

A Catalog of the Megalopteran Collection in the Natural History Museum of the National Science Museum, Thailand

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Abstract

A checklist of the megalopteran specimens housed in the Natural History Museum of the National Science Museum, Thailand (THNHM) is presented. A total of 583 specimens of 21 species, eight genera in two families (Corydalidae and Sialidae) including two holotypes and 26 paratypes are deposited in THNHM. Six species of Megaloptera are new records for Thailand: *Acanthacorydalis asiatica* (Wood-Mason, 1884); *Ctenochauliodes yangi* Liu and Yang, 2006; *Neochauliodes meridionalis* van der Weele, 1909; *Neochauliodes tonkinensis* (van der Weele, 1907); *Neoneuromus ignobilis* Navás, 1932; and *Neoneuromus indistinctus* Liu, Hayashi and Yang, 2018. Most specimens of the order were collected from Northern and Northeastern Thailand. The high-resolution images of the named species are provided.

Keywords

Specimens, Natural History Museum, National Science Museum, Megaloptera, Thailand

Introduction

The order Megaloptera Latreille, 1802 is one of the three orders of Neuropterida (Megaloptera, Neuroptera, and Raphidioptera). The order is divided into two families: Corydalidae Leach, 1815 and Sialidae Leach, 1815 (alderfiles), both families are widely distributed in

all biogeographic regions (except Antarctica), taxa frequently exhibit disjunct distributions (Cover and Bogan, 2015). The family Corydalidae can be divided into two subfamilies: Corydalinae Davis, 1903 (dobsonflies) and Chauliodinae van der Weele, 1909 (fishflies). All species of the order have aquatic larvae, whereas eggs, pupae, and adults are terrestrial (McCafferty, 1981). Currently, ca. 400 species in 34 genera have been recorded worldwide (Rivera-Gasparín *et al.*, 2019; Piraonapicha *et al.*, 2020, 2021; Liu *et al.*, 2021). Among them, 12 species in six genera of both families have so far been recorded from Thailand: *Indosialis bannaensis* Liu, Yang and Hayashi, 2006 from Kalasin, Loei, Nakhon Ratchasima, and Phitsanulok Provinces (Liu *et al.*, 2006c, 2008, 2015a; Bowles and Contreras-Ramos, 2016; Piraonapicha *et al.*, 2020); *Indosialis siamensis*, Piraonapicha, Sangpradub, Jaitrong and Liu, 2020 from Loei Province (Piraonapicha *et al.*, 2020); *Neochauliodes moriutii* Asahina, 1987 from Chiang Mai and Nan Provinces (Liu *et al.*, 2010, Yang and Liu, 2010); *Neochauliodes punctatolus* Liu and Yang, 2006 from Chanthaburi, Chiang Mai, Nakhon Ratchasima, and Phetchabun Provinces (Liu *et al.*, 2006b, 2010; Mahama *et al.*, 2018; Sangpradub *et al.* 2018, Yang and Liu, 2010); *Neoneuromus coomani* Lestage, 1927 from Chiang Mai Province (Yang *et al.*, 2018); *Neurhermes sumatrensis* (van der Weele, 1909) from Trang and Songkhla Provinces (Liu *et al.*, 2015b; Yang and Liu, 2010); *Neurhermes tonkinensis* (van der Weele, 1909) from Chiang Rai Province (Liu *et al.*, 2015a); *Nevromus aspoeck* Liu Hayashi and Yang, 2012 from Chiang Mai Province (Liu *et al.*, 2012); *Nevromus jeenthongi* Piraonapicha, Jaitrong, Liu and Sangpradub, 2020 from Nakhon Si Thammarat and Surat Thani Provinces (Piraonapicha *et al.*, 2020); *Protohermes furcatus* Liu, Hayashi and Yang, 2008 from Chiang Mai Province (Liu *et al.*, 2008); *Protohermes tenellus* Liu, Hayashi and Yang, 2007 from Thailand (Liu *et al.*, 2007; Yang and Liu, 2010); and *Protohermes triangulatus* Liu, Hayashi and Yang, 2007 from Chiang Rai Province (Liu *et al.*, 2007; Yang and Liu, 2010).

In the course of our examination of the Megalopteran specimens deposited in the Natural History Museum of the National Science Museum, Thailand (THNHM), we present a checklist of these specimens and add another six new recorded species for Thailand.

Materials and Methods

Specimens of Megaloptera deposited in the THNHM were examined. Localities have been corrected when they were misspelled in the original labels. Most specimens were collected by Kanyakorn Piraonapicha, Weeyawat Jaitrong, and Tadsanai Jeenthong. Specimens were identified and then were confirmed by Xingyue Liu. Specimens were imaged using a Canon EF-S 60mm f/2.8 Macro lens attached to a Canon 70D digital camera.

The list of the specimens is arranged alphabetically by family, genus, and species, following the format:

Specific name author, publication date

Original name, author(s), publication date: pages of the original description. Type locality: name of locality.

Types. Type status: Number of specimens, sex (THNHM code), locality, date (months in Roman numerals), collector (leg.), codes given in the original description (if available).

Non-type material examined. Number of specimen and sex (THNHM code), locality, date (months in Roman numerals), collector (leg.).

Diagnosis.

Distribution. Country (Provinces) (References if available).

Catalog

A total of 583 megalopteran specimens of 21 species, eight genera in two families (Corydalidae and Sialidae) including two holotypes and 26 paratypes are deposited in THNHM (Table 1). Six species are new records for Thailand: *Acanthacorydalid* (Wood-Mason, 1884); *Ctenochauliodes yangi* Liu and Yang, 2006; *Neochauliodes meridionalis* van der Weele, 1909; *Neochauliodes tonkinensis* (van der Weele, 1907); *Neoneuromus ignobilis* Navás, 1932; *Neoneuromus indistinctus* Liu, Hayashi and Yang, 2018. Five species of *Protohermes* so far have been known as genus level. Most specimens examined here were collected from Northern and Northeastern Thailand.

Table 1. Number of genera, species and specimens of Megaloptera deposited in THNHM.

Genera	Number of species	Number of specimens		
		Non-types	Holotypes	Paratypes
Family Corydalidae				
<i>Acanthacorydalid</i>	1	6		
<i>Ctenochauliodes</i>	1	7		
<i>Neochauliodes</i>	3	79		
<i>Neoneuromus</i>	3	125		
<i>Neurhermes</i>	2	26		
<i>Nevromus</i>	2	133	1	21
<i>Protohermes</i>	7	103		
Family Sialidae				
<i>Indosialis</i>	2	104	1	5
Total	21	583	2	26

ORDER MEGALOPTERA Latreille, 1802**Family Corydalidae Leach, 1815****Subfamily Chauliodinae Weele, 1909*****Ctenochauliodes yangi* Liu and Yang, 2006 (Figure 1)**

Ctenochauliodes yangi Liu and Yang, 2006: 487. Type locality: China (Guangxi: Fulong).

Ctenochauliodes yangi: Yang and Liu, 2010: 260.

Non-type material examined. NORTHERN: 5♂ (THNHM-I-24018 and THNHM-I-24019, THNHM-I-24022 to THNHM-I-24024, pinned), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 13.VI.2020, L. Khaton leg.; 2♀ (THNHM-I-24020 to THNHM-I-24021, pinned), same date, locality, and collector.

Diagnosis. Body blackish brown; wings subhyaline, with distinct brown marks on crossveins; in ventral view, male fused tenth gonocoxites with a pair of asymmetric subtriangular lobes (outer margin of lobes relatively concaved; posterior half of right lobe with a line at median portion) (Figure 2).

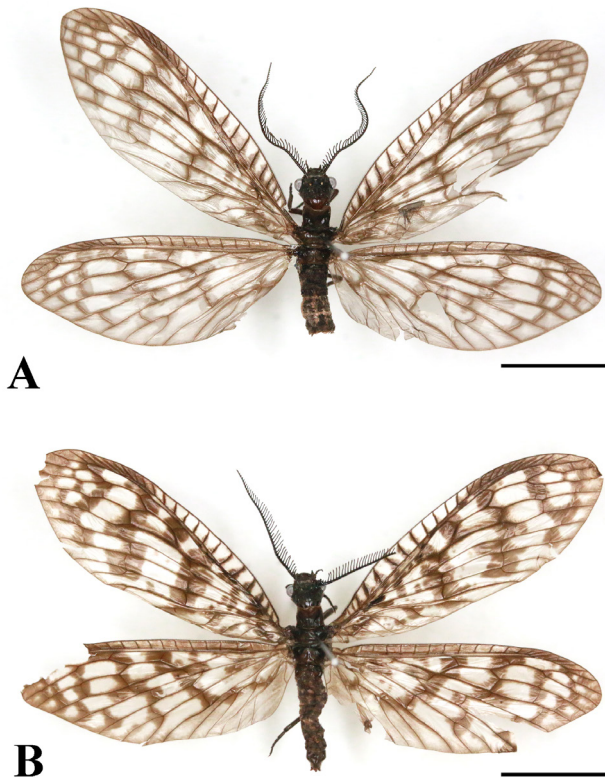


Figure 1. *Ctenochauliodes yangi*, dorsal view. A, male; B, female. Scale bars: 1 cm.

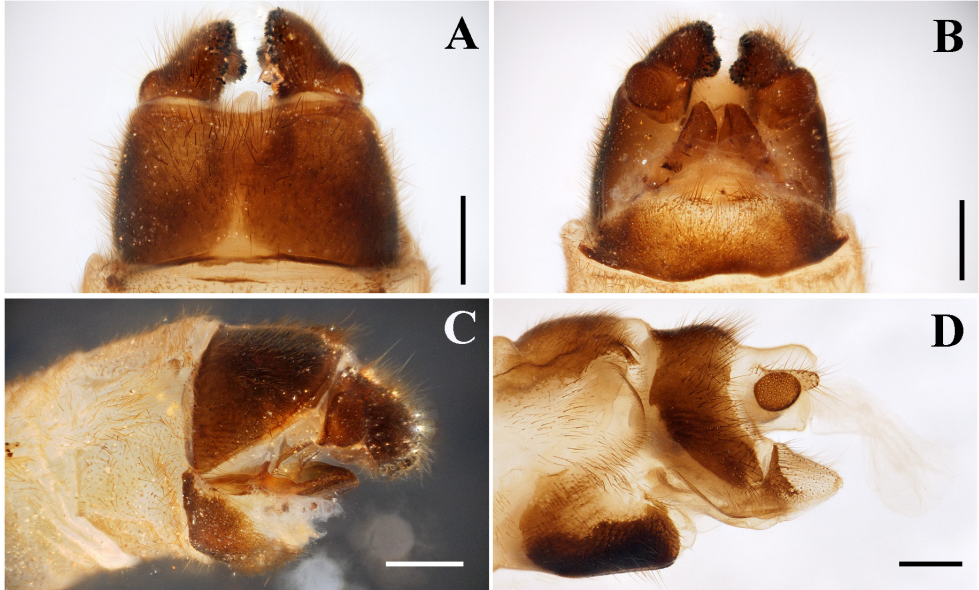


Figure 2. *Ctenochauliodes yangi*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, male genitalia, lateral view; F, female genitalia, lateral view. Scale bars: 1 cm.

Distribution. China (Guangxi, Guangdong) (Liu and Yang, 2006a; Liu *et al.*, 2011; Yang and Liu, 2010), and Thailand (Nan, **new record**).

Neochauliodes meridionalis van der Weele, 1909 (Figure 3)

Neochauliodes sinensis meridionalis van der Weele, 1909: 260. Type locality: China (South China).

Neochauliodes meridionalis: Liu and Yang, 2005: 15, figs. 7, 32–35 [raised to species]; Liu *et al.*, 2010: 113; Yang and Liu, 2010: 293; Liu *et al.*, 2016: 63.

Non-type material examined. **NORTHERN:** 4♂ (THNHM-I-24012, THNHM-I-24014, pinned; THNHM-I-24013, THNHM-I-24015, in alcohol), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 12.V.2020, L. Khaton leg.; 5♀ (THNHM-I-24008 to THNHM-I-24011, pinned; THNHM-I-24016, in alcohol), same locality, date, and collector; 1♀ (THNHM-I-24017, in alcohol), same locality and collector, 7.V.2020.

