

Revision of the genus *Pazius* (Mecoptera: Bittacidae)*

by

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Abstract: Two new species of hanging-flies, *Pazius flinti* and *P. pectinatus*, are described and illustrated. Geographic ranges of previously described species are reviewed. All five species are differentiated in an illustrated taxonomic key (in English and Spanish).

In the 20 years since publication of the first review of *Pazius* (Byers, 1957), the number of known specimens representing this genus has nearly tripled. In 1957, there were a mere eight specimens representing three species. Now, about two dozen specimens have been collected. Although these make known two additional species and provide new localities for some earlier-known kinds, we still have virtually no information about the biology of any species of *Pazius*. It is my impression from available collection data that species of *Pazius* do not occur in large numbers at one time, in their various habitats, as some temperate bittacids do. *Pazius* possibly also avoids being observed and collected by resting or flying close to the ground—behavior observed in some elusive tropical species of *Kalobittacus*.

The two species described below do not extend the known range of the genus but fill some gaps in that range (Fig. 1).

Pazius Navás, 1913: 45

This genus includes bittacids that are slender, with abdomen longer than the wings (Fig. 2) and with the compound eyes large and touching below the antennal bases in both males and females (Fig. 3). The wings are strikingly slender in their proximal one-third (Fig. 4), with the anal veins (Fig. 5, 1A, 2A) very short, 1A coalesced with Cu₂ in the hind wings except for the extreme tip, which appears as a cross-vein.

Type species of genus: *Bittacus gracilis* Navás, 1908

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Pazius gracilis (Navás, 1908: 413)

This species (Fig. 12) is still known only from the male holotype, collected in the vicinity of the Río Chanchamayo, Departamento Junín, Venezuela (11°00'S, 75°20'W), 710-1040 m (date of collection unknown). The badly damaged holotype is in the Museo de Ciencias Naturales, Barcelona, Spain.

Pazius obtusus (Byers, 1957: 4-5)

Described on the basis of three specimens from Panamá, this species (Figs. 13, 14) has subsequently been collected in southern Costa Rica and at additional localities in Panamá. Localities and dates of collections are as follows: Panamá, Prov. Chiriquí, Bugaba (3 km S of Concepción; 8°30'N, 82°36'W), between 245 and 460 m (date of collection not recorded), G. C. Champion (σ holotype, η allotype); Prov. Los Santos, Peña Blanca (6.5 km SSW of Las Tablas; 7°40'N, 80°20'W), 46/m, in light trap, 2 October 1952 (teneral η paratype), F. S. Blanton; Canal Zone, K-6 Road, 20 December 1959, W. J. Hanson (1 σ); Las Cumbres, 14 km N of Panamá City, 5 August 1960, G. B. Fairchild (1 η). Costa Rica, Golfito, near sea level, 3 July (1 σ) and 28 July (1 without abdomen) 1957, A. Menke and F. Truxal. The holotype and allotype are in the British Museum (Natural History), London.

Pazius furcatus (Byers, 1957: 5-6)

The male holotype was taken at Táchira village (8°07'N, 72° 16'W), 307 m, Táchira State, Venezuela, on 7 April 1920, and the female allotype and 2 η paratypes at La Fria village (8°13'N, 72°16'W). 123 m, Táchira, on 16 and 7 April 1920, respectively, by E. B. Williamson and J. Williamson. Both habitats were quebradas (ravines) through "tall tree forest", with luxuriant undergrowth, particularly near the streams. The types (Figs. 15, 16) are in the Museum of Zoology of the University of Michigan, Ann Arbor.

Pazius flinti, sp.n.

Description based on 2 males, 6 females, pinned.

Head: mostly brown, blackish on ocellar prominence; eyes dark brown; rostrum amber brown, slightly paler at base; maxillary palps yellowish brown near base grading into dark brown at apex; antennae light brown on scape and ovoid pedicel, with dark brown flagellum of apparently 19 flagellomeres (extremely slender and difficult to differentiate after 8th); antennal length about 5.1 mm (holotype).

Thorax: brown dorsally, the more elevated areas dark brown; pleural surfaces generally sordid yellowish brown, darkest on mesepisternum and brown on adjacent basalare. Coxae dark yellowish brown; femora grayish brown, darker at tip, with diffuse subterminal band of yellowish brown (grayish color due to closely-set annulations of small, dark hairs); tibiae light brown grading into yellowish brown near apex; tarsi sordid light brown to brown; three large setae on each side of fourth tarsomere near its base.

