

A NEW PHANTOM CRANE FLY  
(INSECTA: DIPTERA: PTYCHOPTERIDAE: BITTACOMORPHINAE)  
FROM TAIWAN

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ABSTRACT

A new species of phantom crane fly (Diptera: Ptychopteridae: Bittacomorphinae) from Taiwan is described and illustrated. *Bittacomorphella lini*, **new species**, is the first record of subfamily Bittacomorphinae from the island of Taiwan and the second species of the subfamily reported from the Oriental Region.

KEY WORDS: *Bittacomorphella*, phantom crane fly, Ptychopteridae, Taiwan, taxonomy

INTRODUCTION

Ptychopteridae is a small family of about 70 species of medium-sized flies (Alexander 1965; Alexander and Alexander 1973; Hutson 1980; Rozkošný 1992). Most of the species in this family resemble large fungus gnats and belong to *Ptychoptera* Meigen, the only genus in the subfamily Ptychopterinae. A few species are placed in the genera *Bittacomorpha* Westwood and *Bittacomorphella* Alexander, and constitute the subfamily Bittacomorphinae. Species in this subfamily are known as “phantom crane flies” due to their tipulid-like appearance with disruptive pattern of black-and-white banded legs which they hold straight out from the body as they drift in the air. Recent species of this family are concentrated in the Holarctic and Oriental Regions, with scattered isolated species in Africa. They are absent from South America and Australasia. Only seven species of *Bittacomorphella* have been described, one in the Oriental Region, one in the eastern Nearctic, four in the western Nearctic, and two in the eastern Palearctic. They are distinctive from *Bittacomorpha* by lacking conspicuously swollen metatarsi and by having a smaller body size, thus they are also known as “pigmy phantom crane flies.”

The Catalogue of the Diptera of the Oriental Region (Alexander and Alexander 1973) listed 15 species in the genus *Ptychoptera* and only one species of *Bittacomorphella* in the Region. In Taiwan, the family Ptychopteridae is represented by only one species, *Ptychoptera formosensis*

Alexander, 1924. Recent entomological fieldwork for the study of Tipuloidea in diverse habitats of Taiwan has revealed a notable diversity of previously unknown species in many major lineages. *Bittacomorphella lini*, new species, was discovered during these recent studies and represents the first record of the subfamily Bittacomorphinae in Taiwan, as well as the second species in that genus described from the Oriental Region. The other described species is *Bittacomorphella thaiensis* Alexander, 1953, from Thailand.

MATERIALS AND METHODS

The specimen collected for this study was hand-netted and then dry-mounted following Byers (1961:677–678). Genitalia preparation was made by soaking the three posterior abdominal segments in cold 10% KOH overnight. The genitalia were rinsed with acetic acid and water after removal from KOH, and then stored in a glycerin-filled microvial pinned below the corresponding specimen. The descriptions are accompanied by drawings of characters found useful in segregating the species. Descriptive terminology follows that of Nakamura and Saigusa (2009). The single specimen studied in this paper is currently deposited in the insect collection of Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA (CMNH).