Diagnosis. Head reddish brown or yellow, wings hyaline with dark marks; pterostigma short, pale yellow; forewing with a small spot on basal third of intercostal area, and a long and a short stripe before and after pterostigma, respectively; basal third of wing with dispersed spots; median transverse band extending from RA to CuP, with small spot marks on each side; apical margin with irregular marks along longitudinal veins; hindwing similarly marked, but basal half mostly hyaline, with median transverse band;

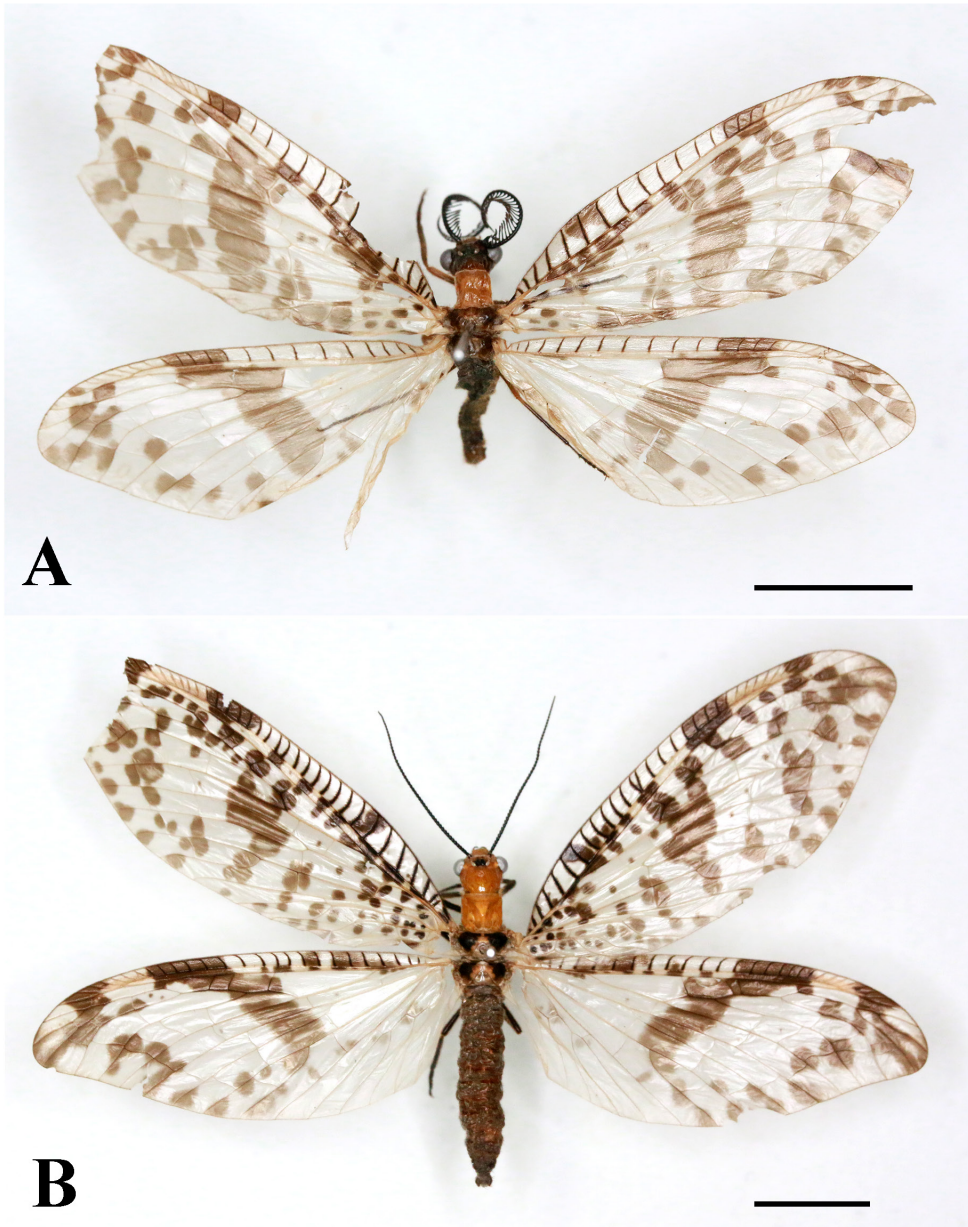


Figure 3. *Neochauliodes meridionalis*, dorsal view. A, male; B, female. Scale bars: 1 cm.

male fused tenth gonocoxites in ventral view strongly sclerotized, narrowly elongated, subtriangular, with apical margin slightly incised (Figure 4).

Distribution. China (Guangdong, Guangxi, Hainan, Yunnan), Vietnam (Hoa Binh, Ha Tinh) (Liu and Yang, 2005; Liu *et al.*, 2010; Liu *et al.*, 2016), Thailand (Nan, **new record**).

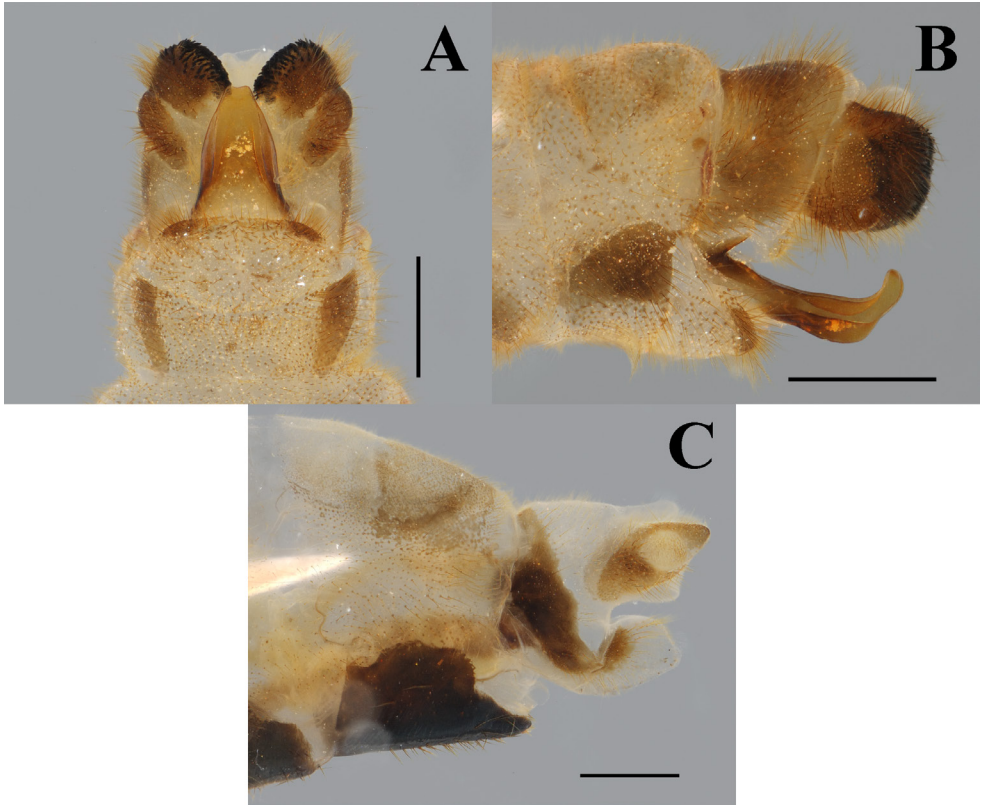


Figure 4. *Neochauliodes meridionalis*, genitalia. A, male genitalia, ventral view; B, male genitalia, lateral view; C, female genitalia, lateral view. Scale bars: 1 mm.

***Neochauliodes punctatolus* Liu and Yang, 2006** (Figures 5, 33A)

Neochauliodes punctatolus Liu and Yang, 2006: 193. Type locality: China (Yunnan: Jingdong)

Neochauliodes punctatolus: Yang and Liu, 2010: 303, fig. 148; Liu *et al.*, 2010: 118, figs. 8, 26.

Non-type material examined. **NORTHERN:** 2♂ (THNHM-I-23992 and THNHM-I-23993, pinned), Chiang Mai Province, Omkoi District, 17°50'47.8"N, 98°22'21.8"E, 960 m a.s.l., 18.VII.2019, K. Piraonapicha leg.; 1♂ (THNHM-I-23994, pinned), same locality and collector, 29.VII.2020; 1♂ (THNHM-I-24310, pinned), Chiang Mai Province, Mae Ai District, Pha Hom Pok N.P., 20°06'00.2"N, 99°16'22.4"E, 28.V.2008, T. Jeenthong leg.; 1♀ (THNHM-I-24314, pinned), same locality, date and collector; 3♂ (THNHM-I-24311 to THNHM-I-24313, pinned), Chiang Mai Province, Fang District, Pha Hom Pok National Park, 19°58'02.7"N, 99°09'13.7"E, 26.V.2008, T. Jeenthong leg.; 1♂ (THNHM-I-24000, pinned), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 29.VII.2020, K. Pi-

raonapicha leg.; 1♀ (THNHM-I-24343, in alcohol), same locality, date, and collector; 1♂ (THNHM-I-24342, in alcohol), Nan Province, Thung Chang District, no date collected, D. Tapunya & T. Phutthanurak leg., THNHM. **NORTHEASTERN:** 3♂ (THNHM-I-23997, pinned; THNHM-I-24337, THNHM-I-24340, in alcohol), Nakhon Ratchasima Province, Pak Chong District, Khao Yai National

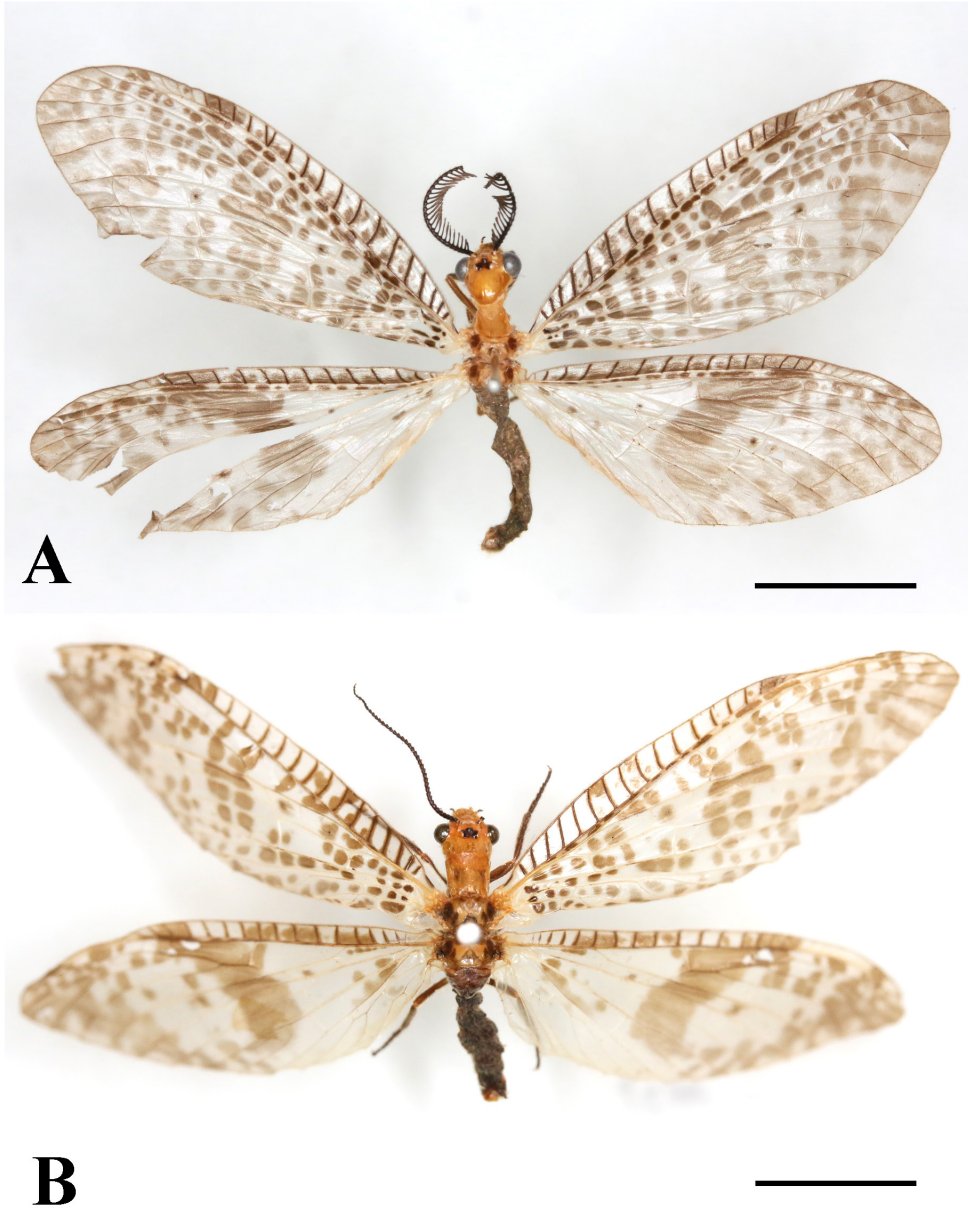


Figure 5. *Neochauliodes punctatolus*, dorsal view. A, male; B, female. Scale bars: 1 cm.

