

NOTES ON PHILIPPINE MOSQUITOES, XII. TOPOMYIA¹

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THE first *Topomyia* reported from the Philippines was that described and named *Kingia gregoryi* by Miss Ludlow in 1911. The specimen was a female, caught by Capt. J. C. Gregory, M. C., U. S. Army, in Ludlow Barracks, Parang, Cotabato, Mindanao island. Because the male is unknown, Edwards (1922, p. 422; and 1932, p. 91) tentatively sunk it as a synonym of *Topomyia argyropalpis* Leicester, 1908. Dyar and Shannon (1925, p. 70) agree with Edwards' opinion. The silvery-scaled apical portion (about $\frac{2}{3}$ or so) of the palpi sharply differentiates *argyropalpis* (or *gregoryi*) from other known species of *Topomyia*.

In a recent collecting expedition (April and May, 1946) to different places in Mindanao (including Parang) by the Entomology Department, 19th Medical General Laboratory, U. S.

¹This study was performed in the Entomology Department of the 19th Medical General Laboratory, U. S. Army, and the specimens used were mostly those of the same entity. As expressed in previous parts of these notes, the author is very grateful to Col. D. M. Kuhns, Commanding Officer of the 19th MGL; to Capt. H. Hoogstraal, formerly chief of the Entomology Department; and to Lt. S. Edgar, present head of the Department. Thanks are also due to T/Sgt. Joseph Enke who collected a number of new species in Luzon and Mindanao, and under whose supervision the success of the collecting party was largely due; and to Messrs. P. Feliciano, F. Gutierrez, and A. Corcega of the same Department who performed the rearing and mounting of specimens. A good deal of the detailed examinations of specimens were performed by the able technician, Mrs. A. U. Pagayon, of the Malaria Section, Bureau of Health; while the male terminalia mounts were skillfully done by Mr. F. V. Dantis, also of the Malaria Section. All the drawings were executed by Mr. E. Enriquez, artist of the Malaria Section. These studies were undertaken with the permission and encouragement of the Director, Bureau of Health, and the Chief of the Malaria Section, Dr. A. Ejercito, of the same Bureau.

Army, no *argyropalpis* was found.¹ Instead, two new species were collected. What seems to be a third new species was found in Luzon and Palawan by other U. S. Army personnel not directly connected with the 19th MGL. The larva and pupa of this third species are not known, and its adult is inseparable by external characters from one of the two new species from Mindanao. Even the male terminalia shows but slight differences from that of the Mindanao form, but the differences seem of a sufficient order to regard this mosquito as a distinct species. Judging from the known larvæ and pupæ of other *Topomyia*, it appears probable that marked differences between these two species are to be found in the larvæ and pupæ. In both species the male bears some external characters different from those of the respective female.

The dorso-central and pre-scutellar bristles in the species described here, are evidently unstable. Some individuals of both sexes possess these bristles in fairly good numbers (about 8 pairs), others have but few (2 or 3 pairs), while still others do not seem to have any as no trace of their sockets, if they were merely detached, could be detected.

TOPOMYIA IMITATUS n. sp.

Adult (male) bears the usual peculiarities of the genus, viz.: rather slender, long-legged, dark mosquito, with silvery line at middle of scutum, silvery and pale-golden patches on head and pleuræ. Differs from the two other species described below in having the undersides of the femora not pure white, and that on the hind leg does not extend through the tibia to the last tarsal segment; *ppn* with patch of pale-golden scales; outstanding scales toward base of wing vein 2 pointed; and the male terminalia markedly different.

Broad flat scales cover the head; dark, with a compact patch of silvery scales on anterior portion of vertex; pale-golden patch low down on either side; no pale line bordering the eyes. A pair of closely set occipital bristles. Torus pale-brown, bare; antenna dark, the last two segments about the same in length

¹ While this was in the press, Capt. H. Hoogstraal sent a male and a female he caught in Davao, Mindanao, which appear to be *argyropalpis* or *gregoryi*. In two details, however, the male terminalia differs from that of *argyropalpis* as illustrated by Edwards (1922, Plate VIII, Fig. 8), so that this has to be compared first with the terminalia mount of *argyropalpis* in the London Museum before a final opinion can be given.