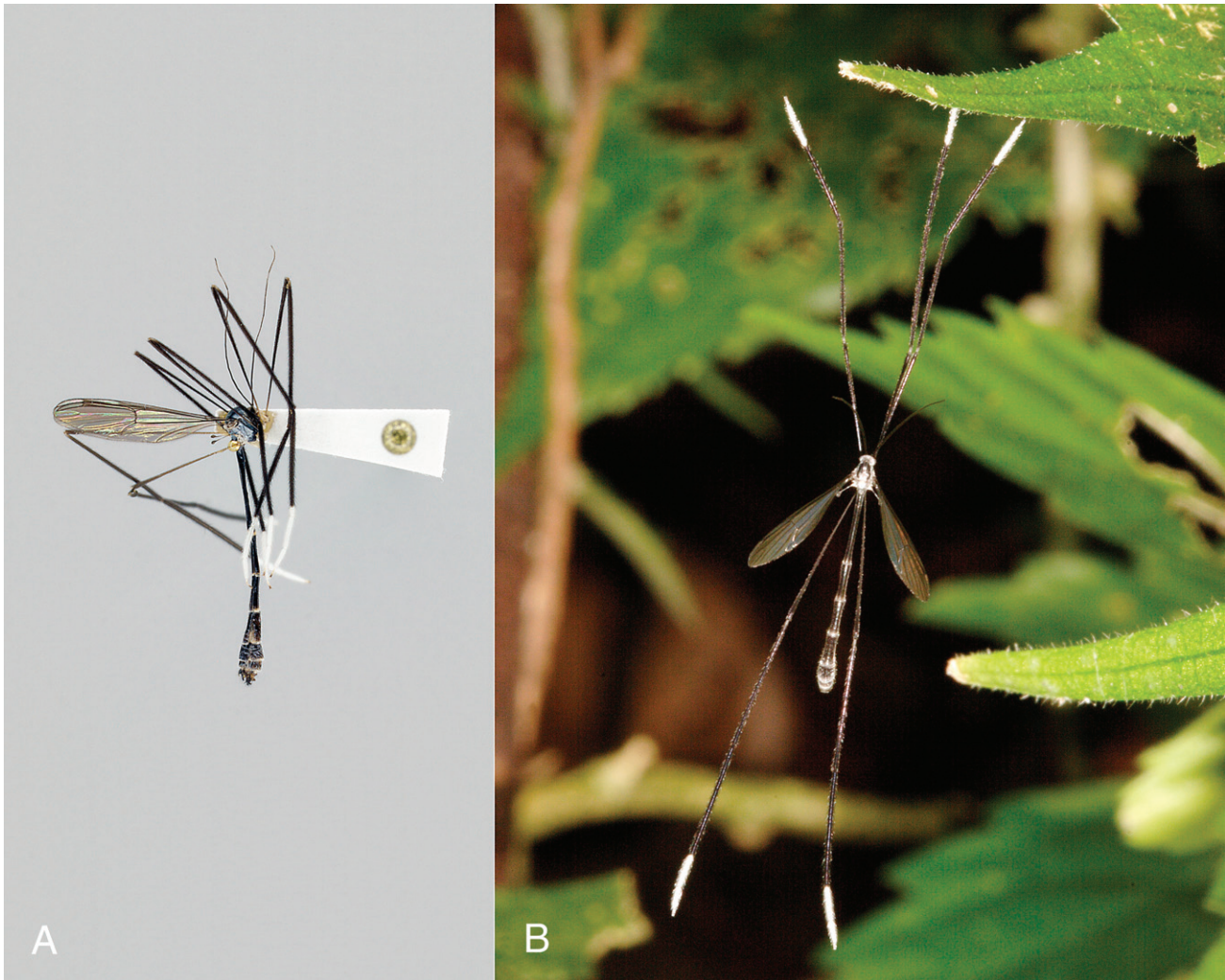


Fig. 1.—Male of *Bittacomorphella lini*. **A**, male mounted specimen, right lateral view; **B**, male in natural habitat (photograph by Gaga Lin).

SYSTEMATIC ENTOMOLOGY  
 Order Diptera Linnaeus, 1758  
 Family Ptychopteridae Meigen, 1803  
 Subfamily Bittacomorphinae Westwood, 1835

Genus *Bittacomorphella* Alexander, 1916

*Bittacomorpha* (*Bittacomorphella*) Alexander, 1916:545  
 Type-species: *Bittacomorpha jonesi* Johnson, 1905:75,  
 by original designation.

*Bittacomorphella* Alexander: Alexander, 1965:98.

*Bittacomorphella lini*, new species  
 (Figs. 1–5)

**Diagnosis.**—*Bittacomorphella lini* is known from the male sex only; it can be easily recognized by the distinctive black-and-white banded legs (Figs. 1A–B). The only other known slender flies with black-and-white banded legs are crane

flies in the genus *Tipulodina* (Tipulidae), but their body size is twice that of *B. lini* and their wings exhibit a distinct dark mark at the tip, lacking in *B. lini*.