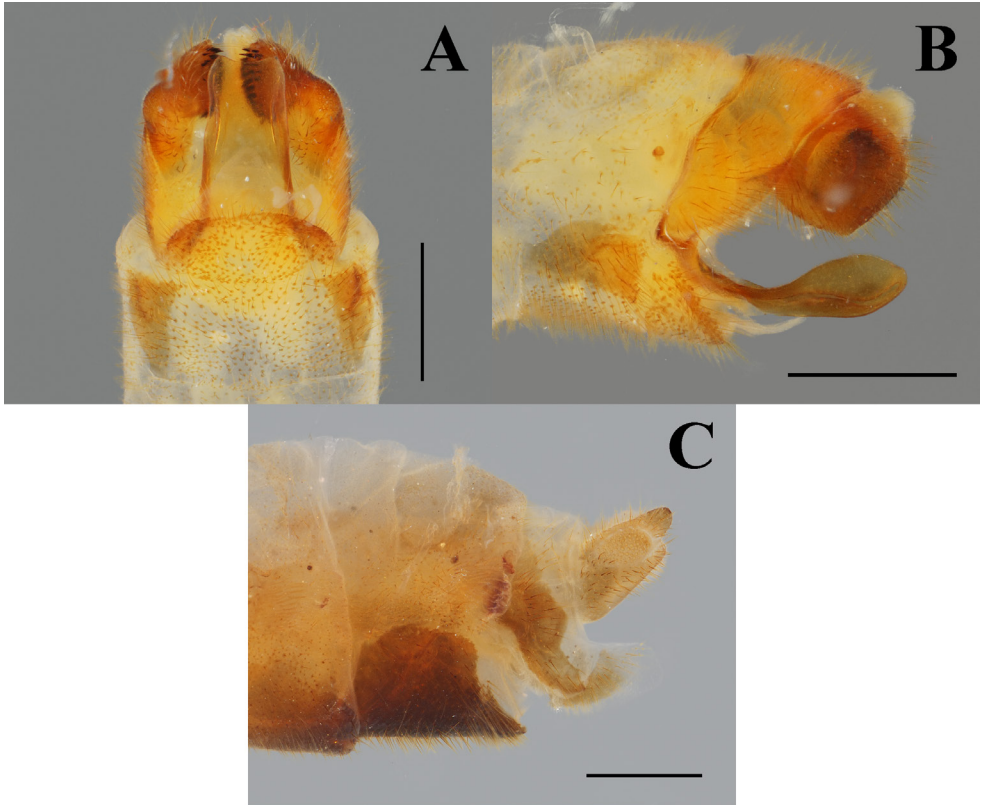


Figure 6. *Neochauliodes punctatolus*, genitalia. A, male genitalia, ventral view; B, male genitalia, lateral view; C, female genitalia, lateral view. Scale bars: 1 mm.

Park, Haew Suwat Waterfall, 14°26'4.18"N, 101°24'56.69"E, 617 m a.s.l., 8.V.2019, K. Piraonapicha leg.; 2♂ (THNHM-I-23998 and THNHM-I-23999, pinned), same locality and collector, 26.VI.2019; 2♂ (THNHM-I-23995 and THNHM-I-23996, pinned), Loei Province, Phu Ruea District, Song Khon Waterfall, 17°21'12.8"N, 101°24'23.1"E, 706 m a.s.l., 3.V.2020, K. Piraonapicha leg.; **CENTRAL:** Uthai Thani Province, Ban Rai District, Huai Kha Khaeng W.S., 1.VI.2002, W. Jaitrong leg. **EASTERN:** 2♀ (THNHM-I-24315 and THNHM-I-24316, pinned), Chanthaburi Province, Soi Dao District, Soi Dao waterfall, 13°05'49.1"N, 102°10'20.1"E, 17.V.2008, T. Jeenthong leg.; 2♀ (THNHM-I-24344, THNHM-I-24346, in alcohol), Sa Kaeo Province, Mueang Sa Kaeo District, Huai Nam Yen Stream, Pang Si Da National Park, 14°2'18.24"N, 102°16'6.04"E, 300 m a.s.l., 22.VI.2017, K. Piraonapicha leg.

Diagnosis. Head and pronotum yellow; wing with dense small spots; in ventral view, male fused tenth gonocoxites strongly sclerotized subtriangular, clearly longer than broad, with apical margin slightly incised, and with basal incision deeply V-shaped; in lateral view, male fused tenth gonocoxites curved upward with slender elongated stem and distinctly inflated apex (Figure 6).

Distribution. China (Yunnan), Laos, Vietnam (Yang and Liu, 2010; Liu and Yang, 2006); Thailand (Chanthaburi, Chiang Mai, Nakhon Ratchasima, Nan, Phetchabun, Sa Kaeo, Uthai Thani) (Yang and Liu, 2010; Sangpradub *et al.*, 2018; Mahama *et al.*, 2018; this study).

***Neochauliodes tonkinensis* (van der Weele, 1907)** (Figures 7, 33B)

Chauliodes tonkinensis van der Weele, 1907: 260. Type locality: Vietnam (Tuyen Quang: Chiem-Hoa).

Neochauliodes orientalis Yang and Yang, 1991: 74 (Synonymy by Liu *et al.*, 2010).

Neochauliodes yunnanensis Navás, 1930: 1 (Synonymy by Liu *et al.*, 2010).

Neochauliodes tonkinensis (van der Weele, 1907): Liu *et al.*, 2010: 120; Háva, 2016: 171; Liu and Dobosz, 2019: 186.

Non-type material examined. **NORTHERN:** 5♂ (THNHM-I-24096 to THNHM-I-24100, in alcohol), Chiang Mai Province, Chom Thong District, 18°32'19.3"N, 98°33'00.1"E, 6.IX.2020, K. Piraonapicha leg.; 1♀ (THNHM-I-24101, in alcohol), same locality, date, and collector, THNHM; 7♂ (THNHM-I-24318 to THNHM-I-24324, pinned), Chiang Mai Province, Mae Ai District, Pha Hom Pok N.P., 19°58'02.7"N, 99°09'13.7"E, 27.V.2008, T. Jeenthong leg.; 1♀ (THNHM-I-24325, pinned), same locality, date and collector; 4♂ (THNHM-I-24326 to THNHM-I-24329, pinned), same locality and collector, 28.V.2008; 1♀ (THNHM-I-24327, pinned), Chiang Mai Province, Chom Thong District, Doi Inthanon N.P., 18°32'11.2"N, 98°31'20.6"E, 1,238 m a.s.l., 27.V.2008, T. Jeenthong leg.; 6♂ (THNHM-I-24073, pinned; THNHM-I-24074 to THNHM-I-24078, in alcohol), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 29.VII.2019, L. Khaton leg.; 1♂ (THNHM-I-24079, pinned), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 7.V.2020, L. Khaton leg.; 1♀ (THNHM-I-24080, in alcohol), same locality, date, and collector; 15♂ (THNHM-I-24081 to THNHM-I-24091, pinned, THNHM-I-24092 to THNHM-I-24095, in alcohol), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 12.V.2020, L. Khaton leg.; 1♂ (THNHM-I-24326, pinned), Nan Province, Chalerm Prakiat District, Ban Sai Khaw, 9.III.2007, T. Jeenthong leg.; 1♂ (THNHM-I-24328, pinned), Nan Province, Bo Kluea District, Ban Ven, 17.VII.2014, T. Jeenthong leg. **WESTERN:** 1♀ (THNHM-I-15676, pinned), Ratchaburi Province, Suan Phueng District, 21.VII.2019, K. Jiaranaisakul leg. **NORTH-EASTERN:** 1♂ (THNHM-I-24329, pinned), Loei Province, Phu Luang District, Phu

Luang W.S., 17°20'34.1"N, 101°30'31.0"E, 915 m a.s.l., 24.IX.2009, T. Jeenthong leg.;
1♂ (THNHM-I-24330, pinned), same locality and collector, 25.IX.2009, T. Jeenthong leg.

**A****B**

Figure 7. *Neochauliodes tonkinensis*, dorsal view. A, male; B, female. Scale bars: 1 cm.

Diagnosis. Head and pronotum yellowish brown; forewing basally with a few brownish spots on costal area, respectively with a stripe before and behind pterostigma, stripe before pterostigma much longer, basal marks with scattered dots; hindwing similarly

marked, but with basal half entirely hyaline; in ventral view, male fused tenth gonocoxite strongly sclerotized and subtriangular, clearly longer than broad, gradually tapering posteriorly, and with basal incision deeply V-shaped (Figure 8).

Distribution. China (Yunnan), Laos (Houa Phan); Myanmar (Shan State); Vietnam (Cao Bang, Lao Cai, Tuyen Quang and Vinh Phu) (Liu *et al.*, 2010) and Thailand (Chiang Mai, Loei, Ratchaburi and Nan, **new record**).

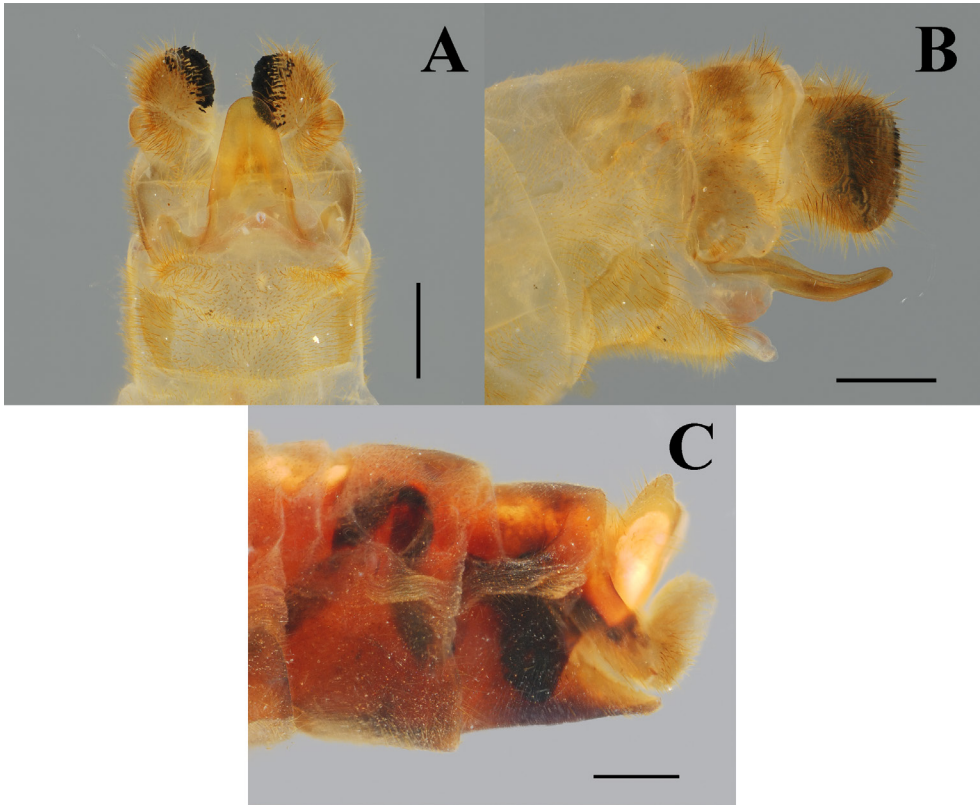


Figure 8. *Neochauliodes tonkinensis*, genitalia. A, male genitalia, ventral view; B, male genitalia, lateral view; C, female genitalia, lateral view. Scale bars: 1 mm.

Subfamily Corydalinae Davis, 1903

Acanthacorydalis asiatica (Wood-Mason, 1884) (Figures 9, 33C, 33D)

Corydalis asiatica Wood-Mason, 1884: 110. Type locality: India (Naga Hills).

Acanthacorydalis asiatica: Weele, 1907: 230 (transferred to *Acanthacorydalis*); Glorioso 1981: 282 (designed *Corydalis asiatica* as the type species of *Acanthacorydalis*); Liu *et al.*, 2005: 374; Yang and Liu, 2010: 99; Bolotov *et al.*, 2014: 446; Cao *et al.*, 2019: 123.

Non-type material examined. *NORTHERN*: 4♂ (THNHM-I-23434 to THNHM-I-23437, pinned), Mae Hong Son Province, Mueang District, Pai River, 19°13'36.746"N, 97°2'14.038"E, 13.I.2021 S. Rattanachai-preechakul & O. Rattanachai-preechakul leg.; 1♀, Mae Hong Son Province, Sob Moei District, Mae Ngao River, 17°48'31.3"N, 97°59'20.8"E, 14.II.2020, K. Piraonapicha leg. (THNHM-I-23432, pinned); 1♀ (THNHM-I-23433, pinned), Nan Province, Bo Kluea District, 19°11'13.35"N, 97°59'20.8"E, 1,006 m a.s.l., 6.II.2021, L. Khaton leg.

