthus*, *demeijerei*, and *rufofemoralis*. The black serrate area on the theca is about one and one-half times as long as wide.

The specimen referred by KRÖBER to *Conops gigas* (1930, Zool. Anzeiger, 89: 72), may belong to this species.

***Conops bellatus*, sp. nov.**

Holotype ♂: W. Sumatra: Benkulen, 1'-50', May 1935, purchased from E. LEMOULT (British Museum).

Vertex and front black, slightly reddish on sides of vertical triangle. Opaque velvety black mark at junction of front and face. Face and cheeks yellow, gold pollinose except for antennal prominence. Lower facial keel and adjacent part of grooves, black. Occiput black. Post-orbitals yellowish white pollinose, extending across back of vertex. Antennae

nissing. Proboscis black, two times length of head. Thorax dull black, yellowish white pollinose on the dorsum, medial and posterior to the humeri, at the transverse suture, and anterior to the scutellum. Also yellowish white pollinose on postnotum, metapleura and pleural stripe. Legs black, rufous on coxae, trochanters, distal ventral third of anterior and middle femora, all except dorsal apex of posterior femur, and hind first tarsus. Pulvilli, and claws except black tips, yellow.

Wings with dark pattern from costa to third vein and vena spuria. Dark pattern yellowish on basal half and darkest apically between second and third veins. Halteres rufous, partly black on club and base.

Abdomen dull black, somewhat reddish on ventral margins of third to fifth segments. Gold pollinose on distal half and sides of first segment, distal one-third and sides of second segment, and indistinct narrow margins of third, fourth and fifth segments. Sixth segment somewhat pointed at apex, yellow pollinose on distal two-thirds.

Size: 12 mm (without antenna).

This specimen was identified by KRÖBER as *Conops metaxanthus* WALKER, but differs from this species as indicated in the key. While I dislike naming individual specimens in such a difficult group, there is no other species in which it could possibly be placed.

***Conops lieftincki*, sp. nov.**

Holotype ♂: West Java: Mt. Pangrango, Tjisarua S., 1000 m, October 2, 1941, M. A. LIEFTINCK (Leiden Museum).

Head yellow. Front with small area of transverse grooves in midline. Narrow reddish midline on front dividing above antennal prominence. Black on upper half of antennal prominence and at base of keel and adjacent grooves. Velvety black spot on side of front at facial junction. Face except antennal prominence, cheeks, orbitals, lower occiput, and transverse post-occipital stripe gold pollinose. Upper occiput grayish yellow. Antenna black. First segment about four times as long as wide. Second segment nearly two times as long as first. Third segment slightly longer than first. Arista black, elongated. Process on second segment minimal. Proboscis black, reddish at base and labella, one and one-half times length of head.

Thorax black, mostly gold pollinose. Four dark stripes on dorsum, the lateral ones interrupted by the transverse suture. Humeri and band toward neck rufous. Gold pollinose pleural stripe very broad and distinct. Coxae, femora and tibiae rufous, and gold pollinose; blackish partly on coxae, base of femora, and apex of tibiae. Tarsi black except for rufous

apical segment. Claws except black tips, and pulvilli yellow. Wings with yellow band between costa and fourth vein. Dark brown to blackish in first posterior cell and apical half of submarginal cell. Calypters yellow. Halteres rufous, partly gold pollinose especially on the stem.

Abdomen black, distal third to half of each segment gold pollinose. Sixth segment nearly entirely gold pollinose. A dorsal midline is present, that appears black, or gold pollinose, or disappears, depending on the view.

Length: 14 mm (without antenna).

Paratype ♂: West Java: Mt. Pangrango, Tjisarua S., 1000 m, Sep. 3, 1939, M. A. LIEKTINCK.

Similar to holotype but larger and more brightly colored. Front orange yellow. Ground color of upper occiput rufous. Length 18 mm. (Not selected as holotype because the head and one wing were accidentally knocked off during handling.)