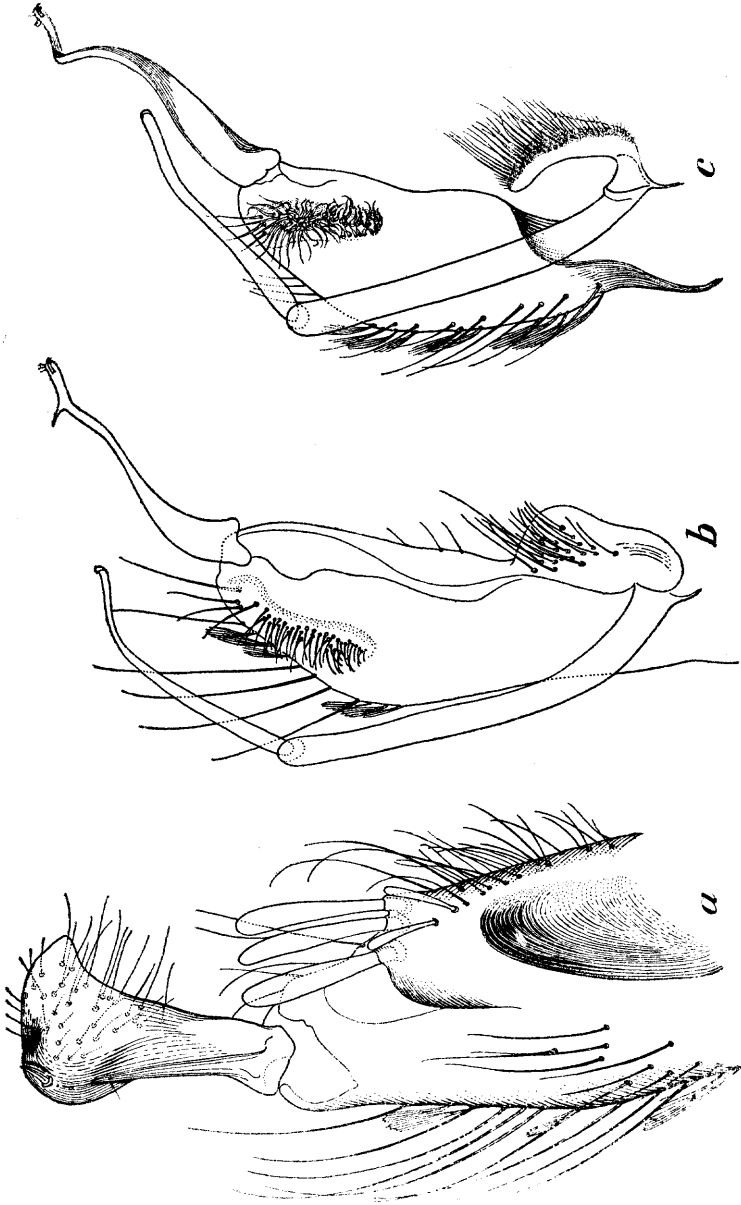


FIG. 1. Parts of male terminalia. (a) *imitatus*; (b) *barbus*; (c) *pseudobarbus*.

as other segments; verticils few and short, 6 to 8 on each flagellum, the longest (toward base) slightly exceed the combined lengths of two flagella. Clypeus dark-brown, side paler, bare. Palpi dark-brown, about as long as clypeus. Proboscis dark, moderately stout, swollen toward apex, slightly bent upwardly toward base and again downwardly toward apex; with a narrow pale-golden line underneath originating from base and terminating where the apical enlargement of proboscis begins; about as long as front femur. Integument of thorax dark; scutal scales rather thick, narrow, dark; median silvery line formed by two rows of broad roundish scales; originates from anterior border and ends in front of pre-scutellar bare space; a few broad long pale-golden scales on lateral border, the tips of which partly cover the paratergite. Without dorso-central or pre-scutellar bristles; quite a few, but rather short supra-alars. Scutellum dark-brown, all lobes covered with broad flat dark scales, the midlobe with two white scales at base; one strong dark bristle on lateral lobe, four on midlobe. Postnotum dark, bare. *Apn* dark-brown, with a patch of broad silvery scales; about eight dark strong bristles and two or three weaker ones. *Ppn* brownish, covered entirely but not densely by broad flat pale-golden scales; with three or four weak bristles. Pleuræ extensively covered with long, broad, pale-golden scales; patches and bristles as follows:—one spiracular, but no postspiracular bristle; patch covers post- and sub-spiracular areas; three weak pre-alar bristles; no upper-, and only one weak lower-sternopleural bristle; sternopleural patch originates from pre-alar knob continued to lower border and leaving bare only the anterior third of lower sternopleuron. About six upper-, but no lower-mesepimerals; mesepimeral patch covers upper- and posterior half of lower-mesepimeron. A few broad pale scales and two bristles on propleuron. A small patch of pale-golden scales on each coxa. Legs dark, undersides of femora paler. Wings dark-scaled, scales broad except the outstanding ones on petiole of vein 2 which are long and pointed. *Af* nearly as long as its petiole, its base closer to origin of wing than that of *pf*. Vein 6 terminates well beyond level of forking point at 5. Abdominal tergites dark, with narrow pale-golden area on sides forming straight line. Sternites pale-golden except VIII which is dark.

Male terminalia: (Figs. 1-*a* and 2-*a*.) Tergite IX and coxite bear certain similarities with those of *decorabilis* as illustrated