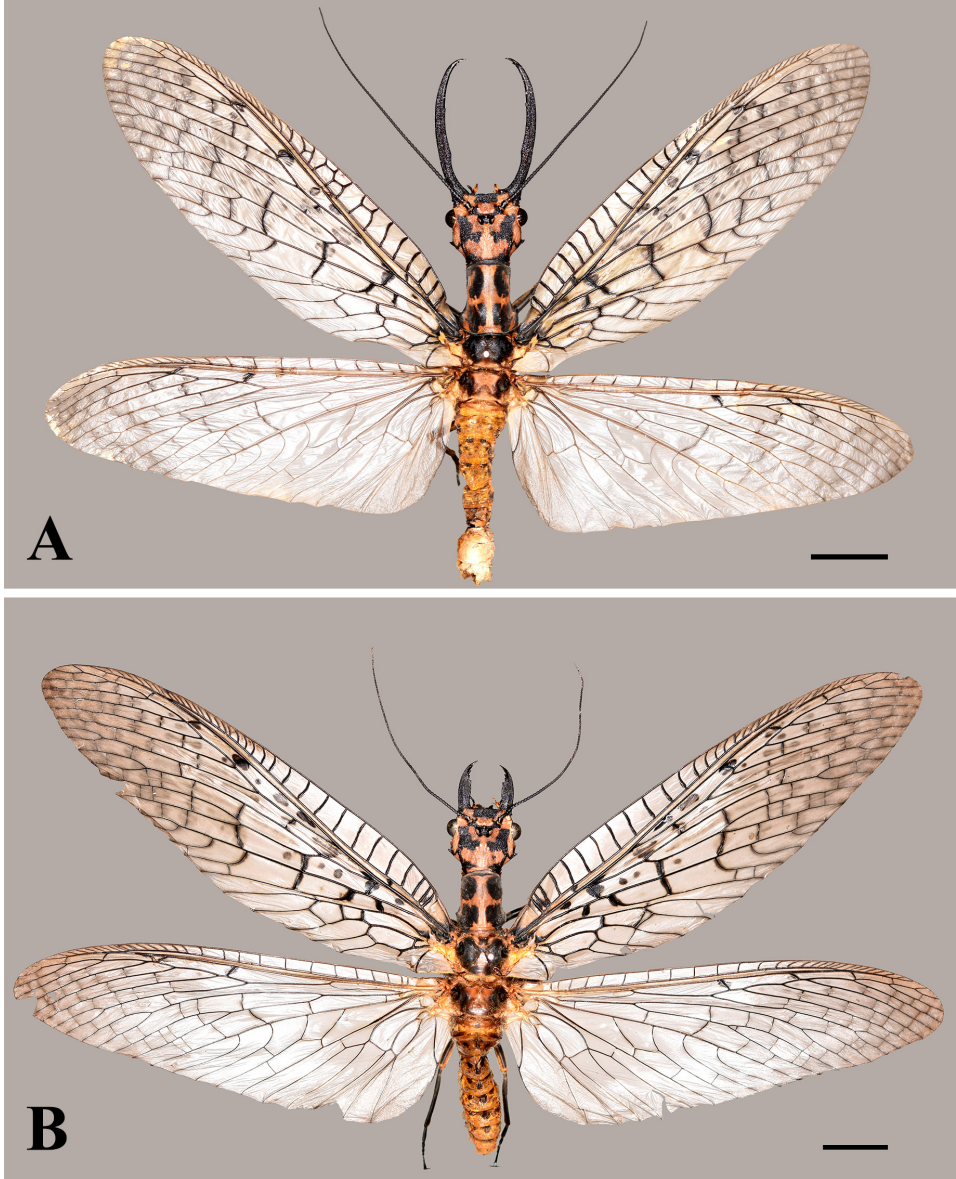


Figure 9. *Acanthacorydalis asiatica*, dorsal view. A, male; B, female. Scale bars: 1 cm.

Diagnosis. Head yellowish brown, with a pair of irregular longitudinal black marks running from level of middle length of compound eyes to occiput in both sexes; male mandibles enlarge and elongate, with large and sharp apical tooth, followed by small triangular subapical tooth, and large, blunt basal tooth; male ectoproct clavate, inner margin weakly sinuate; in ventral view, male fused tenth gonocoxites with swollen lateral arms and its median portion subrectangular; male tenth gonostyli curved inward, shorter than lateral arms of tenth gonocoxites, and connected to posterolateral portion of tenth gonocoxites (Figure 10).

Distribution. India (Naga Hills and Assam), Myanmar (Kachin), China (Sichuan and Yunnan) (Mason, 1884, Bolotov *et al.*, 2014, Cao *et al.*, 2019) and Thailand (Mae Hong Son, Nan, **new record**).

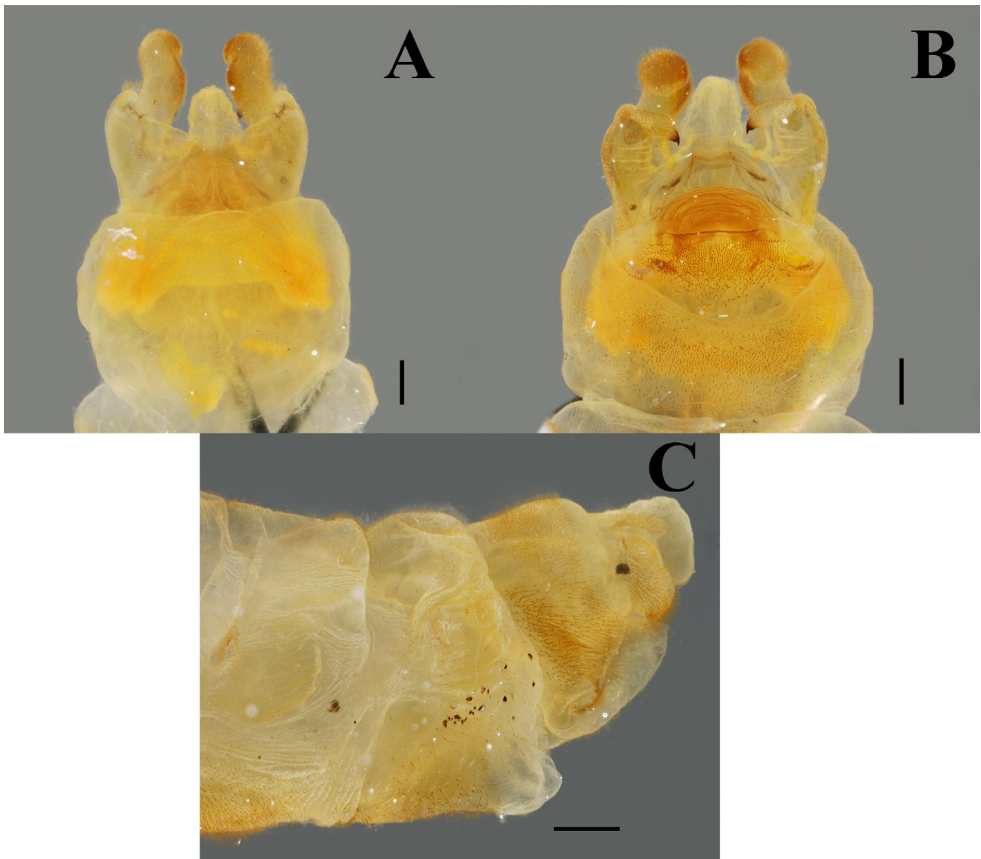


Figure 10. *Acanthacorydalis asiatica*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, female genitalia, lateral view. Scale bars: 1 mm.

Neoneuromus coomani Lestage, 1927 (Figure 11)

Neoneuromus coomani Lestage, 1927: 111. Type locality: Vietnam.

Neoneuromus coomani : Yang *et al.*, 2018: 588, figs. 1D,3, 6E–F.

Non-type material examined. **NORTHERN:** 2♂ (THNHM-I-24025 and THNHM-I-24026, pinned), Chiang Rai Province, Wiang Pa Pao District, 19°50'54"N, 100°9'12"E, 11.VI.2019., 11.VI.2019, W. Pathomwattananurak leg.; 5♀ (THNHM-I-24027 to THNHM-I-24029, pinned, THNHM-I-24030 to THNHM-I-24031, in alcohol), same locality, date, and collector; 9♂ (THNHM-I-24032 to THNHM-I-24038,

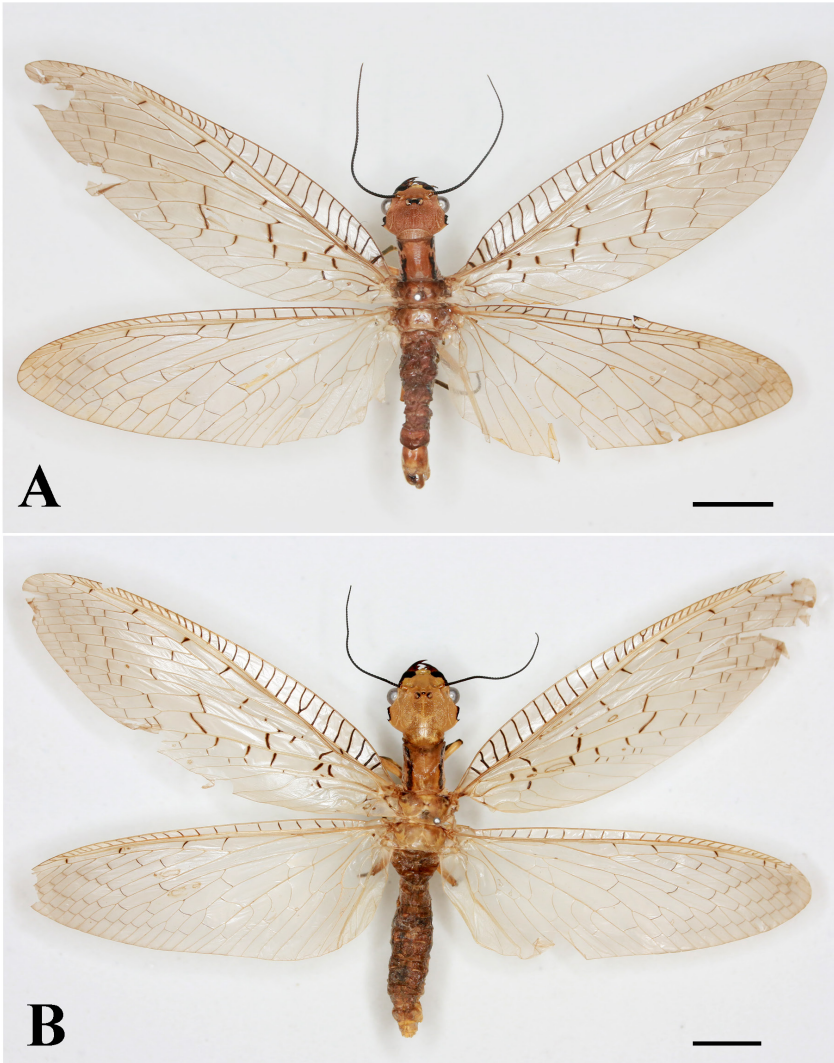


Figure 11. *Neoneuromus coomani*, dorsal view. A, male; B, female. Scale bars: 1 cm.

pinned; THNHM-I-24039 to THNHM-I-24040, in alcohol), Chiang Mai Province, Chom Thong District, 18°32'19.3"N, 98°33'00.1"E, 6.IX.2020, K. Boonarj leg.; 2♀ (THNHM-I-24041, THNHM-I-24042, pinned), same locality, date, and collector.

Diagnosis. Head yellow to yellowish brown; pronotum with a pair of short anterolateral black markings, bear a small black spot aside, and a pair of long lateral black vittae; ninth sternite attenuate, clearly longer than broad, its median portion with two longitudinal internal ridges, and slightly concave apical incision; fused tenth gonocoxites strongly sclerotized, with long lateral arms, obtuse lateral projections; tenth gonostyli slender, connected to posterolateral tenth gonocoxites (Figure 12).

Distribution. China (Sichuan, Yunnan); Laos (Attapeu, Champasak, Bokeo, Hua Phan, Savannakhet, Xieng Khouang); Thailand (Chiang Mai, Chiang Rai); Vietnam (Hoa Binh, Lao Cai, Quang Nam, Son La, Vinh Phuc) (Yang *et al.*, 2018 and this study).