This beautiful gold pollinose and yellow winged species is very distinct.

Key to the *Conops metaxanthus*-group

This key is presented to replace KRÖBER's keys to the *morosus*-group (1940, Ann. Mag. Nat. Hist. (11) 5: 210). *Conops morosus* DE MEIJ. has been removed to *Archiconops* (see below).

This group may be characterized as follows. The antennae and abdomen are entirely or practically entirely black. The abdomen has some pollen forming a more or less distinct pattern. The frontal spots are velvety black. Only the very dark specimens of *pactyas* (var. *malayensis*) fall into this group.

All of the species that I have seen (and also the other species of *Conops* in this paper) have the transverse grooves on the front, and therefore belong to the subgenus *Asiconops* CHEN (1939, Notes d'Ent. Chinoise, 6: 170). I have not seen *niponensis*, *philippinensis*, *frontosus*, or *pseudogigas*.

1. Abdomen metallic blue (Japan, ♀) *niponensis* VOLL.
- Abdomen without metallic blue sheen 2.
2. Head entirely yellow 3.
- Front and vertex always darker 4.
3. Wing dark brown, strongly iridescent
- (Philippines, ♂, ♀) *philippinensis* KRB.
- Wing yellow, dark apically (Java, ♂) *lieftincki*, n. sp.

- Front and vertex rufous to dark brown 5.
- Front and vertex black 6.
- Sides of third abdominal segment usually not pollinose. Femora mainly reddish brown (Burma to Java) *pactyas* WALK.
- Sides of third abdominal segment pollinose. Femora mainly black. (Sikkim, ♂) *frontosus* KRB.
- Large species, 18 mm. Proboscis short, length of head. Apex of scutellum yellow brown. No pleural stripe (Burma, ♂) *pseudogigas* KRB.
- Smaller species. Not as above 7.
- Anterior and middle femora mainly reddish 8.
- Anterior and middle femora mainly black 9.
- Femora brownish or dark rufous. Black of abdomen dull and opaque. Female theca short (Burma to Java) *pactyas* WALK.
- Femora bright rufous. Black of abdomen shiny. Female theca very long (Flores, ♂, ♀) *rufofemoralis* CAM.
- Abdomen with gold or yellow pollen, especially at apex or base 10.
- Abdomen with fine white pollen, more diffuse 11.
- Second abdominal segment mainly pollinose especially on sides
Posterior femur mainly rufous (Sumatra, ♂) *bellatus*, n. sp.
- Second abdominal segment with relatively little pollen. Posterior femur black (New Guinea, Waigeu Id.) *metaxanthus* WALK.
- Black of abdomen more velvety and opaque. Hind femur mainly rufous (Sumatra, ♀) *keiseri* var.
- Black of abdomen more shining. Hind femur mainly black 12.
- Posterior tibia mainly black. (Ceylon, ♂) *keiseri* CAM.
- Posterior tibia mainly reddish. (Java, ♀) *keiseri* var.

Conops pactyas WALKER

Conops pactyas WALKER, 1852, Dipt. Saund., 4: 255.

Conops pactyas var. *malayensis* KRÖBER, 1940, Ann. Mag. Nat. Hist., (11) 5: 232.

West Java: Djampang Tengah, G. Tjisuru, 6-800 m, Jan. to Mar. 1933
I. E. WALSH, 1 ♂, 5 ♀: Tjikadjang (Priangan), Bandjarwangi Est., -900 m, Apr. 7-10, 1939, M. A. LIEFTINCK, 1 ♂; near Bogor, Mt. Pantjar, 00 m, Jan. 3, 1936, F. DUPONT, 1 ♂.

East Java: Mt. Raung, Bajukidul Estate, 450-700 m, Dec. 1930, Oct. 1931, H. LUCHT, 1 ♂, 1 ♀.

East Borneo: Balikpapan, Wain River, 50 m, Nov. 1950, A. M. R. VEGNER, 1 ♀.