Wings: faintly tinged with smoky brown, with dark brown stigma; membrane extremely iridescent.

Abdomen of male (Figs. 6-8): very slender, segment 2 about 8 times as long as its greatest diameter; segments 3-5 each about 11 times as long as their greatest diameter; segments 6-7 slightly shorter and thicker, 8-9 abruptly expanded. Terga brown laterally, dark brown along dorsal mid-line, narrowly darkened at ends (more broadly darkened at anterior end of segment 2). Epiandrial lobes and fused basistyles sordid yellowish brown. Posterolateral corners of ninth sternum intensely blackened. Epiandrial lobes of ninth tergum (Fig. 7) concave mesally, convex laterally, prolonged posteriorly to blunt upturned point with low, setose tubercle on its dorsal margin; posteroventral margin curved mesad as forked process bearing a folded posterior point (Fig. 8), a longer, more slender anterior point terminating in two blackened denticles, and a low, setiferous dorsal tubercle. Proctiger small, deeply recessed within ninth segment; cerci long, slender. Dististyles minute. Aedeagus abruptly thickened near base (Fig. 6), with ventral projection branching into two elliptical, compressed blades.

Abdomen of female: slender and colored approximately as in male. Posterior margin of eighth tergum slightly upturned, thickened and darkly sclerotized. Ninth tergum mostly concealed beneath eighth, subsequent segments completely recessed within ninth. Subgenital plate divided into two distinct subtriangular sclerites with apices in contact posteriorly.

Body length: male, 24.2 to 24.6 mm (holotype 24.6 mm); female, 21.2 to 22.6 mm (allotype 22.6 mm). Length of fore wing, male, 16.2 (holotype) to 16.8 mm; female, 15.6 to 18.0 mm (allotype 16.1 mm).

Holotype: male, Panama Canal Zone, milepost 5 on Thatcher Highway (8 km W of Panamá City), 6-12 July 1967, O. S. Flint, Jr. Allotype female, 1 ♂, 5 ♀ paratypes, same data as for holotype. Holotype, allotype and 4 ♀ paratypes in National Museum of Natural History, Washington, D. C.; 1 ♂, 1 ♀ paratypes in Snow Entomological Museum, University of Kansas, Lawrence.

Pazius flinti most closely resembles *P. furcatus* Byers of Venezuela, the only other known species in which the male possesses a forked process on the ventral side of the aedeagus near its base. In *flinti*, the epiandrial lobes are more prolonged caudad than in *furcatus*; the bifurcate process from the lower edge of the epiandrial lobe appears near mid-length of the lobe, in dorsal aspect (Fig. 7), while in *furcatus* it appears well behind mid-length and lacks the small, setiferous dorsal tubercle (Fig. 16). It would appear from Fig. 7 that the epiandrial lobes overlap one another, which they do in dried specimens. Probably in life these structures are held more widely apart. The forked projection from the aedeagal base has distinctly compressed branches in *flinti*, contrasted with branches of more uniform diameter in *furcatus*. The eighth abdominal tergum in females of *flinti* is upturned and thickened but in *furcatus* is neither upturned nor thickened. Three of the females are callow, their abdomens slender throughout; three others have segments 6-8 abruptly expanded, containing large, apparently mature eggs.

This species is dedicated to Dr. Oliver S. Flint, Jr., noted authority on the Trichoptera, in recognition of his continuing interest in collecting Mecoptera in the Neotropical Region and elsewhere.

Pazius pectinatus, sp.n.

Description based on 1 male, 1 female, pinned.

Head: dark brown, black on ocellar prominence; eyes black; rostrum dark amber brown, a little paler near base; maxillary palps blackish brown; antennae sordid dark brown throughout (most of flagella missing from holotype), with apparently 19 flagellomeres (difficult to differentiate beyond 11th); antennal length about 5.0 mm (allotype).

Thorax: pronotum and anterior two-thirds of mesonotum sordid blackish brown, black on more elevated areas; mesonotal scutum brown (holotype) to dark brown, scutellum dark yellowish brown; metanotum brown; pleural surfaces and coxae sordid dark yellowish brown. Femora and tibiae dull brown, darkened apically; fore and middle tarsi light brown, with one pair of thick, black setae on fourth tarsomere; hind tarsi dark brown, with two pairs of unequal stout setae on fourth tarsomere.

Wings: strongly tinged with smoky brown, stigma dark brown, membrane highly iridescent.