**Description.**—Based on a single dry-mounted male specimen (Fig. 1A). Body length: 11 mm. Wing length: 7.5 mm. Female: unknown.

**Head.**—Vertex and frons brown with brilliant silvery pruinosity; palpi pale brown. Antenna black, filiform, 8 mm in length, as long as wings; flagellomeres elongate cylindrical, covered with fine erect setae; ultimate flagellomere minute.

**Thorax.**—Thoracic dorsum polished black medially, silvery pruinose and microscopically punctured laterally. Pleurotergite dark brown with silvery pruinosity. Legs long, slender, mostly covered with black setae (Figs. 2A–C). Coxae and trochanters of all legs pale yellow. Femora on all legs slender, pale brown at base, gradually and slightly thickened, darkened to black distally. Tibiae black; foretibia with a pair of lamellate spurs, covered with fine setae (Fig. 3A); mid and hind tibiae each with nine long enlarged setae forming a comb-like array at dorsal end of tibiae, flanked by pair of spine-shaped tibial spurs (Fig. 3B). Fore metatarsus black with white band distally (Fig. 2A); mid and hind metatarsi entirely black (Figs. 2B–C); all legs with second, third, and fourth tarsomeres white; fifth tarsomere minute, infuscated, distinguished only by darker color. Metatarsi on all legs



subequal to respective tibiae and much longer than succeeding tarsomeres on same leg. Pretarsal claws dark brown, simple. Wing narrow, subhyaline, weakly suffused with darker coloration; distinct markings at stigma; apical area of wing bearing macrotrichia. Haltere black.

**Abdomen.**—Abdomen black, narrowed at base, gradually widened to tip, covered with short dark setae.

**Hypopygium.**—Male genitalia as in Figs. 4–5. Epandrium (ninth tergum) roughly rectangular, bilobed with weakly sclerotized triangular posteromedial area; posterior margin with two finger-like protrusions bearing setae, convergent medially; lateral processes long, broad basally, tapering and curving medially toward acute tips with long setae scattered on dorsal surface. Gonostyli broad basally, tapering, curved gradually inward to rounded tip, bearing 7–8 long setae on dorsal inner edges. Parameres flattened, club-shaped, tapering gradually toward rounded tip, with no anterior extension; Aedeagus short, strongly sclerotized.

**Distribution.**—*Bittacomorphella lini* is currently recorded only from Taiwan. The collecting locality of the type in JianAn (建安), Taipei County, indicates that this species occurs at low elevation in wooded habitats along streams.

**Type material.**—Holotype male (CMNH). Three labels, each label separated by /: “Taiwan: Taipei Co. SanSia City (三峽市), JianAn (建安) 303m 24-54-36N 121-28-39E 1 Apr 2008 Chen Young” / “Carnegie Museum Specimen Number CMNH-543,450” / “HOLOTYPE *Bittacomorphella lini* Young and Fang, 2010 [printed red label].”

**Etymology.**—This species is named in honor of Gaga Lin (林義祥). Lin is an enthusiastic nature photographer who devoted his retirement years to introducing the insect fauna of Taiwan to the general public, and to educating the community regarding the conservation of natural resources of Taiwan. Lin captured the first image of this new species on March 5, 2006, compelling this study.

**Biological Notes.**—The flight pattern of this new species is quite different from that of species in the genus *Bittacomorphella*. *Bittacomorphella lini* performs a series of short, quick, vertically oscillating aerial movements instead of the straight, slow, drifting flight with extended legs of *Bittacomorphella*. The black-and-white banded legs of the new species could be easily confused with crane fly species of the genus *Tipulodina* in the same habitat, except that the *Tipulodina* are larger in size and fly more rapidly.