This series shows considerable variation, and it is possible that more than one species is represented. However, the intergradation is complete. The more rufous specimens have the abdominal bands more distinct; and usually the males are darker. The front varies independently, from nearly black to rufous; the latter specimens having a black margin near the tip especially dorsally. The occiput varies from black to rufous, but the upper half is always yellow. The gold pollinose post-vertical band is usually complete. The posterior femur may be entirely rufous or brownish; may be dark basally or apically, distinctly or indistinctly separated from the light area.

The chief characters of the species are the following. The wing pattern is darker apically, somewhat yellowish basally. The first, distal part of second, and apical abdominal segments are predominantly pollinose. The legs are mainly reddish. The theca is not much longer than wide, and the black serrate area is shorter than wide.

This species was previously known from Burma, Malaya, and Java.

***Conops diffusipennis*, sp. nov.**

Holotype ♂: North Celebes: Minahasa, Modinding, 1000 m, June 27, 1941, F. DUPONT (Leiden Museum).

Front brown, transversely grooved above. Velvety longitudinal mark between vertex and upper front, and eye. Round, velvety black spot near eye on front at facial junction. Indistinct blackish midline on front joining black on upper antennal prominence. Face and cheeks yellow, bright yellow pollinose except for antennal prominence. Black on lower facial lobe and adjacent grooves. Occiput yellow, brownish on upper half, except vertex. Orbitals and lower occiput, gold pollinose. Small, shining triangle on posterior margin of eye. Antennae brown, blackish dorsally, rufous ventrally on third segment. First segment four times as long as wide. Second segment nearly two times as long as first. Third segment slightly longer than first. Arista three segmented, dark brown. Apical segment, rufous on basal half, black on distal half. Proboscis blackish, reddish at base and labella. Distal two-thirds yellow on ventral half.

Thorax black, diffusely bright yellow pollinose. Indistinct dark stripes on thorax. Humeri and stripe toward neck, rufous. Gold pollinose pleural stripe, broad and distinct. Coxae, femora, and tibiae rufous and gold pollinose. Indistinct blackish areas on coxae, apex of femora dorsally, and apex of tibiae ventrally. Tarsi black, except for rufous apical segment. Claws, except black tips, and pulvilli, yellow. Wings hyaline, with in-

indistinct band between costa, and third vein and vena spuria. Indistinctly yellowish between costa and anterior half of sub-marginal cell. Indistinctly brownish in remainder of sub-marginal cell and first posterior cell. Veins dark brown. Calypters dark yellow. Halteres dark yellow, partly reddish on clubs and base of stem.

Abdomen black, indistinctly yellow pollinose on distal margins of each segment. Sixth segment diffusely gold pollinose and reddish at apex. Sides of abdomen partly reddish, and faintly yellow pollinose extending dorsally on posterior margin. These reddish areas are largest on the second and third segments. Genitalia mostly reddish.

Size: 15 mm (without antennae).

Paratype ♂: same data. Similar to the holotype. Abdomen somewhat grease stained.

Size: 15 mm.

This species belongs to the *pactyas*-group and keys to couplet 3 (KRÖBER, 1940, Ann. Mag. Nat. Hist., (11) 5: 212) where it differs by having the occiput yellowish-black above, and yellow below. However, this character is more variable than the key would suggest, and the same coloration occurs in *pactyas*. This species is immediately distinguishable from *pactyas* by the color of the wing.

Archiconops morosus de MEIJERE

Conops morosus DE MEIJERE, 1924, Tijdschr. v. Ent. 76: 213.

West Java: Palabuan Ratu, Tjipanas, Sept. 10, 1939, M. A. LIEFTINCK, 1 ♀.

South Java: Penandjung Bay, July 1936, M. A. LIEFTINCK, 3 ♂.