Abdomen of male (Figs. 9-11): slender, segment 2 about 8 times as long as its greatest diameter, segments 3-5 each about 10 times as long as greatest diameter; segment 6 widening from front to rear, segments 7-8 enlarged to about four times diameter of anterior segments. Terga 2-5 bearing broad, black mid-dorsal stripe, grading into brown laterally; terga 6-8 brownish black throughout. Epiandrial lobes of tergum 9 dark yellowish brown near base, darkening toward apex; fused basistyles dark brown ventrally near base, yellowish brown in apical half and laterally near base. Posterolateral corners of ninth sternum intensely blackened. Posterior margin of tergum 8 shallowly notched at either side of broadly rounded, black median lobe. Epiandrial lobes generally concave mesally, truncate posteriorly. On mesal face of each lobe, near posterior margin, a curved, densely sclerotized ridge set with blackened spines grading from short and thick at dorsal end of comb to long and blade-like at ventral end (figs. 10, 11). Posteroventral corner of each epiandrial lobe abruptly infolded, with thickened, glabrous, darkly sclerotized apex (fig. 10). Proctiger inconspicuous, surrounded at base by sclerotized disc from which short cerci emerge. Dististyles small, curved anteromesad, with bluntly rounded tips. Aedeagus thickest just above base, abruptly narrowed to slender filament beyond mid-length.

Abdomen of female: segments 2-5 slender and colored approximately as in male; segment 6 slender in anterior half, thickened posteriorly to 4 times diameter of anterior end; segments 7-8 expanded (presumably with eggs), their terga evenly dark brown; tergum 9 yellowish brown posteriorly and at sides, dark brown medially near base. Proctiger and minute cerci almost wholly concealed within ninth segment. Eighth sternum composed of two large, sclerotized plates, narrowly separated along ventral mid-line, each expanded upward anteriorly, nearly touching eighth tergum, each yellowish brown with large, dark brown, anterior spot.

Body length: male, 24.2 mm; female, 23.1 mm. Length of fore wing, male, 17.4 mm; female, 18.7 mm.

Holotype: male, and female allotype collected as mating pair at Balzapamba (Prov. Bolivar, 1045'S, 79°12'W), Ecuador, 700 m, 4 May 1938, by William

Clarke-Macintyre. These specimens were shipped together with numerous Tipulidae to Prof. Charles P. Alexander, who donated them to the Snow Entomological Museum, University of Kansas, Lawrence. An account of Clarke-Macintyre's entomological work in Ecuador appears in Alexander's "Notes on the Tipulidae of Ecuador, Part I" (1953, *Rev. Ecuat. Ent. Part.*, 1: 1-9).

The conspicuous, comb-like row of large spines near the apex of each epiandrial lobe is unique, not only setting this species apart from others in the genus *Pazius* but totally unlike the arrangement of epiandrial spines in any other known bittacid. The specific name refers to this structure (Latin *pecten* = comb). Coloration of wings and of terminal abdominal sclerites will probably permit differentiation of the female from those of other species.

Key to species of *Pazius*, based primarily on males

1. Aedeagus with forked ventral (posterior) projection near base (*furcatus* group, Figs. 6, 15) 2
 Aedeagus without forked ventral projection near base 3
2. Ventral bifurcate process of epiandrial lobe, seen in dorsal aspect, near mid-length of lobe (Fig. 7); posterior margin of eighth abdominal tergum of female slightly upturned, thickened and darkly sclerotized (known range: Panamá) *flinti*
 Ventral bifurcate process of epiandrial lobe, in dorsal aspect, behind mid-length of lobe (Fig. 16); posterior margin of eighth abdominal tergum of female unmodified, but anterior margin of ninth tergum darkly sclerotized (known range: Venezuela) *furcatus*
3. Epiandrial lobes each bearing a nearly vertical comb of thick, black spines on mesal surface (Figs. 10, 11) (known range: Ecuador) *pectinatus*
 Epiandrial lobes without comb of blackened spines on mesal surface (*gracilis* group) . . . 4
4. Epiandrial lobes with blunt, downwardly turned apices, in lateral aspect (Fig. 13); thoracic pleura distinctly bicolored in both sexes (known range: Panamá and Costa Rica) *obtusus*
 Epiandrial lobes with acute, upturned apices, in lateral aspect (Fig. 12); thoracic pleura not bicolored (known range: Perú) *gracilis*

Clave para determinar las especies de *Pazius*, basada principalmente en los machos