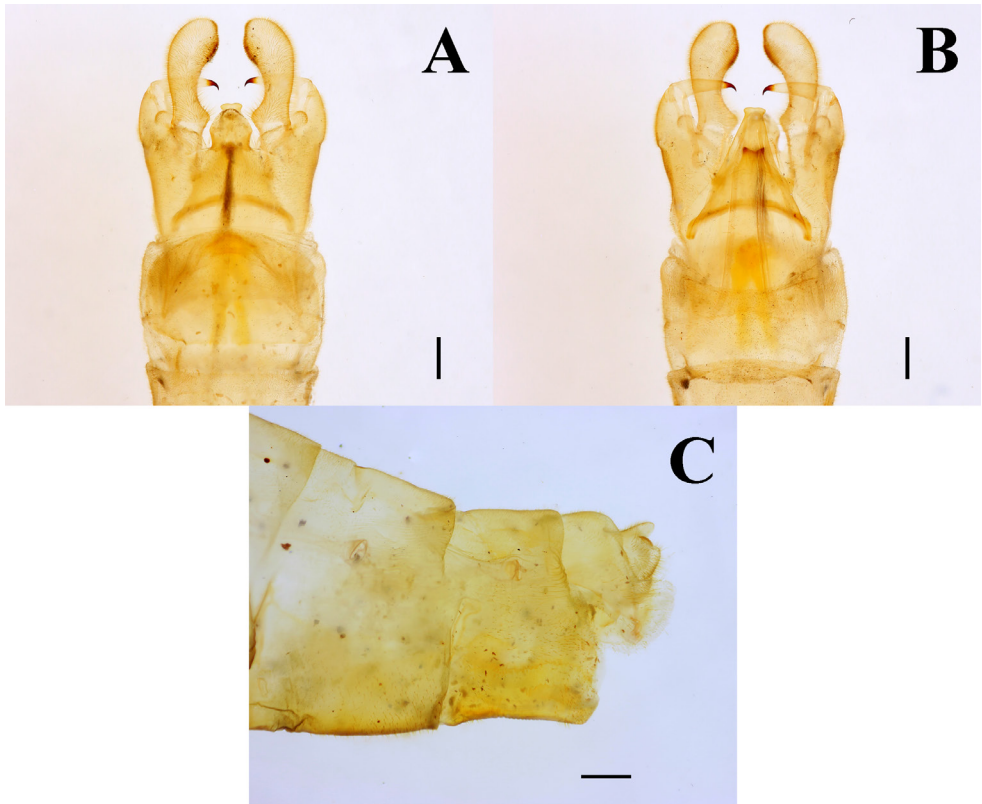


Figure 12. *Neoneuromus coomani*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, female genitalia, lateral view. Scale bars: 1 mm.

***Neoneuromus ignobilis* Navás, 1932** (Figures 13, 33E)

Neoneuromus ignobilis Navás, 1932: 147. Type locality: China (Sichuan: Emeishan)

Neoneuromus ignobilis: Liu and Yang, 2004: 148; Yang and Liu, 2010: 113; Cao *et al.*, 2018: 538; Yang *et al.*, 2018: 589.

Corydalis huangshanensis Ôuchi, 1939: 230. (Synonymy by Liu and Yang, 2004.)

Non-type material examined. NORTHERN: 1♀ (THNHM-I-24357, pinned), Chiang Mai Province, Fang District, Ban Yang, 6.VI.1986, Sampao leg.; 10♂ (THNHM-I-23516

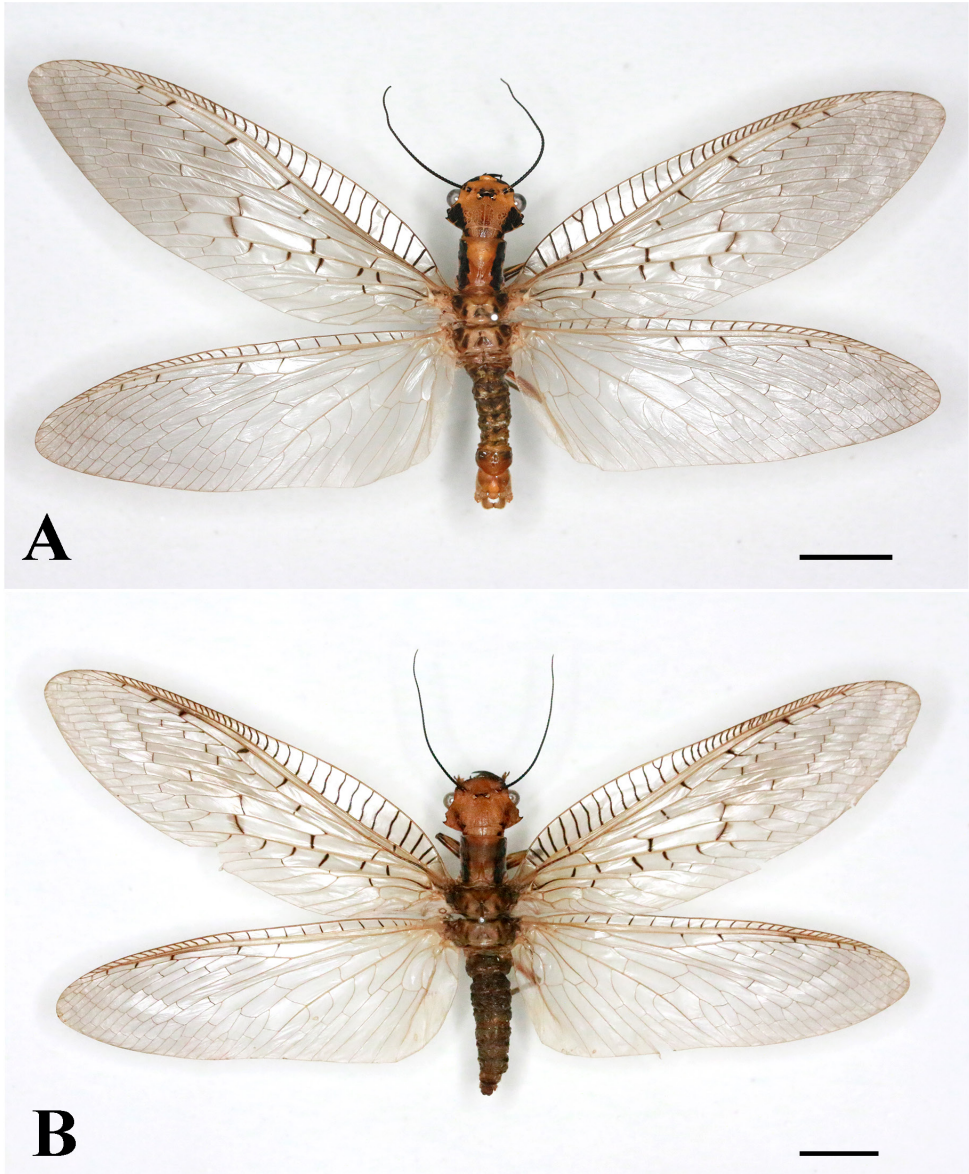


Figure 13. *Neoneuromus ignobilis*, dorsal view. A, male; B, female. Scale bars: 1 cm.

to THNHM-I-23523, pinned; THNHM-I-23524 and THNHM-I-23525, in alcohol), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 12.V.2020, L. Khaton leg.; 11♀ (THNHM-I-23495 to THNHM-I-23498, THNHM-I- 23509 to THNHM-I-23515, pinned), same locality, date and collector.

Diagnosis. Head and prothorax yellow to yellowish brown; head with black marking running from posterior margin of compound eye to posterolateral corner of head (weak or absent in some specimens); pronotum with a pair of longitudinal black vittae; wings hyaline, with its apical half slightly darker than basal half; in ventral view, male ninth sternum attenuate, clearly longer than broad, its median portion with two longitudinal internal ridges, and with concaved distally, leaving a pair of digitiform projections; male fused gonocoxites 10 with long lateral arms, rather narrow apex, a pair of long and narrow lateral projections, and a pair of tenth gonostyli (Figure 14).

Distribution. China (Anhui, Chongqing, Gansu, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Yunnan, Zhejiang), Laos (Bokeo, Champasak, Hua Phan, Savannakhet, Xieng Khouang), Vietnam (Cao Bang, Ha Noi, Ha Tinh, Kon Tum, Lai Chau, Lam Dong, Lang Son, Lao Cai, Nghe An, Son La, Thua Thien Hue) (Yang *et al.*, 2018), and Thailand (Nan, **new record**).

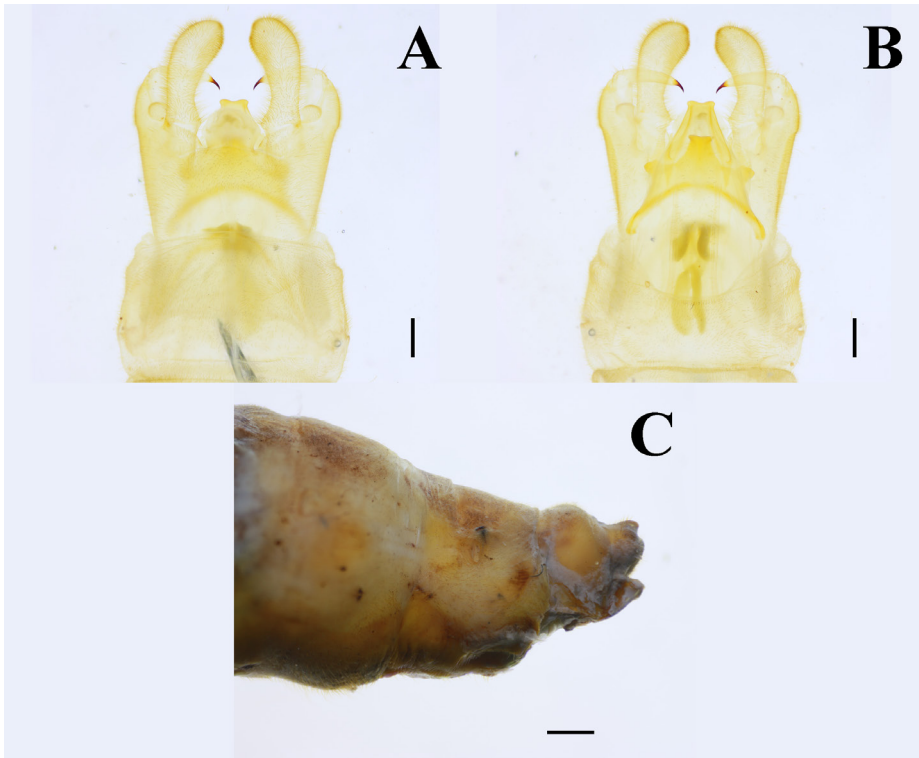


Figure 14. *Neoneuromus ignobilis*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, female genitalia, lateral view. Scale bars: 1 mm.

Neoneuromus indistinctus Liu, Hayashi and Yang, 2018 (Figures 15, 33F)

Neoneuromus indistinctus Liu, Hayashi and Yang, 2018: 590. Type locality: China (Yunnan: Huanglianshan).

Non-type material examined. **NORTHERN:** 40♂ (THNHM-I-23452 to THNHM-I-234553, THNHM-I-23455 to THNHM-I-23485, THNHM-I-23538 to THNHM-I-23544, THNHM-I-23549, pinned), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1006 m a.s.l., 12.V.2020, L. Khaton leg.; 25♀ (THNHM-I-23454, THNHM-I-23486 to THNHM-I-23494, THNHM-I-23499 to

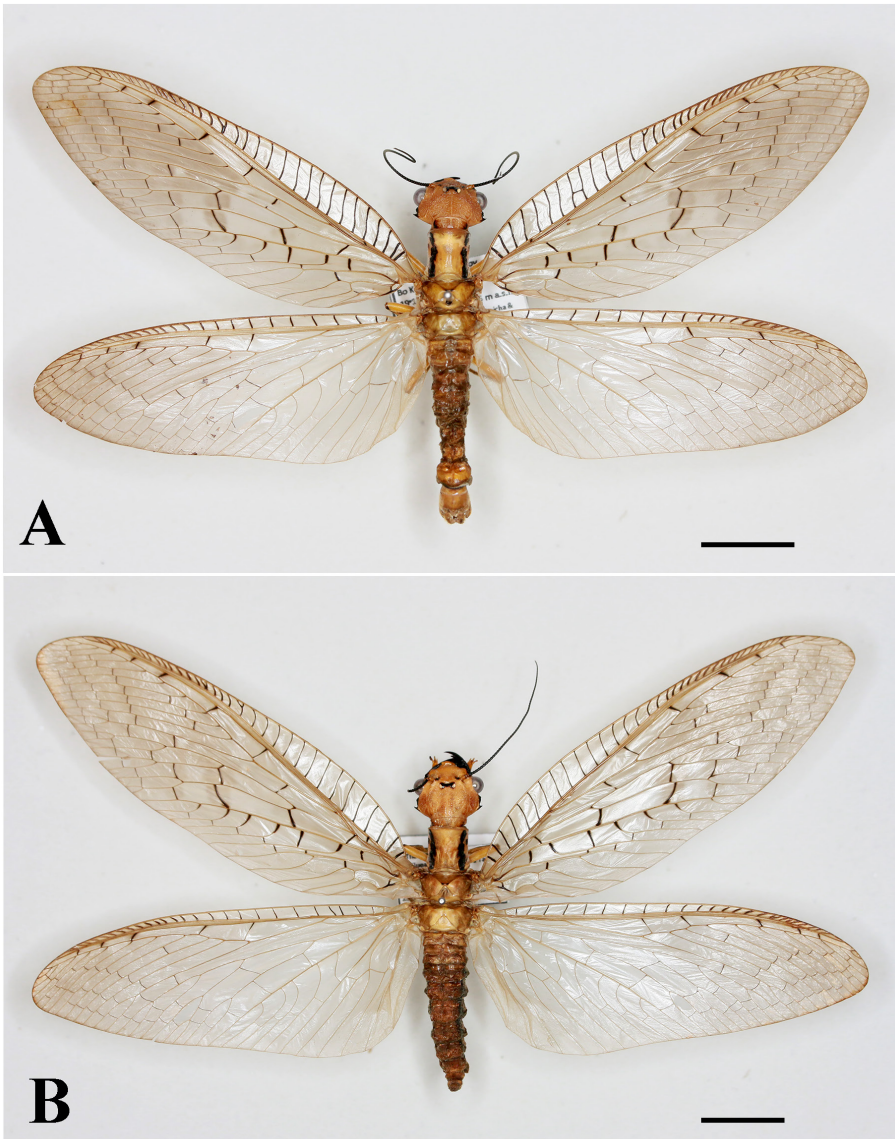


Figure 15. *Neoneuromus indistinctus*, dorsal view. A, male; B, female. Scale bars: 1 cm.