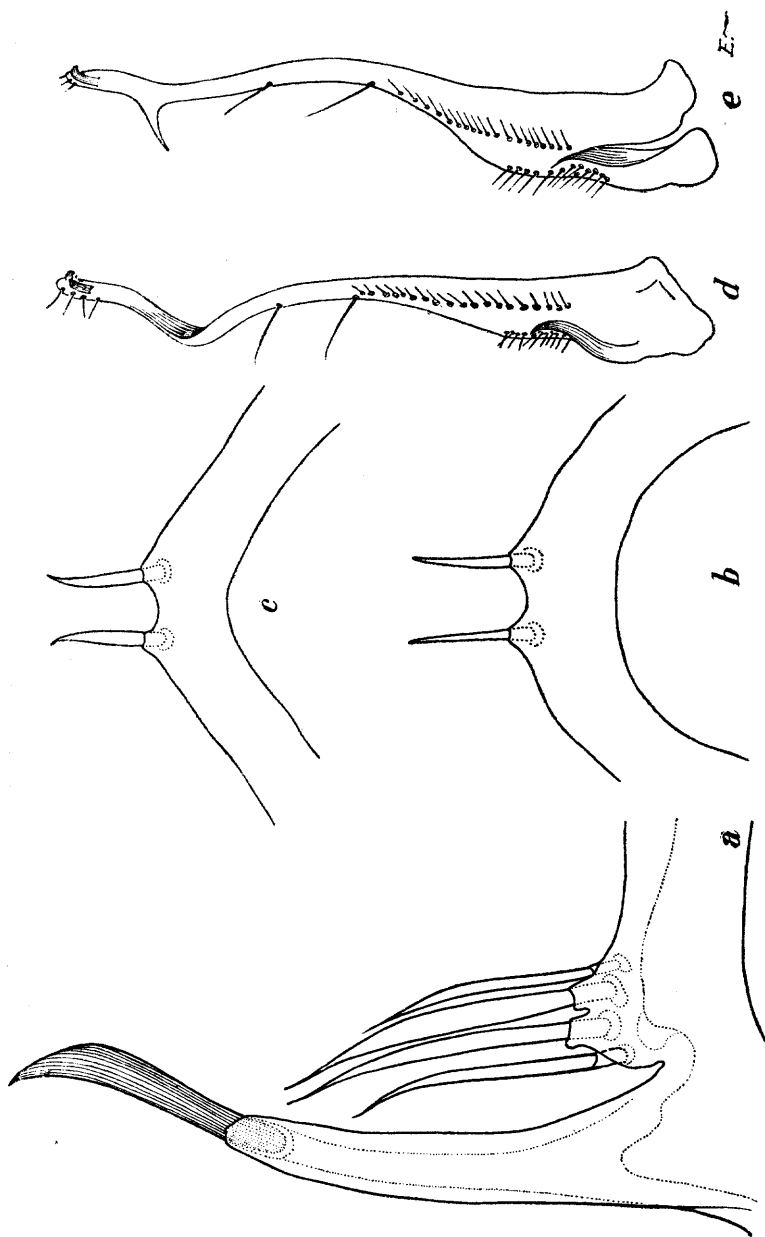


FIG. 2. Parts of male terminalia. (a) left side, tergite IX of *imitatus*; (b) tergite IX of *barbus*; (c) tergite IX of *pseudobarbus*; (d) style of *pseudobarbus*; (e) style of *barbus*

by Edwards (1922, plate VIII, Figs. 1 and 2), but the style is different. This is short, very stout, much enlarged toward apex, with two ill-defined prominences at tip; a short thick spine surmounts the external prominence, while the internal tapers to a short triangular point at its inner side. The whole enlarged portion of the style with many hairs on sternal surface. The subapical lobe of the coxite bears three moderately broad, round-ended leaflets or rods, aside from hairs of various sizes. Sternal surface of coxite with many scales and a few hairs; no scales but with many hairs on tergal side. Tergite IX with a claspette-like structure on either side; internal to this is a pair of small lobes each bearing four bristles in a row, the inner two being flattened and somewhat longer than that on either side.

Holotype: A male (Lot No. P1054-1), with larval and pupal skin mounts. Found as larva in a cut joint of "climbing" bamboo at Kidapawan, Cotabato, Mindanao, on May 12, 1946, by T/Sgt. J. W. Enke, Mr. A. Corcega, and Mr. P. Feliciano. When received in the Manila laboratory of the 19th MGL (sent by plane), it was the only larva in the collecting bottle, but it is not known whether it devoured other larvæ (if any) that might have been placed with it. Pupated after several days in the laboratory, but remained a pupa for six days, the exact duration being: pupated at about 3 p. m. on May 23, 1946, emerged at about 4 p. m. on May 29, 1946. The lone specimen with its skin mounts will be forwarded to the U. S. National Museum.

Female unknown.

Pupa: (Fig. 3.) Characterized mainly by two well-developed tufts on abdominal segment VIII. Though certain species of other genera, such as *Zeugomyia lawtoni*, etc. also have two tufts on this segment, one of these is much smaller than the other. The genital pouch (male) is unusually large in actual size and in relation to the paddles, but another species described below, and *Zeugomyia lawtoni* also have a large male genital pouch.

Respiratory trumpet short and stout. Hair 6 of cephalothorax long, single or split into two (similar to those of Group B, *Tripteroides*). Metathoracic hairs all single; *P* longer than either *R* or *O*. Dendritic tuft on I developed. Abdominal hairs weak except *B* of III to VI, and the tufts on VII and