1. En el macho el edeago con la proyección ventral (posterior) bifurcada cerca de la base (grupo *furcatus*, Figs. 6, 15) 2
 Edeago sin la proyección ventral bifurcada cerca de la base 3
2. Proceso ventral bifurcado del lóbulo epiandrial, visto dorsalmente, cerca de la mitad de la longitud del lóbulo (Fig. 7); margen posterior del octavo tergito abdominal de la hembra ligeramente elevado, grueso y esclerotizado y de color oscuro (distribución geográfica conocida: Panamá) *flinti*
 Proceso ventral bifurcado del lóbulo epiandrial, visto dorsalmente, a la mitad y por detrás de la longitud del lóbulo (Fig. 16); margen posterior del octavo tergito abdominal de la hembra sin modificación, pero el margen anterior del noveno tergito esclerotizado y de color oscuro (distribución geográfica conocida: Venezuela) *furcatus*

3. Lóbulos epiandriales con peines casi en posición vertical y con espinas gruesas y negras en su superficie mesal (Figs. 10,11) (distribución geográfica conocida: Ecuador). *pectinatus*
- Lóbulos epiandriales sin los peines de espinas gruesas y negras sobre la superficie mesal (grupo *gracilis*) 4
4. Lóbulos epiandriales, vistos dorsalmente, con sus ápices romos y dirigidos hacia abajo (Fig. 13); pleura torácica claramente bicolor en ambos sexos (distribución geográfica conocida: Panamá y Costa Rica). *obtusus*
- Lóbulos epiandriales, vistos dorsalmente, con sus ápices agudos y dirigidos hacia arriba (Fig. 12); pleura torácica no bicolor (distribución geográfica conocida: Perú) *gracilis*

RESUMEN

Se describen y se ilustran dos nuevas especies de Mecoptera, *Pazius flinti* y *P. pectinatus* de Panamá y de Ecuador, respectivamente, y se revisa la distribución geográfica de tres especies descritas anteriormente. Se incluyen claves taxonómicas en inglés y español para identificar las cinco especies.

LITERATURE CITED

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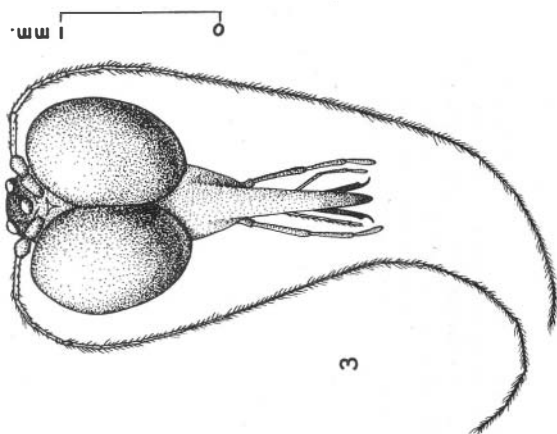
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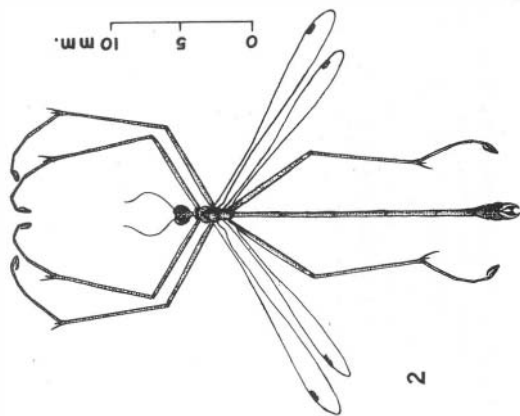
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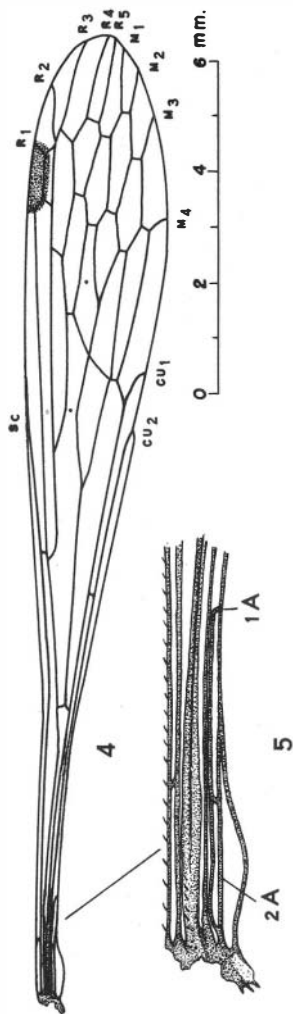
Figs. 2-5. Taxonomic characteristics of the genus *Pazius*. 2, entire insect (male of *P. furcatus*), dorsal aspect. 3, head (female of *P. furcatus*), anterior aspect, showing compound eyes in contact below antennal bases. 4, venation of wing (Sc - subcosta, at junction with costa, R - radius, M - media, Cu - cubitus). 5, detail of base of wing (A - anal veins).