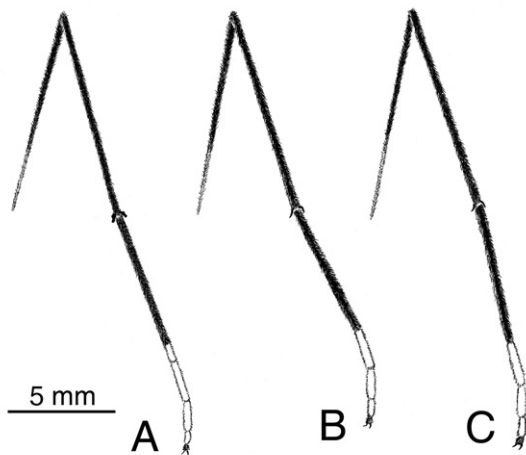


Fig. 2.—Legs of male *Bittacomorphella lini*. A, prothoracic leg; B, mesothoracic leg; C, metathoracic leg.

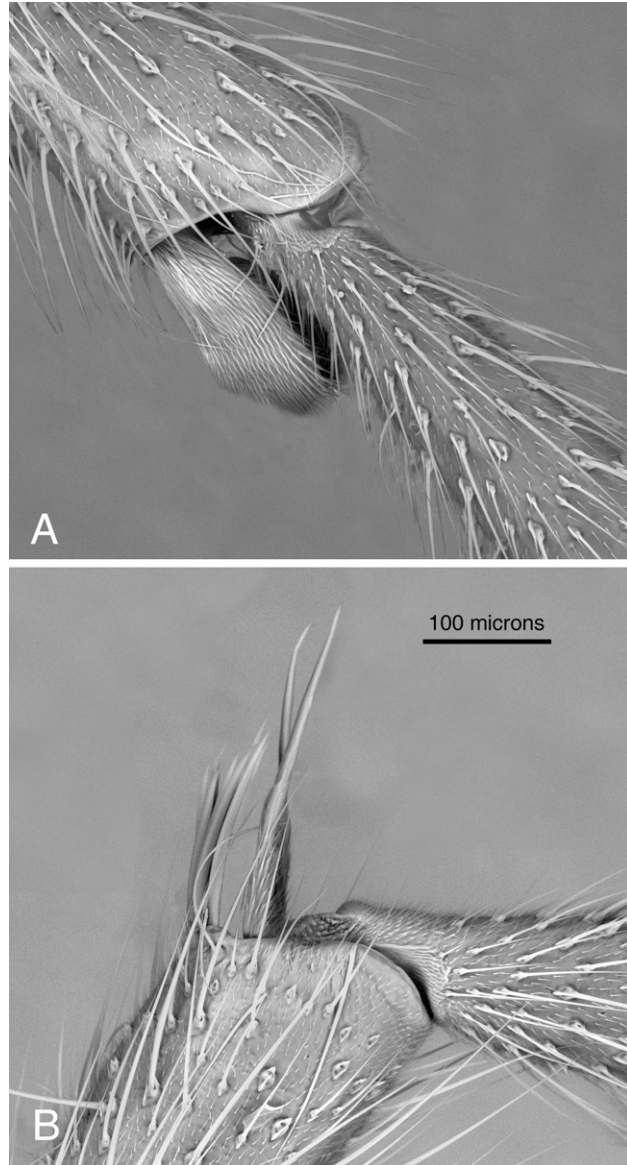


Fig. 3.—Tibial spurs of male *Bittacomorphella lini*. A, tibial spur of right prothoracic leg, right lateral view; B, tibial spur of right metathoracic leg, right lateral view. Scale line applies to both micrographs.