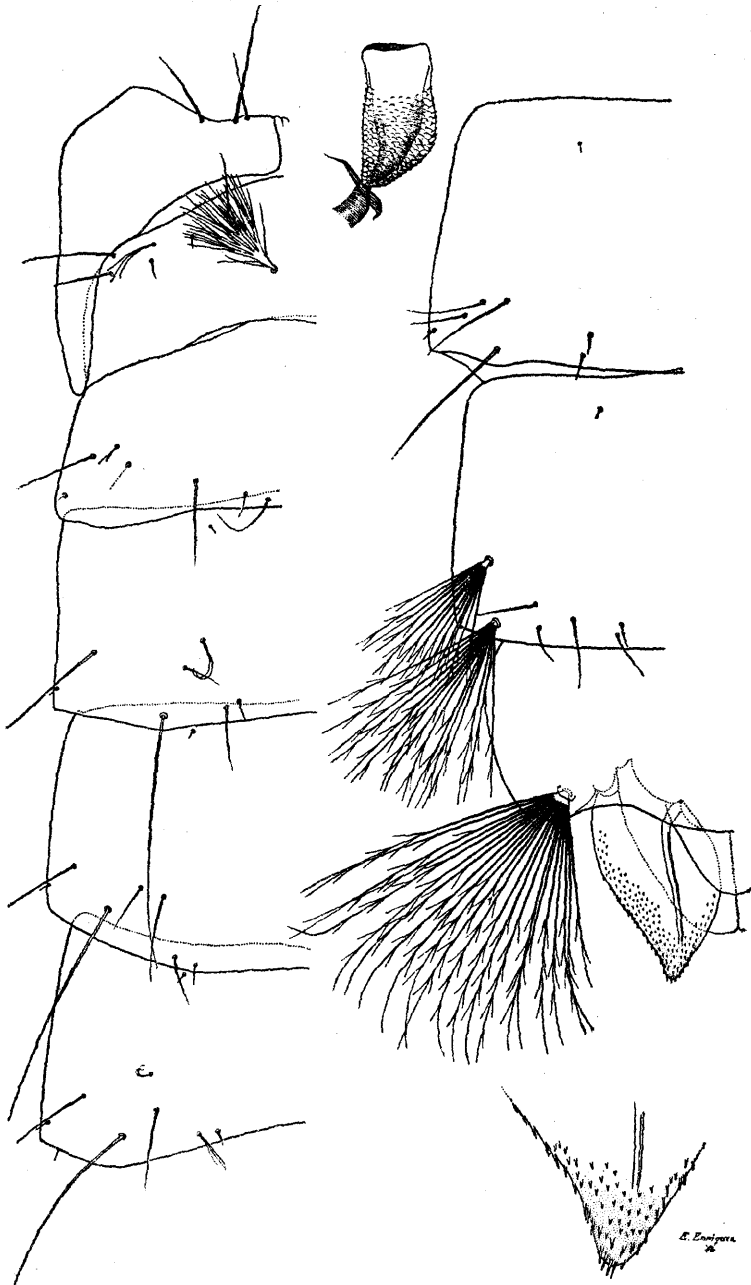


FIG. 3. Parts of pupa of *imitatus*

VIII. *A* of II to VI, tiny, single. *B* of III single, finely and sparsely frayed, nearly as long as segment IV; of IV missing (reconstructed by the artist in the illustration, Fig. 3); of V similar to those on III but shorter, being only slightly over half the length of segment VI; of VI still shorter, single. *C* weak on all segments, short, single (that on left side of V split into two branches). *A*-VII about equal to segment VIII in length, split into 16 subplumose branches; *A*-VIII still larger and longer, the central (longest) branches nearly twice as long as the paddle; split into 22 subplumose branches. The other pair of tufts on VII is slightly smaller than *A*-VII, each with 10-14 subplumose branches; these tufts evidently represent hair No. 1, although hair 1 of the preceding segments are all weak and single. Paddle leaf-like, broadly lanceolate, with a few spines at tip, and finer spicules along borders and over surface. Midrib fairly distinct. Without paddle hair.

Larva: (Fig. 5.) Resembles larva of *Goeldia* in maxillæ and siphon. The similarity in maxillary characters with those of *Goeldia* invalidates the differentiation given by Edwards (1932, p. 69) between *Goeldia* and some *Topomyia*. Edwards' opinion was based on what little was then known about larvæ of *Topomyia*. Even now, *imitatus* larva is the only one among known *Topomyia* with "articulated horns" on its maxillæ.

Head: Feeding brushes thick, mostly with serrate tips. Preclypeal spines long, fairly stout, single. Antenna short, shaft not spiculed, somewhat shorter but only about half as stout as the maxillary palp; its hair single, arises at about $\frac{1}{3}$ from base. Frontal hairs weak. *A* single, rather more internal than the usual location of *A* in culicines; a little shorter than shaft of antenna. *B* similar but longer, internal and anterior to *A*; *C* still longer, far behind level of *A*, single or split into two; *d* similar to *B* to which it is anterior and internal in position; *e* shorter, 2-branched. There are two pairs of short extra hairs, all single, located very close to the anterior border of clypeus and external to base of preclypeal spine. Each maxilla with two unequal articulated horns, and a long single bristle springing from internal side just beneath the articulation of horns; below this, at about middle, is a shorter bristle. Maxillary palp a little longer than, and about twice as stout as, shaft of antenna. Thoracic hairs mostly weak, but long hairs of pleural groups and some dorso-lateral