One of the males has the basal half of the wing irregularly yellowish. The lower front and upper face is reddish, and the lower face and cheek is black. This specimen is somewhat teneral. The other two males have the lower part of the front, and the entire face and cheeks black. The female has the lower front and upper face black, but the lower half of the face and cheeks are reddish.

This species is obviously a geographical representative of *Archiconops erythrocephalus*. Specimens of the latter from Ceylon have the dark head, but the anterior and usually the middle femora are reddish. Specimens from China and Siam (U. S. Nat. Mus.) have the yellow head, but black legs. Only the Java form (*morosus*) lacks the strongly iridescent wings.

Physoconops microvalvus KRÖBER

Physoconops microvalvus KRÖBER, 1930, Zool. Anzeiger, 89: 71.

West Java: Djampang Tengah, G. Tjisuru, 6-800 m, Jan., Mar., Nov., 1933, M. E. WALSH, 3 ♂, 2 ♀; Djampang Kulon, G. Guha, 5-600 m, Dec. 1939, M. E. WALSH, 1 ♂; Djampang, Tjiajunan, 1000 m, Dec. 26, 1940, Mar. 9, 1941, M. A. LIEFTINCK, 2 ♂, 2 ♀; Mt. Pangrango, Tjisarua S., 1200 m, Feb. 12, 1939, M. A. LIEFTINCK, 1 ♀; Mt. Tangkuban Prah, 15-1600 m, Oct. 5, 1941, J. OLTHOF, 1 ♂.

The front is nearly entirely black in one specimen, and in another the vertex is predominantly black. The humeri are usually black, but may be dark reddish. The scutellum is usually yellow, but may be entirely black. The series appears rather uniform in size, but the extremes vary from 12½ mm (♂) to 17½ mm (♀).

Physocephala gigas (MACQUART)

Conops gigas MACQUART, 1843, Dipt. Exot., 2, pt. 3: 10.

West Java: Djampang Tengah, G. Tjisuru, 6-800 m, Jan., Sept. 1933, M. E. WALSH, 1 ♂, 1 ♀; Djampang, G. Sesuru, 6-700 m, Mar. 1937, M. E. WALSH, 1 ♀; Djasinga, 150 m, Apr. 19, 1935, M. A. LIEFTINCK, 1 ♂; Mt. Pangrango, Tjisarua S., 1000 m, June 13, 1948, M. A. LIEFTINCK, 1 ♂.

There is considerable variation in the amount of purple iridescence of the wings. The cheeks may or may not have gold pollen. The size varies from 18 mm (♂) to 25 mm (♀).

Physocephala fumosa, sp. nov.

Holotype ♂: South Moluccas: Ambon, Oct. 1949, M. A. LIEFTINCK (Natural History Museum, Basle, Switzerland).

Vertex dark yellow. Front with a large dark area semi "T"-shaped, extending in a line half way down the face. Remainder of face, front, and cheeks yellow. Facial grooves and keel yellow, a black mark in lower half of each groove. Occiput black, with narrow white posterior orbital. Antennae yellow, becoming blackish on apex of second segment. Third segment dark reddish, blackish apically. Arista black. First antennal segment four times as long as wide. Second segment two times as long as first. Third segment as long as first. Process of proximal arista segment as long as apical segment. Proboscis dark blackish dorsally, reddish yellow ventrally; two times as long as head. Thorax blackish dorsally with faint brownish pollen. Humeri, sides of dorsum, and most of scutellum rufous. A white pollinose mark at medial junction of humerus and dorsum.

leura reddish, darker below and on postnotum. Indistinct white pollinose leural stripe. Legs dark reddish yellow, partly black on coxae. A broad dark band on the hind femur and on apical half of posterior tibia. Sides of tarsi and apical third of claws black. Remainder of claws and pulvilli yellow.

Wings with dark pattern from costa to fifth vein. Apical two-thirds of discal cell hyaline. Middle of first posterior cell paler. Anterior cross-vein very short. Halteres yellow, except black base of stem.