**Remarks.**—This is the only species of Bittacomorphinae known to occur in Taiwan. One other species, *B. thaiensis*, has been recorded from the Oriental Region (Thailand). The new species possesses all the generic features of *Bittacomorphella*. A comparison of genitalia between this species and *B. thaiensis* is not possible since the new species is based on a male while *B. thaiensis* was described from a female. Leg coloration is not sexually dimorphic in Nearctic and Japanese species of *Bittacomorphella*. However, *B. lini* and *B. thaiensis* may be separated based on leg coloration. The basal tarsomeres of the prothoracic legs of *B. lini* are black with a white band at the distal end; these are solid black in *B. thaiensis*. Tarsomeres 2–4 are white in

*B. lini* but only tarsomeres 2–3 are white in *B. thaiensis*. The new species also resembles two eastern Palearctic species, *B. nipponensis* Alexander, 1924, and *B. esakii* Tokunaga, 1938, from Japan in general appearance, differing most evidently in the coloration of the legs and the structure of male genitalia, especially the shape of the parameres. The latter are long, flattened, and club-shaped in *B. lini*, but long and slender in *B. nipponensis* and short and stout in *B. esakii* (Nakamura and Saigusa 2009). Comparison between the new species and three Nearctic species reveals little difference in body size and coloration, but the shape of the gonostyli and the parameres easily distinguish them. The Nearctic species have an apical white band on all the metatarsi, not just the fore metatarsi. Based on the study of male genitalia, leg coloration, and wing venation of the eight known species of *Bittacomorphella*, one cannot assign these eight species into species groups, thus it is not possible using those characters to associate the new Taiwan species with one or more congeners.

The discovery of this unique endemic species emphasizes that many taxa remain undescribed and undoubtedly uncollected, thus undocumented. There is need for more field-work and geographically targeted collecting in the Oriental region, particularly in China where species of *Bittacomorphella* may occur but are currently unknown.

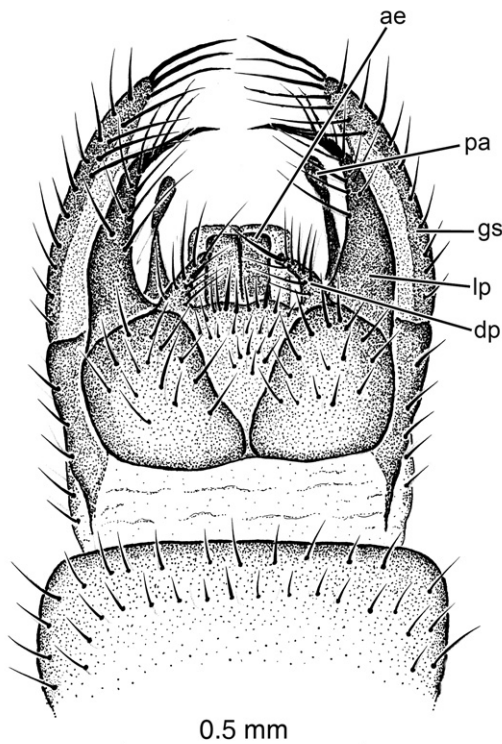


Fig. 4.—Terminal abdominal segments of *Bittacomorphella lini*, dorsal view. Abbreviations: **ae**, aedeagus; **dp**, dorsal process of epandrium; **gs**, gonostylus; **lp**, lateral process of epandrium; **pa**, parameres.

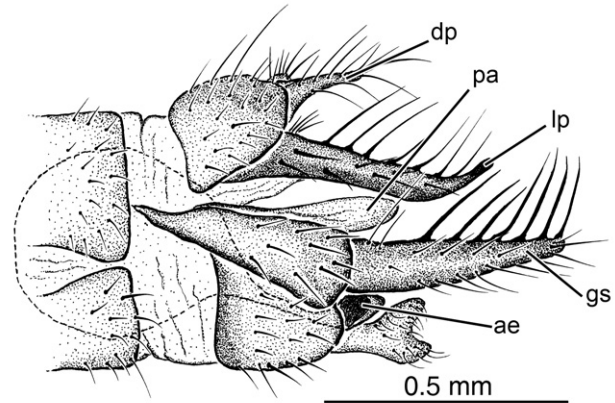


Fig. 5.—Terminal abdominal segments of *Bittacomorphella lini*, left lateral view. Abbreviations as in Fig. 4.

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