developed. Pro-hair 7 split near base into eleven subplumose branches; hair 8 longer but with only four subplumose branches. Evidently only three hairs on propleural plate, all long and frayed; the longest single, the second longest split from base into eleven subplumose branches, while the third has five branches; a short blunt prominence representing spine on plate. Mesohairs 5 and 6 very long, single, highly frayed, the tips extending beyond middle of head (in mounted skin). Four hairs and a short blunt prominence on meso-pleural plate; one of the hairs very tiny and hardly visible; the other three long, frayed; the longest of these is single, the next has two branches, while the third which is only slightly shorter, has six branches. Meta-hair 7 split from base into eleven subplumose branches. Meta-pleural group also composed of four hairs: the longest is single, frayed; the second longest has nine subplumose branches; the third is single, frayed, about half as long as the longest; the fourth tiny, single. Dorsal abdominal hairs weak. Two pairs of *lh* on I, frayed; the dorsal stronger, split from base into three or four branches; the ventral with two or three branches. One pair on II single, frayed, distinctly weaker than *lh* of I, and shorter than those of III to VI. Also one pair on III to VI, frayed, each split into two unequal branches on III to V, those on VI single. Comb composed of about 12 teeth, arranged in one row; individual tooth sharply pointed, base bulbous, finely serrate on either side of bulb. Anal segment less than half as long as siphon, the plate covering its dorsal and half the lateral sides; plate with fine spicules mostly grouped like scales, those along posterior border somewhat coarse. *Isc* and *osc* developed, not frayed, branched from base into 15 and 12 respectively; *lh* longer but with only nine branches which are finely and sparsely frayed. Only one pair of fan hairs, similar to *isc* and *osc* but more developed, with longer and more (22-24) branches; the fan springs from a small plate separate from the saddle. Anal papillæ narrow, lanceolate, the longer pair exceeds the siphon in length. Siphon moderately long and stout, without pecten but with spicules scattered over surface; six pairs of dorsal tufts, each with five or six finely frayed branches; about 12 ventral tufts, the most basal three and the five most apical are paired; the longer ones about twice or more the length of dorsal tufts; each with two to seven branches, frayed, except the two most distal and smallest pairs.

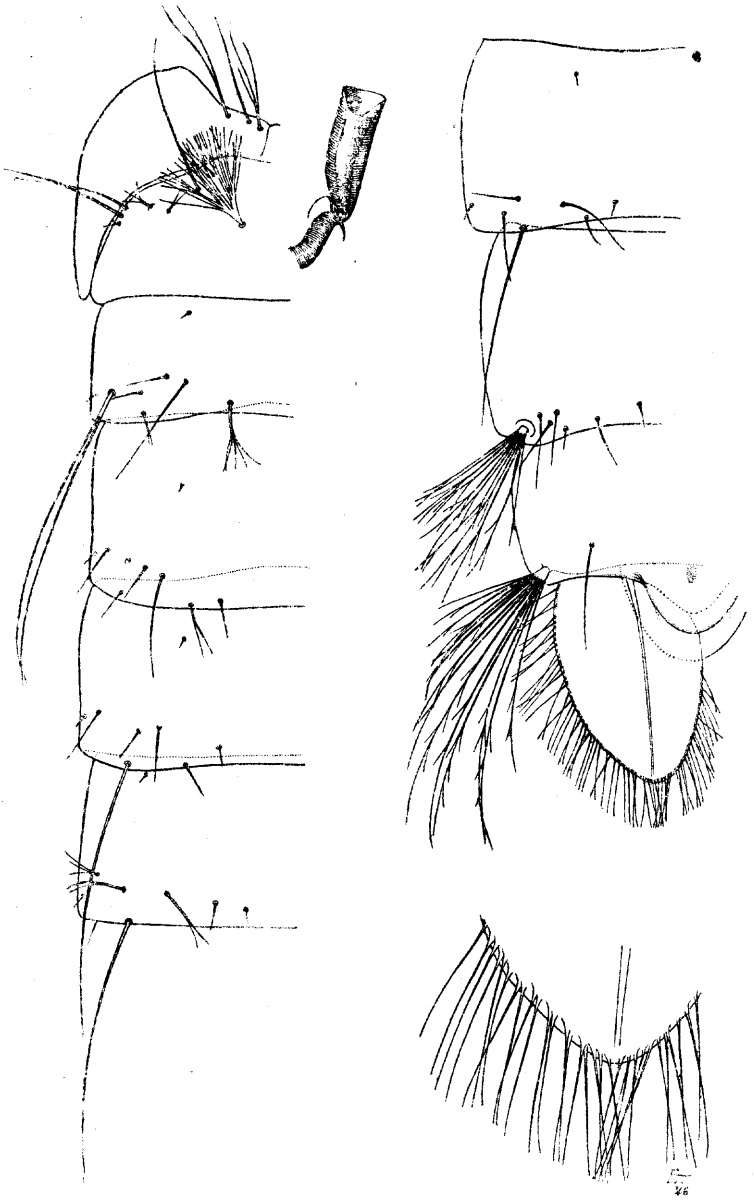


FIG. 4. Parts of pupa of *barbus*

TOPOMYIA BARBUS n. sp.

Adult differs from *imitatus* in having: (1) extreme base of proboscis golden in male not in female; (2) silvery median line on scutum extends very close to anterior border of mid-scutellar lobe; (3) midlobe of scutellum largely or completely covered by broad silvery scales in female; with or without such silvery scales in male; (4) patch of broad scales on *ppn* dark; (5) undersides of mid and hind femora in male distinctly white, that on the hind extending through the tibia to the last tarsal segment, and that on mid extends to a little beyond middle of tibia; in female pale or ochreous not pure white, and not as extended; (6) dorso-central and pre-scutellar bristles usually present in both sexes; (7) wing scales narrower, and the outstanding ones on petiole of vein 2 blunted; and (8) male terminalia different.