THNHM-I-23505, THNHM-I-23526 to THNHM-I-23527, THNHM-I-23532 to THNHM-I-23537, pinned), same locality, date and collector; 2♂ (THNHM-I-23546 and THNHM-I-23548, pinned), same locality and collector, 29.VII.2019; 6♀ (THNHM-I-23528 to THNHM-I-23531, THNHM-I-23547, THNHM-I-24475, pinned), same locality, date and collector; 1♂ (THNHM-I-23545, pinned), same locality and collector, 28.VII.2020; 4♀ (THNHM-I-24472 to THNHM-I-24474, pinned), same locality, date and collector; 1♂ (THNHM-I-23550, pinned), same locality and collector, 7.V.2020; 3♀ (THNHM-I-23986 to THNHM-I-23988, in alcohol), same locality, date and collector; 1♀ (THNHM-I-24482, pinned), Nan Province, Chiang Klang District, Nan river, 19°13'31.08"N, 100°49'28.52"E, 246 m a.s.l., 19.IV.2017, T. Phuttanurak & P. Buntha leg.; 1♂ (THNHM-I-24524, pinned), Nan Province, Bo Kluea District, Ban Ven, 1,076 m a.s.l., 17.VII.2014, T. Jeenthong leg. **NORTHEASTERN:** 1♂ (THNHM-I-24523, pinned), Loei Province, Na Haeo District, Phu Suan Sai, 1.V.2018, W. Sanguansombat & Y. Ratchamee leg.

Diagnosis. Head yellow, with only postocular margins and postocular spines black; pronotum yellow, laterally with a pair of black vittae that are sometimes interrupted

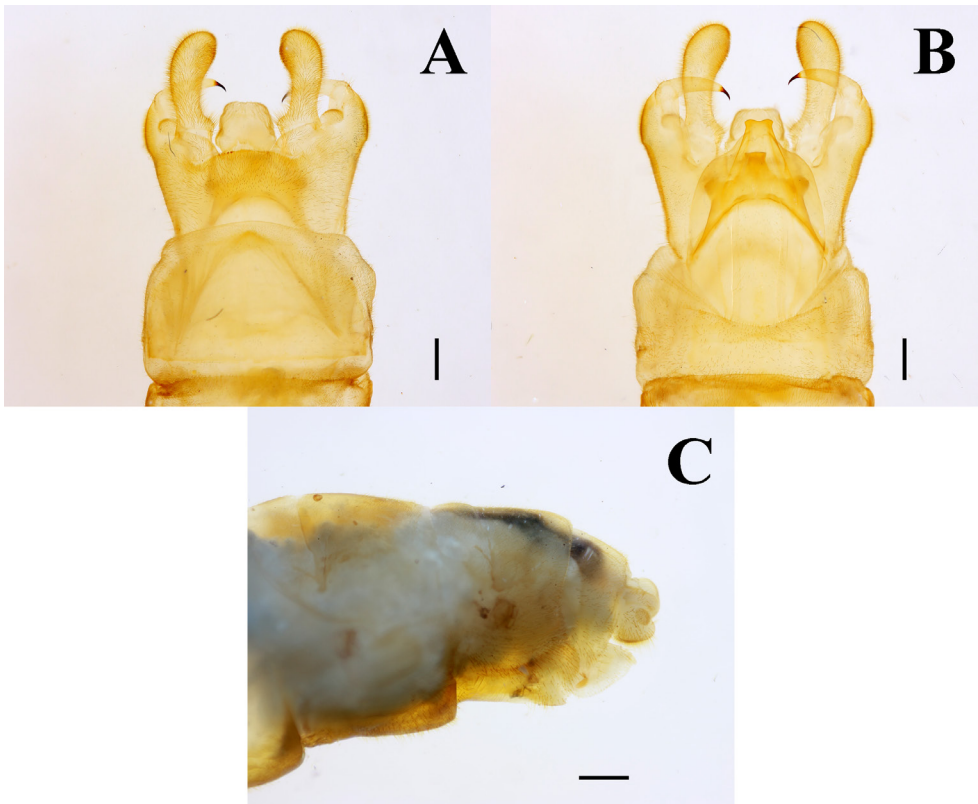


Figure 16. *Neoneuromus indistinctus*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, female genitalia, lateral view. Scale bars: 1 mm.

anteriorly, and anterolaterally with a pair of small black spots aside black vittae. Legs blackish brown, with femora mostly yellow. Forewing slightly smoky brown on distal half, lacking dark marking on 1mp-cua. Male ninth sternum with apex much narrower than anal sclerite, distinctly incised medially at tip, leaving a pair of short digitiform projections. Male fused tenth gonocoxites with long lateral arms and narrow apex, lateral projections subtrapezoidal, tenth gonostyli present (Figure 16).

Distribution. China (Yunnan Province), Laos (Hua Phan) (Yang *et al.*, 2018), and Thailand (Nan and Loei Provinces, **new records**).

Neurhermes sumatrensis (van der Weele, 1909) (Figures 17, 33G)

Hermes sumatrensis van der Weele, 1909: 255. Type locality: Indonesia (Sumatra).

Neurhermes sumatrensis: Navás, 1915: 391 (transferred to *Neurhermes*); Liu *et al.*, 2015b: 56.

Non-type material examined. WESTERN: 1♂ (THNHM-I-23442, pinned), Prachuap Khiri Khan Province, Thap Sakae District, 11°37'28.6"N, 99°36'57.2"E,

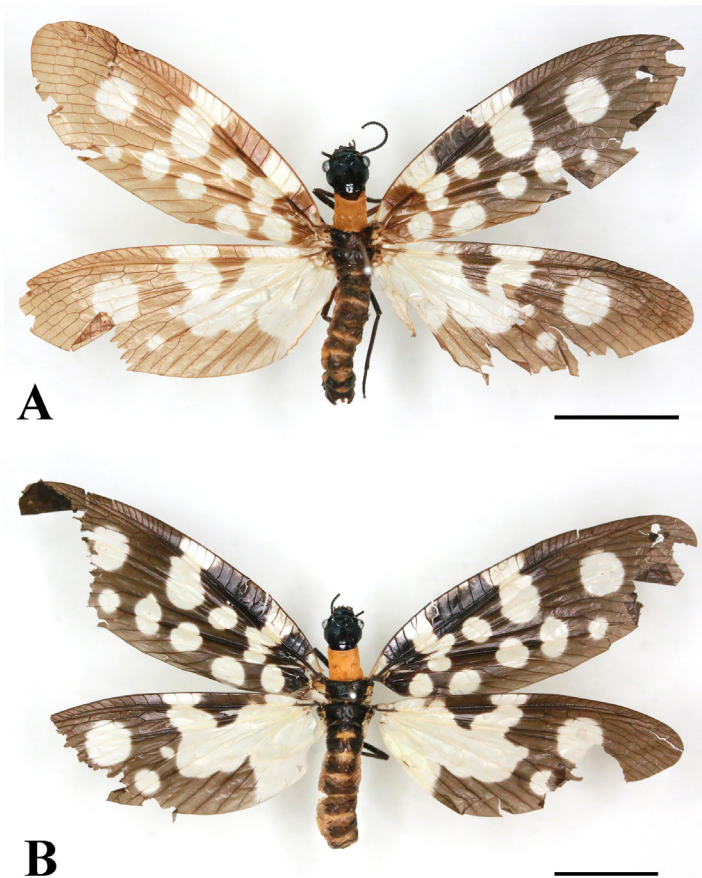


Figure 17. *Neurhermes sumatrensis*, dorsal view. A, male; B, female. Scale bars: 1 cm.

1,006 m a.s.l., 17.VII.2019, P. Laudee leg. **SOUTHERN:** 5♂ (THNHM-I-23439 to THNHM-I-23441, pinned; THNHM-I-23443 to THNHM-I-23444, in alcohol), Ranong Province, Kra Buri District, 10°38'9.548"N, 98°22'24.869"E, 17.VII.2020, W. Pathomwattananurak leg.; 3♀ (THNHM-I-23438, pinned; THNHM-I-23445 to THNHM-I-23446, in alcohol), same locality, date, and collector; 1♀ (THNHM-I-24347, pinned), Trang Province, IV.1964; 1♀ (THNHM-I-24348, pinned), Nakhon Si Thammarat Province, Tha Sala District, Khao Nan N.P., 47–360 m a.s.l., 21.XI.2006, Jin [Jarujin Nabhitabhata] et al. leg.; 1♀ (THNHM-I-24349, pinned), same locality, 26.I.2007, W. Jaitrong leg.; 1♀ (THNHM-I-24350, pinned), Nakhon Si Thammarat Province, Sichon District, Khao Nan N.P., Yod Nam Waterfall, 8°54'32.6"N, 99°43'55.3"E, 2.II.2008, W. Jaitrong leg.

Diagnosis. Pronotum yellow; a large white round markings present at distal 1/3 of both fore- and hindwings, hindwing with a broad proximal white marking, and male ninth sternum with a small posteromedian projection (Figure 18).

Distribution. Thailand (Prachuap Khiri Khan, Nakhon Si Thammarat, Ranong and Trang) (Liu *et al.*, 2015b; this study); Malaysia (Malay peninsula), and Indonesia (Sumatra) (Liu *et al.*, 2015b).

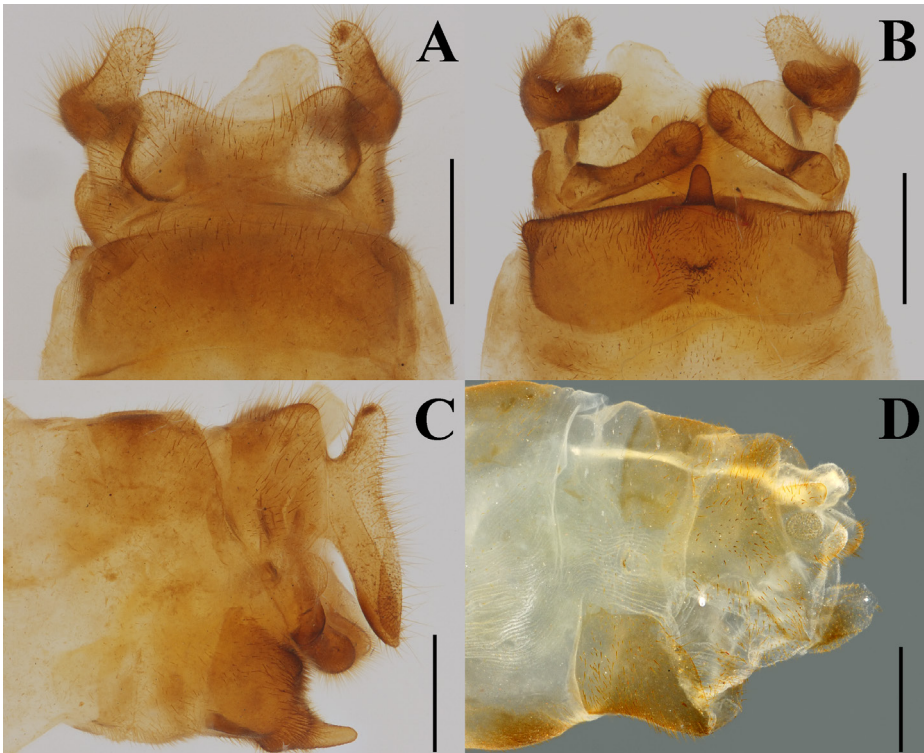


Figure 18. *Neurhermes sumatrensis*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, male genitalia, lateral view; D, female genitalia, lateral view. Scale bars: 1 mm.

Neurhermes tonkinensis (van der Weele, 1909) (Figure 19)

Hermes maculifera tonkinensis van der Weele, 1909: 255. Type locality: Vietnam.