Abdomen black, dark reddish on distal half and sides of first segment, second segment, basal third and distal margin of third segment, distal margin of fourth segment, and sides of fifth and sixth segments. Genitalia blackish.

Size: 10 mm (without antenna).

This species keys to couplet 6 in KRÖBER's key (1940, *Ann. Mag. Nat. Hist.* (11) 5: 215), and differs from the alternatives by having the reddish brown scutellum and black postnotum. If the color of the scutellum is considered variable, this species keys to *P. bipartita*; but I consider *bipartita* to be a species with the first basal cell hyaline.

***Physophala bipartita* (DOLESCHALL).**

Conops bipartita (DOLESCHALL), 1858-9, *Nat. Tijdschr. Ned. Ind.* 17: 100.

West Java: Bandung, 700 m, Jan., June, Oct., Nov., 1940-1, J. OLTHOF, 11 ♂, 3 ♀; Mt. Pantjar, 500 m, Oct. 1936, F. DUPONT, 1 ♂; Depok, 100-250 m, May 19, 1939, M. A. LIEFTINCK, 1 ♂; Bogor, Sept. 29, 1929, M. A. LIEFTINCK, 1 ♂; Bogor, Tjiburial, Apr. 3, 1932, M. A. LIEFTINCK, 1 ♂; Bogor, Jan. 29, 1933, M. A. LIEFTINCK, 1 ♀ (on flowers of *Antigonon leptopus*); Bogor, Hambalang Est., 600 m, Oct. 3, 1942, M. A. LIEFTINCK, 1 ♀.

N. Celebes: Tondano, May 30, 1940, R. G. WIND (*Calif. Ac. Sci.*). 1 ♂.

This series is rather uniform in the darkness of the costal and subcostal cells. The black in the first posterior cell may extend behind the vena spuria. The posterior femur may be entirely reddish, but with some black on the medial surface.

I am identifying this species with KRÖBER's keys and descriptions in his 1915 work (*Arch. f. Naturgesch.* 81A, pt. 4). In 1939 (*Ann. Mag. Nat. Hist.*, (11) 5: 214-7), he places *bipartita* in his keys as a species with the first basal cell entirely dark, but I do not believe that this is correct.

This species was previously known from Philippines, Sumatra, Java, and Moluccas.

***Physocephala limbipennis* de MEIJERE**

Physocephala limbipennis DE MEIJERE, 1910, Tijdschr. v. Ent. 53: 165.

West Java: Bandung, 700 m, Jan., Feb., Sept., Oct., 1940-1, J. OLTHOF, ♂, 2 ♀; Tjikadjang (Priangan), Bandjarwangi Est., 8-900 m, Apr. 7-10, 1939 M. A. LIEFTINCK, 3 ♂; Depok, 100-250 m, May 19, 1939, M. A. LIEFTINCK, 1 ♀; Palabuan Ratu, Tjipanas, Sept. 10, 1939, M. A. LIEFTINCK, ♀; Bogor, Tjiburial, 250 m, Apr. 19, 1935, J. VAN DER VECHT, 1 ♂; Bogor, pr. 21, 1919, W. M. DOCTERS VAN LEEUWEN, 1 ♀; Priangan, 400 m, Sept. 7, 1937, Miramare Est., F. C. DRESCHER, 2 ♂.

This series shows considerable variation in the amount of dark color between the fourth and sixth veins. In some, this area is quite hyaline; in others, the basal cells and base of the discal cell are light brownish (much paler than the dark wing pattern); and in others there are dark margins anterior to the fifth and sixth veins, and the basal half of the first basal cell and all of the second basal cell light brownish. The costal and subcostal cells are dark, but frequently paler than the main dark pattern. The posterior femur may be reddish externally with some black medially; or it may be broadly black.

The wing variations suggest that this form, *calopa*, and *tenella* may have to be united.

This species is known from Ceylon, India, Formosa, Philippines, Malaya, Java, and Bali.