Wing venation similar to that of *imitatus*; abdominal markings also the same. Pleural bristles and scale patches as follows: dark patch of broad scales and a single bristle on *ppn*; two or three weak spiraculars, no postspiraculars; two prealars; apparently no upper or lower sternopleurals; silvery patch of broad scales covers pre-alar knob and extends to lower border of sternopleuron joining similar patch on mid coxa, but anterior half of lower sternopleuron bare; about six to eight upper mesepimerals; no lower mesepimeral; silvery patch covers anterior half of entire mesepimeron; a small silvery patch and a single bristle on propleuron.

Male terminalia: (Figs. 1-*b*, 2-*b*, and *e*.) Tergite IX arched; with a pair of submedian strong spines arising from small lobe; no tiny hairs internal or external to these. Basal lobe of coxite bears numerous short hairs. Stem of harpago a little shorter than coxite, its terminal appendage about as long as the stem. This appendage tapers considerably from about middle to apex, the extreme tip somewhat broadened and upturned like a spoon. The apical lobe of the coxite is elongate and bears numerous short hairs. Style long, broad toward base, narrows considerably from about middle to apex; bears a short blunt toothed terminal spine, and a subapical hook or barb on the opposite (external) side of the terminal spine. Numerous scales and a few hairs on the sternal surface of coxite. Paraproct and phallosome simple.

Holotype: A male (Lot No. P845-*a*); allotype: A female (Lot No. P953-1); paratypes: three male and three female,

three of which have larval and pupal skin mounts. Collected from axils of taro, banana, and treehole in various places in Mindanao during April and May, 1946, by a party composed of Capt. H. Hoogstraal, Lt. S. Edgar, T/Sgt. J. W. Enke, Mr. E. Gutierrez, Mr. A. Corcega, and Mr. P. Feliciano. One male and one female paratypes, and one of the skin mounts will be retained for the collections of the Bureau of Health; all the others will be sent to the U. S. National Museum.

Pupa: (Fig. 4.) Differs from pupa of *imitatus*: (1) with only one pair of tufts on segment VII; (2) paddles fringed with long hairs; and (3) hair 1 on abdominal segment II unusually long.

Respiratory trumpet short, considerably less stout than that of *imitatus*; cephalothoracic hair 6 long, split into two branches. *R* long, 2- or 3-branched; *P* about as long, single; *O* shorter, 2- or 3-branched. *K* variable, longer than other hairs on I; dendritic tuft variable, developed. *A* tiny, single on II to VII; developed into subplumose tufts on VII and VIII, each split from base into 11 to 15 branches, the longest branches of that on VII exceeds the length of segment VIII, while those on VIII about $1\frac{1}{2}$ as long as the paddle. *B* single; weak and short on II and III; long, rather stout, with or without a few frayings on IV to VI; that on IV variable, but usually nearly equal to combined lengths of segments V and VI; that on V extends to middle of VII; on VI just about equal to length of VII; on VII short and slender. *C* of II short, rather stout, split subapically into about six or seven branches; of other segments tiny, single or split into two or more branches. Hair 1 of II long and rather stout, similar to *B* on IV and V, single or split into two sub-basally; weak, short, single on other segments. Paddles broadly lanceolate, fringed with long hairs along borders; without spicules or paddle hair; midrib well-defined.

Larva: (Fig. 6.) Bears some similarities with larva of *Harpagomyia*. Compared, however, with the larva of *Harpagomyia* on hand (this may be *genurostris* or one very close to it), there are marked differences. In *Topomyia barbuis* the branches of the main frontal hairs are subequal in lengths or nearly so; the most posterior ventral hair of the head is a normal, fairly long, 4- to 6-branched hair; while the maxillary plate bears at its apex a strong pointed spine with a bulbous base; this spine is internal to the group of apical bristles; in addition there is also a long single subapical hair on the maxillary plate.