Non-type material examined. **NORTHERN:** 2♀ (THNHM-I-24445 and THNHM-I-24446, pinned), Chiang Mai Province, Mae On District, 18°51'57.4"N, 99°21'11.0"E, D. Tapunya & T. Phutthanurak leg.; 1♂ (THNHM-I-23447, pinned), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 12.V.2020, L. Khaton leg. **WESTERN:** 1♀ (THNHM-I-15675, pinned), Ratchaburi Province, Suan Phueng District, 21.VII.2019, K. Jiaranaisakul leg. **NORTHEASTERN:** 3♂ (THNHM-I-23448, pinned);

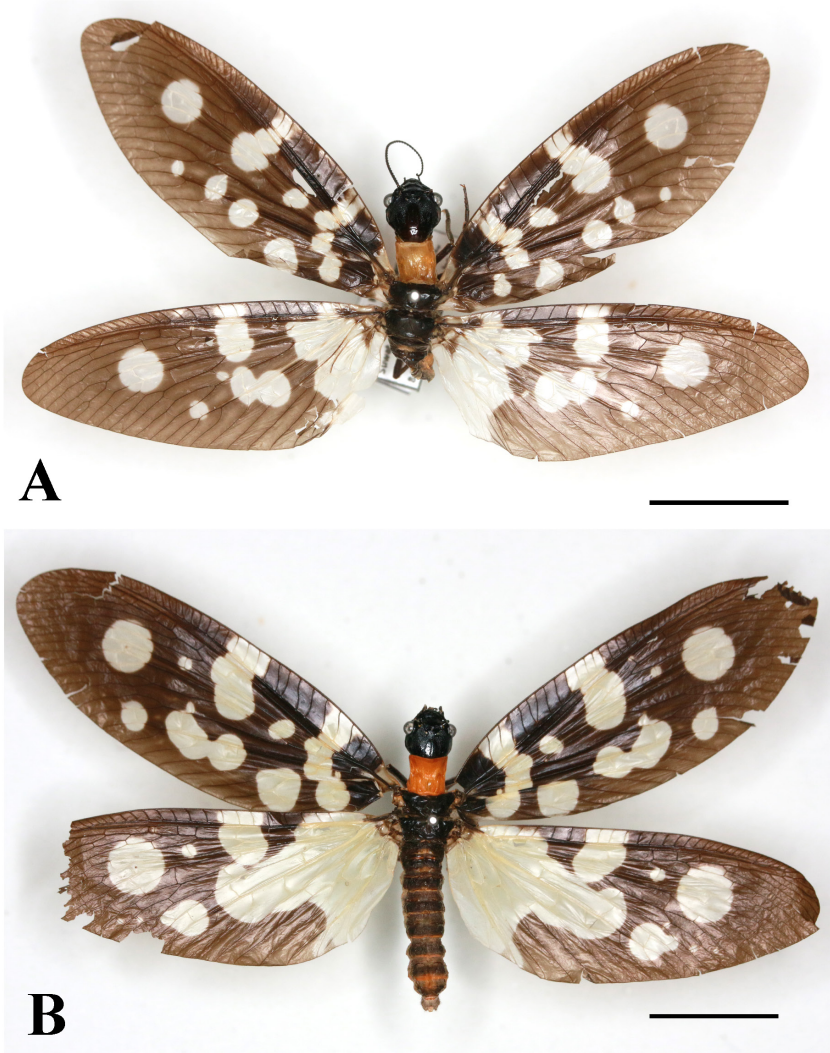


Figure 19. *Neurhermes tonkinensis*, dorsal view. A, male; B, female. Scale bars: 1 cm.

THNHM-I-23989 to THNHM-I-23990, in alcohol), Nakhon Ratchasima Province, Pak Chong District, Khao Yai National Park, Haew Suwat Waterfall, 14°26'4.18"N, 101°24'56.69"E, 617 m a.s.l., 8.V.2019, K. Piraonapicha leg.; 5♀ (THNHM-I-23449 to THNHM-I-23451, THNHM-I-23506, pinned; THNHM-I-23991, in alcohol), same locality, date, and collector; 1♀ (THNHM-I-24351, pinned), Loei Province, Na Duang District, Nam Suai Hui Pa Duk Forest Plantation, 12.IV.2008, T. Jeenthong leg.

Diagnosis. Pronotum yellow; a large white round marking present at distal 1/3 of both fore- and hindwings, hindwing with a broad proximal white marking, and male ninth sternum with strongly subtriangular projection at middle portion posteriorly (Figure 20).

Distribution. China (Fujian, Guangdong, Guangxi, Gui-zhou, and Yunnan), Vietnam (Bac Kan, Ha Giang, Ha Tay, Hoa Binh, Lam Dong, Lang Son, Lao Cai, and Vihn Phuc), Laos (Hua Phan, Luang Namtha, Xieng Khouang), and Thailand (Chantaburi, Chiang Mai, Nan, Mae Hong Son, Loei, and Nakhon Ratchasima, Ratchaburi) (Liu *et al.*, 2015b; this study).

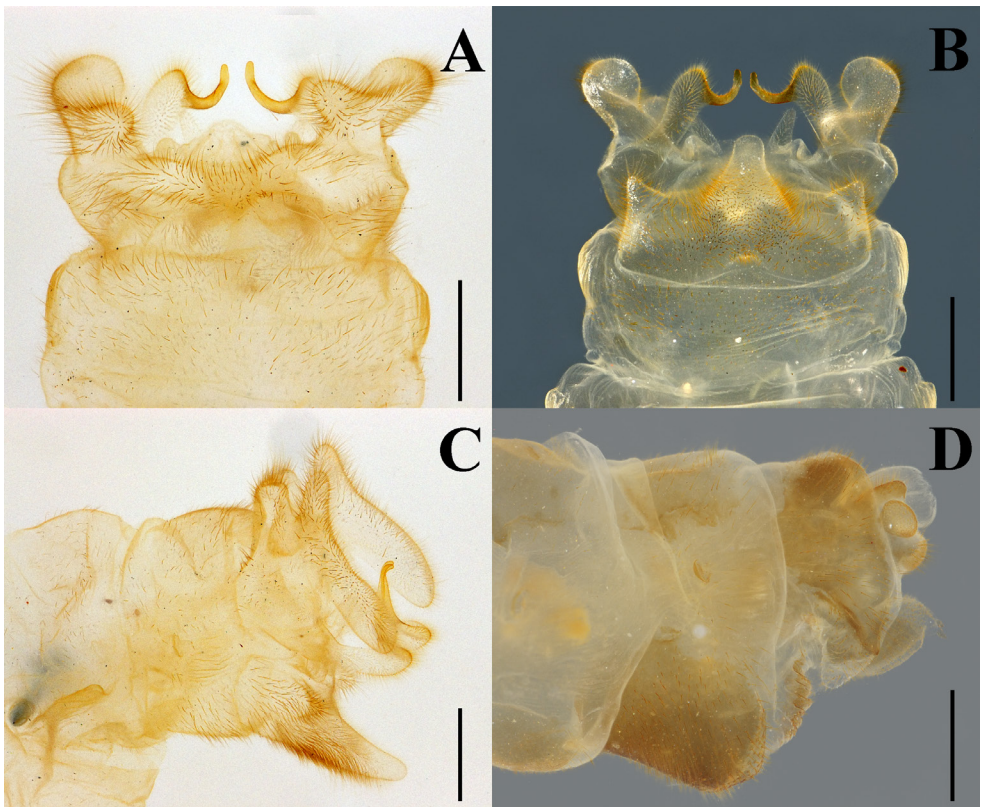


Figure 20. *Neurhermes tonkinensis*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, male genitalia, lateral view; D, female genitalia, lateral view. Scale bars: 1 mm.

Nevromus aspoeck Liu, Hayashi and Yang, 2012 (Figures 21, 33H)

Nevromus aspoeck Liu, Hayashi and Yang, 2012: 661. Type locality: China (Yunnan: Xishuangbanna).

Nevromus aspoeck: Piraonapicha *et al.*, 2021: 98, figs. 2–10, 16.

Non-type material examined. *NORTHERN*: 83 larvae (unknown sex, THNHM-I-24506, pinned), Mae Hong Son Province, Sob Moei District, Mae Ngao River, 17°48'31.3"N,

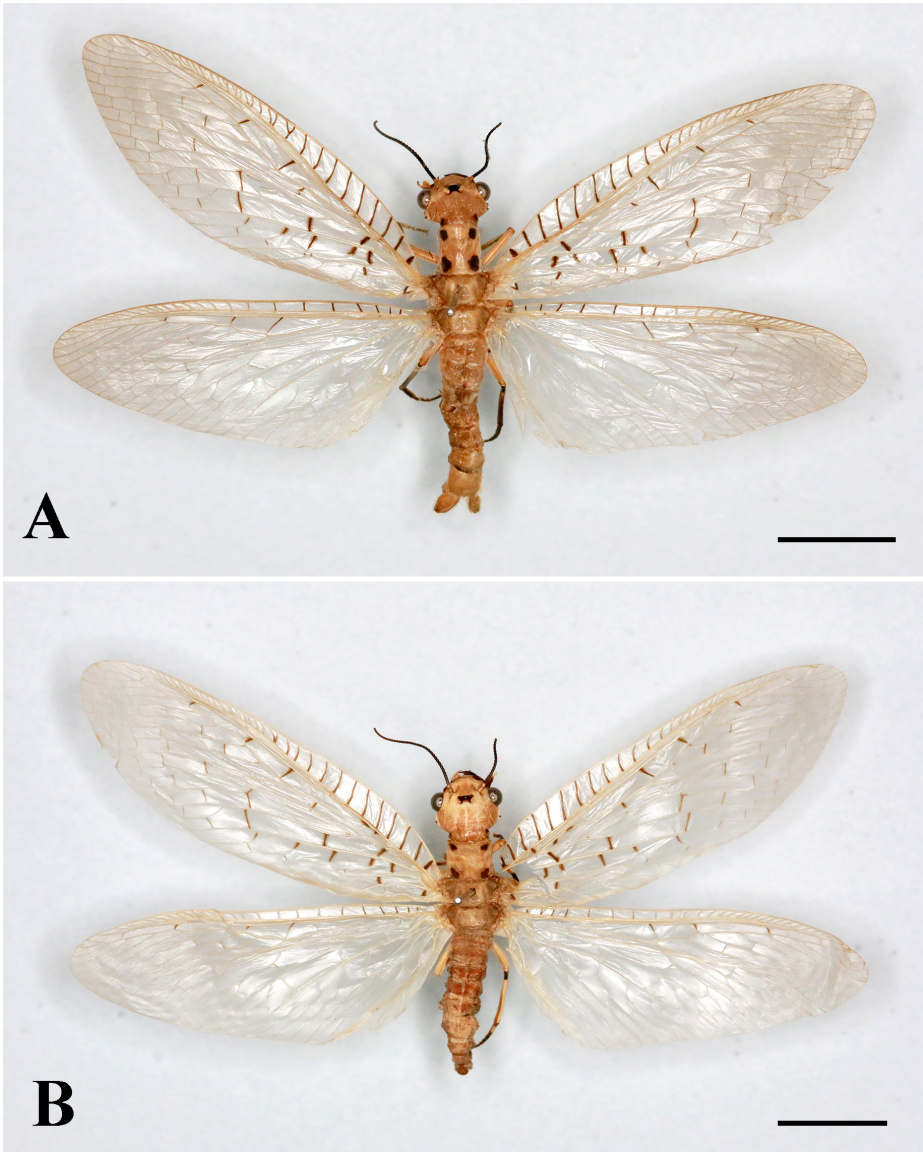


Figure 21. *Nevromus aspoeck*, dorsal view. A, male; B, female (modified from Piraonapicha *et al.*, 2021). Scale bars: 1 cm.

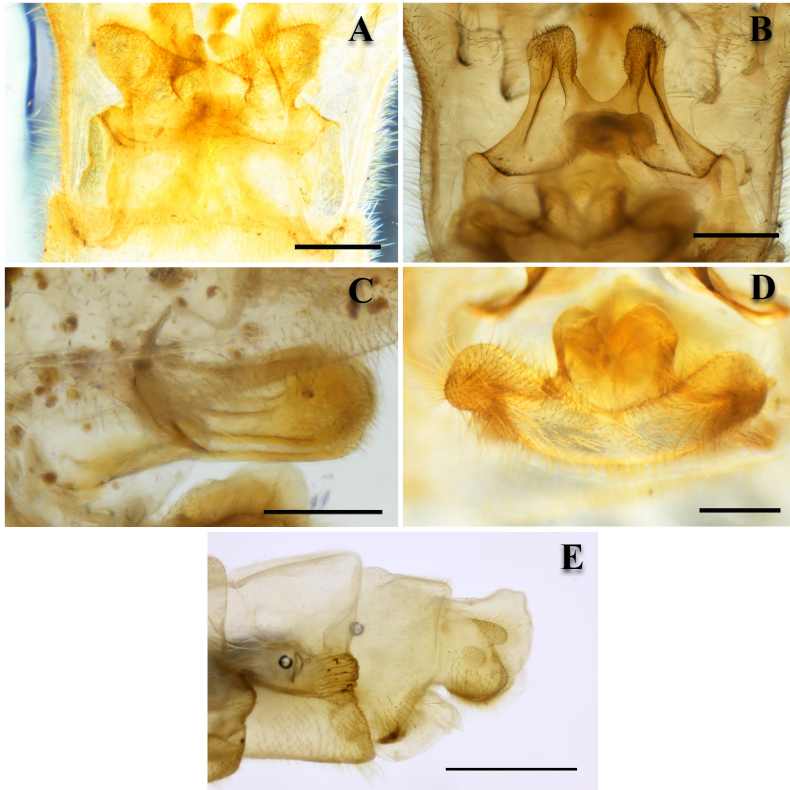


Figure 22. *Nevromus aspoeck*, genitalia. A, male ninth sternum, ventral view; B, male fused tenth gonocoxites, ventral view; C, male fused tenth gonocoxites, lateral view; D, male ninth sternum, caudal view; E, female genitalia, lateral view (modified from Piraonapicha *et al.*, 2021). Scale bars: 1 mm (A, D); 1.25 (B, C); 2.50 (D).