3



2



4

5

Figs. 6-8. *Pazius flinti*, terminal abdominal segments of male holotype. 6, terminal abdominal segments, left lateral aspect. 7, left epiandrial lobe, dorsal aspect (a, b - projections corresponding to a, b in fig. 8). 8, forked process of epiandrial lobe, mesal aspect, enlarged; cf. Fig 7. Figs. 9-11. *Pazius pectinatus*, terminal abdominal segments of male holotype. 9, terminal abdominal segments, right lateral aspect. 10, right epiandrial lobe, dorsal aspect. 11, right epiandrial lobe, posterior aspect, enlarged. Scale at left, figs. 6-7, 9-10. Scale at right, figs. 8, 11.

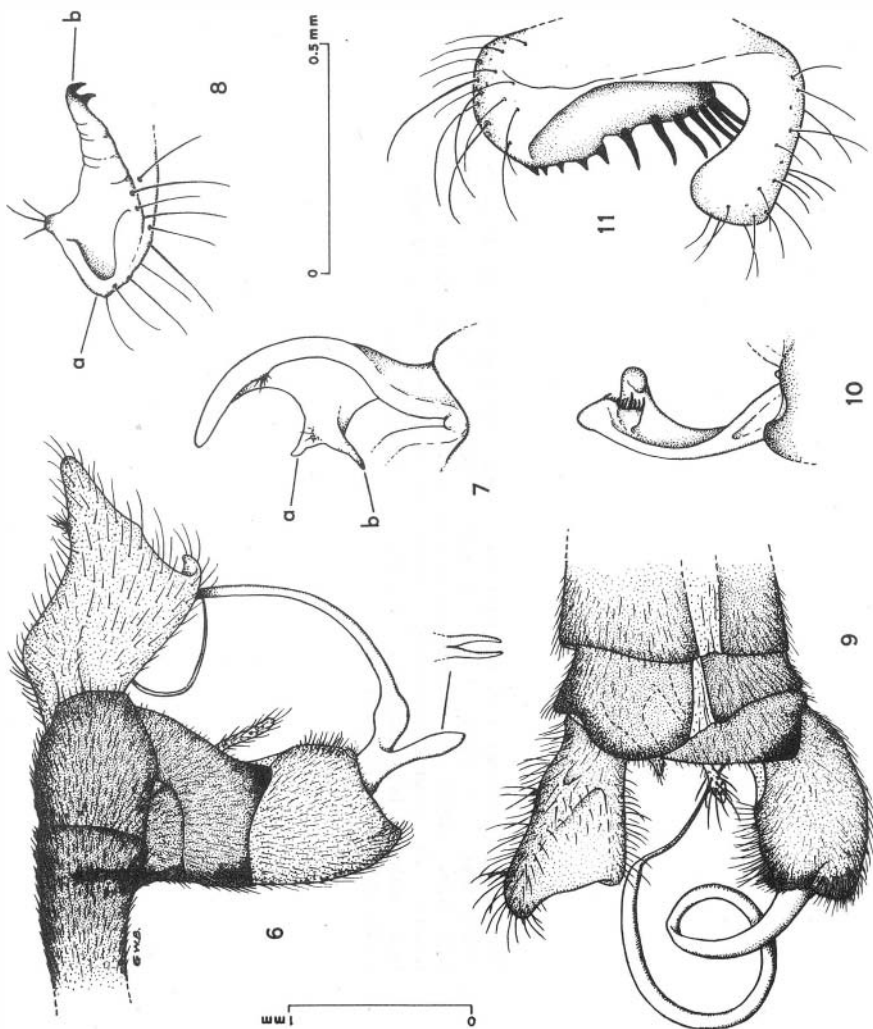


Fig. 12. *Pazius gracilis*, terminal abdominal segments of male (reconstructed from sketch by Navás). Figs. 13-14. *Pazius obtusus*. 13, terminal abdominal segments of holotype, right lateral aspect. 14, right epiandrial lobe, dorsal aspect. Figs. 15-16. *Pazius furcatus*. 15, terminal abdominal segments of holotype, right lateral aspect (aed - aedeagus, bs - basistyle, s - sternum, t - tergum). 16, right epiandrial lobe, dorsal aspect. Scale, all figures.