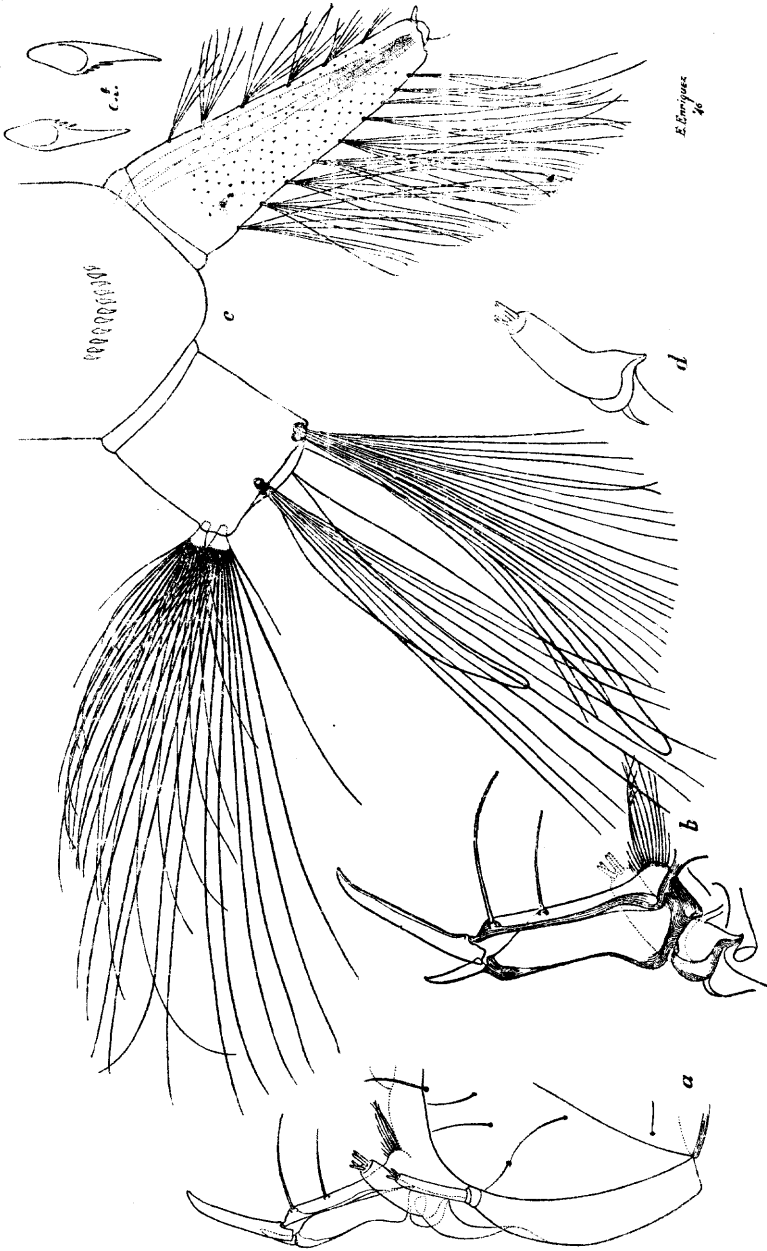


FIG. 5. Parts of *imitatus* larva. (a) left side of head; (b) maxilla; (c) tip of abdomen; (d) maxillary palp.
ct = comb teeth.

The frontal hairs of *Harpagomyia* have the central branch considerably longer and more stout than the lateral branches, and that of *d* is sometimes frayed toward its base; the most posterior ventral hair of the head is represented by a stout spine which may be single or split into 2 or 3 points; the maxillary spine is external to the apical bristles, its base not bulbous, and its tip is split into about five equal points; there is no subapical hair on the maxillary plate. There are many large stellate tufts on the thorax and abdomen of *Topomyia barbuis*, none or very weak in *Harpagomyia*. The spines on the thoracic pleural plates are comparatively longer, pointed in *T. barbuis*; short, blunt in *Harpagomyia*. There are also differences in the type and branchings of hairs on the anal segment, the number and type of comb and pecten teeth, as well as in the tufts of the siphon, but no character seems of generic importance, there being even more marked differences between *Topomyia imitatus* and *Topomyia barbuis*, than between *Harpagomyia* and *Topomyia*.

Central feeding brushes few and short, spinelike; inner feeding brushes thick, finely serrate at extreme tips; outer also thick, not serrate. Preclypeal spines about as long as inner feeding brushes, single, of uniform thickness from base to apex, tips curved. Maxillæ not modified. Antenna short, shaft smooth; its single weak hair arises at about $\frac{5}{8}$ from base. Frontal hair *A* about as long as shaft of antenna, 2-branched, not frayed; *B* somewhat longer and stronger, also 2-branched, far internal and anterior to *A*; *C* still longer, single, nearly directly behind *B*, and about equally spaced posterior and internal to *A*, as *B* is internal and anterior to *A*; *d* similar to *A*, 2- or 3-branched, internal and anterior to *B*; *e* weak, short, single or split into two. Thoracic hairs mostly strong, some on prothorax large and stellate, while a few others have many long branches. Four long hairs of different lengths on pro-pleural plate, all single and finely frayed; also a fairly long spine on plate. Pro-hairs 7 and 8 long and subplumose, split from base into seven and nine branches, respectively. Also four hairs on mesopleural plate, one being tiny, single; the longest extends to or beyond anterior border of head, split from base into two branches, finely and sparsely frayed; the second is only slightly shorter, single, finely and sparsely frayed; the next is about $\frac{3}{4}$ as long, more slender, finely frayed. A single moderately long spine on mesopleural plate. The largest hair on metapleural plate is split from base into five or more subplumose branches; the second is about as long or slightly longer,

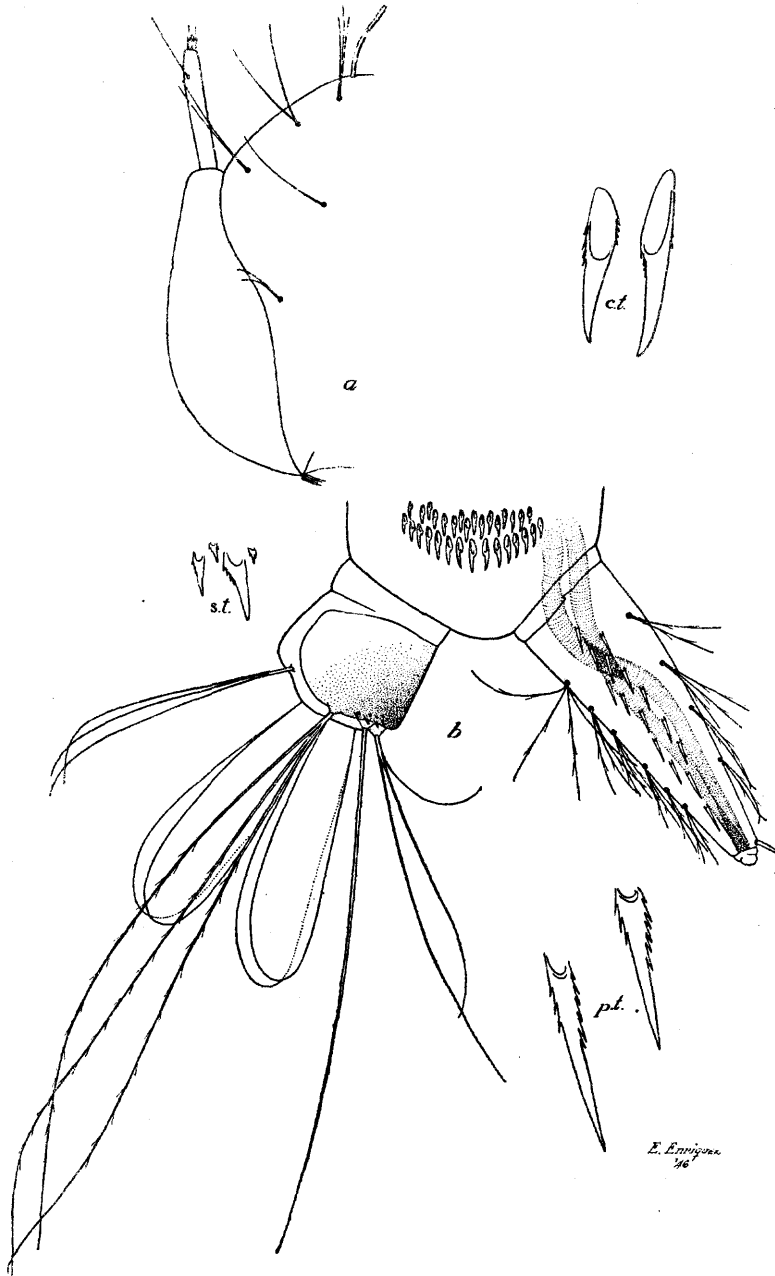


FIG. 6. Parts of larva of *barbus*. (a) left side of head; (b) tip of abdomen. (ct=comb teeth; pt=pecten teeth; st=saddle teeth.)

frayed, single, or split toward apex into two; the third is a little shorter, split from base into two, frayed; the fourth is very tiny, single. Metapleural spine somewhat longer than either that on pro- or meso-pleural plate. Meta-hair 7 many-branched, subplumose. Abdomen with a number of large stellate tufts, the largest of which is apparently hair No. 4, each of these with more than 10 finely frayed branches. Two pairs of *lh* on each of abdominal segments I and II, frayed, the dorsal longer, with six to seven branches, the ventral with four or five; a single pair of *lh* on III to VII, finely frayed, longer than those on I and II, split basally into two branches, except those on VI and VII which are single. About 25 to 32 comb teeth in a roughly triangular patch, individual tooth pointed, minutely serrate on either side at base. Anal segment short, largely covered by plate, minutely spiculed, with about three to five long teeth on either side of posterior border, the largest with one or more rather coarse serrations. *Isc* split into two or more branches, not frayed; *osc* longer, single, also not frayed; *lh* still longer, finely frayed, branched from base into three or four; fan composed of a pair of hairs, shorter than *isc*, each split into three branches, not frayed. Anal papillæ broadly lanceolate, longer pair about three times the length of anal segment. Siphon fairly long, stout, tapers considerably from about middle to apex. Pecten teeth variable in number and arrangement, usually lined in two rows (sometimes three) on either side of tube, the most basal tooth close to base of siphon, the most distal about twice the length of tooth away from apex of tube; individual tooth pointed, serrate on either side toward base. About five or more pairs of ventral tufts, frayed, the most basal with three or more branches each, the others split into two; three or more pairs of subdorsal tufts, finely frayed 2- or 3-branched each.

TOPOMYIA PSEUDOBARBUS n. sp.

Adult: Cannot be distinguished by external characters from *barbus*. The style of the male terminalia, however (Fig. 1-c and Fig. 2-d), is twisted toward the tip, does not possess the subapical barb on the external side; while the appendage of harpago does not narrow appreciably toward apex, and the basal lobe of the coxite bears fewer hairs. Tergite IX has a more stout pair of spines.

Similar to *barbus* the male has the golden ring or patch at base of the proboscis and the white broad line on underside of mid and hind legs; the female without these.

Holotype: A male (Lot No. F/280(a)-x); allotype: a female (Lot F/280(a)-y), without skin mounts. Collected as larvæ but not isolated by T/Sgt. D. F. Bray, U. S. Army, from axils of taro near San Miguel, Bulacan, in August, 1945. Paratype: three male and three female, all without skin mounts. One male was from larva found in axil of *Colocasia* in Puerto Princesa, Palawan; the others were from axils of the same kind of plant around Subic Bay, Zambales; collected in August, 1945. All the paratypes will be forwarded to the U. S. National Museum; the holotype and allotype were personally given to the author by the collector, and will, thereby, be kept in the Bureau of Health collections.

Pupa and larva unknown.

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