97°59'20.8"E, 8.II.2020, K. Piraonapicha leg.; 1♀ (THNHM-I-24525, in alcohol), Nan Province, Thung Chang District, Nan River, unknown collecting date, D. Tapunya & T. Phutthanurak leg. **NORTHEASTERN:** 16♂ (THNHM-I-23407 to THNHM-I-23422, pinned), Nakhon Ratchasima Province, Khon Buri District, Wang Tao Waterfall, 14°20'13.64"N, 102°14'48.00"E, 223 m a.s.l., 24.V.2014, K. Piraonapicha leg.; 2 larvae (unknown sex, THNHM-I-24515, in alcohol), same locality and collector, 27.IV.2014; 1 larva (unknown sex, THNHM-24518, in alcohol), same locality and collector, 27.IV.2015; 1 larva (unknown sex, THNHM-I-24519, in alcohol), same locality and collector, 24.XI.2013; 9♀ (THNHM-I-23423 to THNHM-I-23431, pinned), same locality, date, and collector; 1♂ (THNHM-I-24071, in alcohol), same locality and collector, 29.II.2020; 3♂ (THNHM-I-24336, THNHM-I-24070, THNHM-I-24451, in alcohol), same locality and collector, 27.IV.2013; 4♀ (THNHM-I-24067 to THNHM-I-24069, pinned; THNHM-I-24072, in alcohol), same locality, date, and collector. **CENTRAL:** 1♂ (THNHM-I-24335, pinned), Nakhon Nayok Province, Pak Phli District, Khao Yai

National Park, Haew Narok Waterfall, 14°17'19.74"N, 101°23'32.38"E, 363 m a.s.l., 15.VI.2017, K. Piraonapicha leg.; 1♀ (THNHM-I-24514, in alcohol), same locality and collector, 12.III.2019; 6 larvae (unknown sex, THNHM-I-24516, in alcohol), same locality and collector, 11.I.2018; 1 pupa ♀ (THNHM-I-24513, in alcohol), same locality and collector, 12.III.2019; 1 pupa ♀ (THNHM-I-24517, in alcohol), same locality and collector, 27.III.2019. **Specimens from other country:** 3♂ (THNHM-I-24520 to THNHM-I-24522, pinned), Laos (?), Koh Khong, 2.VII.1974, CTNRC team leg.

Diagnosis. Head yellow, with a pair of small black markings on lateral portions of occiput; mandibles mostly black; prothoracic black markings transversely broadened in both sexes; male ectoproct flatly foliate with a long and digitiform apex; ninth sternum with posterior lobes strongly produced posterolaterally (Figure 22).

Distribution. China (Yunnan), Lao (Koh khong), and Thailand (Chiang Mai, Mae Hong Son, Nan, Nakhon Ratchasima, and Nakhon Nayok) (Liu *et al.*, 2015; Piraonapicha *et al.*, 2021; this study).

***Nevromus jeenthongi* Piraonapicha, Jaitrong, Liu and Sangpradub, 2021** (Figures 23, 331)

Nevromus jeenthongi Piraonapicha, Jaitrong, Liu and Sangpradub, 2021: 107. Type locality: Thailand (Nakhon Si Thammarat: Sichon).

Types. Holotype: ♂ (THNHM-I-21545, pinned), S. Thailand, Nakhon Si Thammarat Province, Sichon District, 8°55'09.2"N, 99°40'34.8"E, 1.XI.2008, T. Jeenthongi leg.

Paratypes: 1♀ (THNHM-I-21523, pinned), S Thailand, Nakhon Si Thammarat Province, Sichon District, 8°55'09.2"N, 99°40'34.8"E, 1.XI.2006, T. Jeenthongi leg.; 3♂ (THNHM-I-21520 to THNHM-I-21522, pinned), S Thailand, Nakhon Si Thammarat Province, Sichon District, 47 m a.s.l., 21.XI.2006, Jin [Jarujin Nabhitabhata] *et al.* leg.; 5♀ (THNHM-I-21524 to THNHM-I-21525, THNHM-I-21530, THNHM-I-21541 to THNHM-I-21542, pinned), S. Thailand, Nakhon Si Thammarat Province, Sichon District, 47 m a.s.l., 22.XI.2006, Jin [Jarujin Nabhitabhata] *et al.* leg.; 2♀ (THNHM-I-21538 and THNHM-I-21539, pinned), S Thailand, Nakhon Si Thammarat Province, Sichon District, 240 m a.s.l., 25.XI.2006, T. Jeenthong leg.; 3♀ (THNHM-I-21527 to THNHM-I-21529, pinned), S. Thailand, Nakhon Si Thammarat Province, Sichon District, 47 m a.s.l., 23.XI.2006, Jin [Jarujin Nabhitabhata] *et al.* leg.. 1♀ (THNHM-I-21519, pinned), S Thailand, Nakhon Si Thammarat Province, Sichon District, 8°79'62.2"N, 99°55'31.1"E, 514 m a.s.l., 16.VI.2007, W. Jaitrong & T. Jeenthong leg.; 4♀ (THNHM-I-21514 to THNHM-I-21517, pinned), S. Thailand, Nakhon Si Thammarat Province, Sichon District, 8°55'09.22"N, 99°40'34.88"E, 10.I.2008, W. Jaitrong leg.; 2♀♀ (THNHM-I-215144 and THNHM-I-21545, pinned), S. Thailand, Nakhon Si Thammarat Province, Sichon District, 8°55'09.2"N, 99°40'34.8"E, 2.II.2008, T. Jeenthong leg.

Non-type material examined. SOUTHERN: 1♂ (THNHM-I-24492, pinned), Nakhon

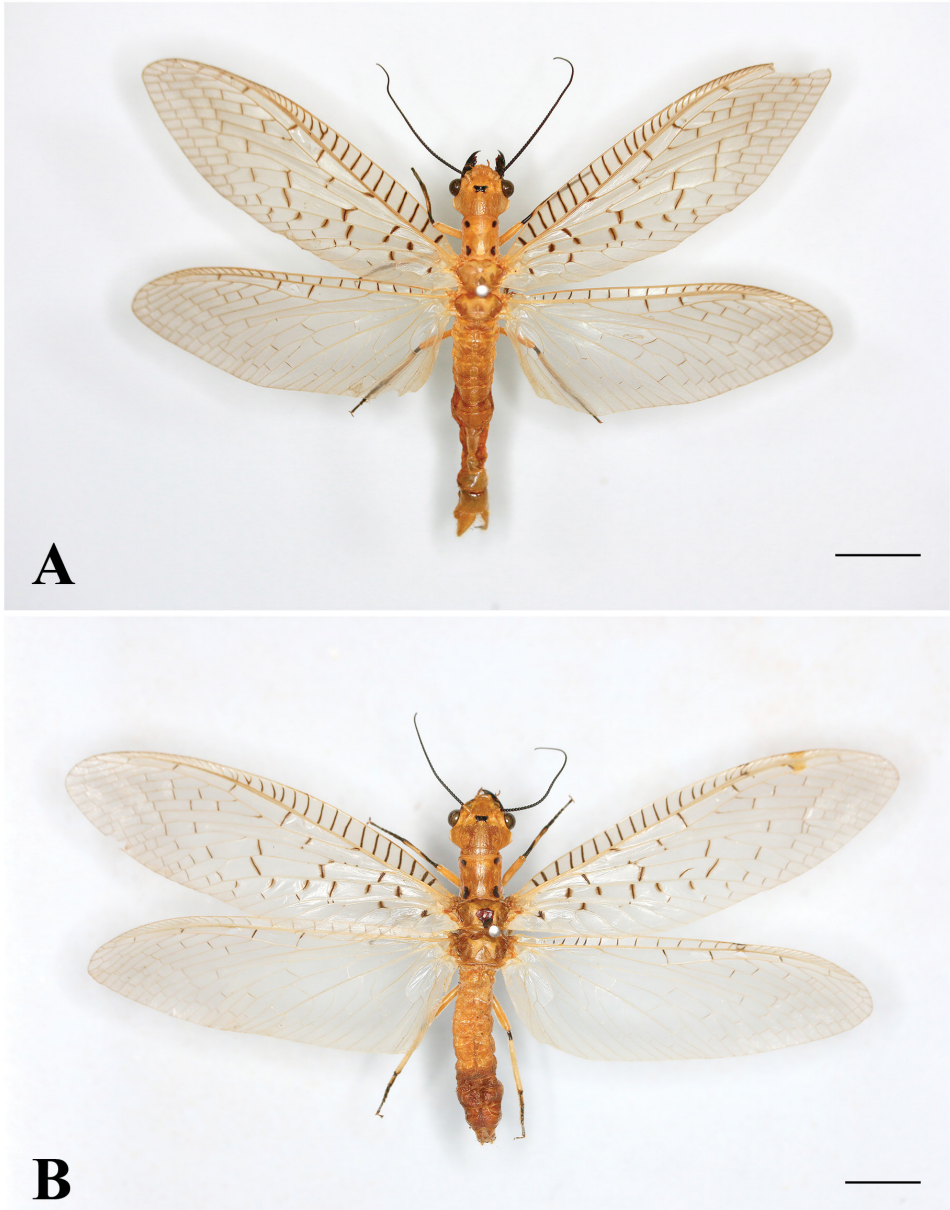


Figure 23. *Nevromus jeenthongi*, dorsal view. A, male; B, female (modified from Piraonapicha *et al.*, 2021). Scale bars: 1 cm.

Si Thammarat Province, Sichon District, 8°55'09.22"N, 99°40'34.88"E, 10.I.2008, W. Jaitrong leg.; 3♀ (THNHM-I-24494 to THNHM-I-24496, pinned), same locality, date and collector; 1♂ (THNHM-I-24493, pinned), Nakhon Si Thammarat Province, Sichon District, Head Quarter Khao Nan National Park, 22.XI.2006, Jin [Jarujin Nabhitabhata] *et al.* Leg.

Diagnosis. Head yellow to yellowish brown; occiput yellow without black markings; pronotum with two pairs of small black markings near lateral margins of pronotum in both sexes. Male ectoproct flatly foliate with a long and digitiform apex, fused tenth gonocoxites in ventral view strongly curved dorsad; ninth sternum with the posterolateral lobes broad, reaching to the lateral margin of ninth tergum (Figure 24).

Distribution. Thailand (Surat Thani and Nakhon Si Thammarat) (Piraonapicha *et al.*, 2021).

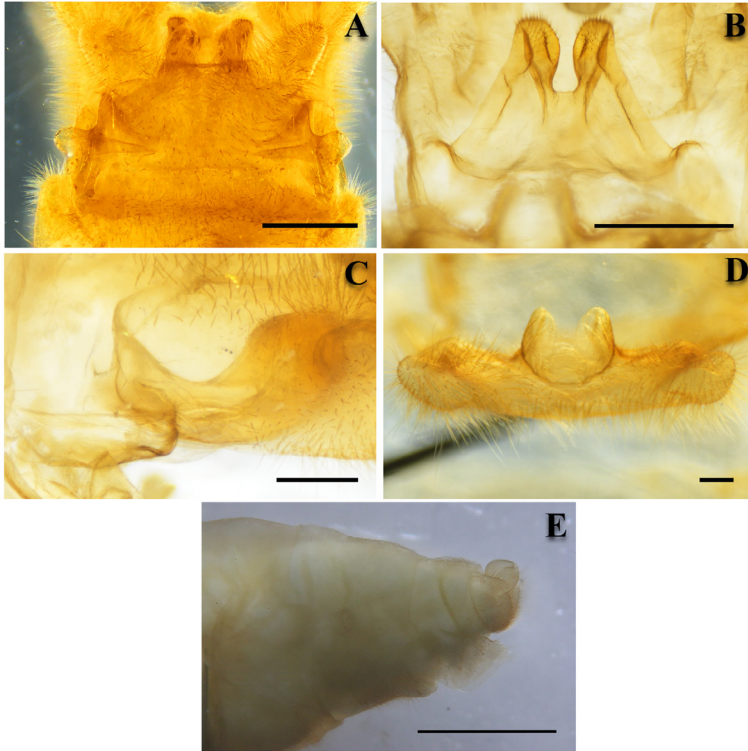


Figure 24. *Nevromus jeenthongi*, genitalia. A, male ninth sternum, ventral view; B, male fused tenth gonocoxites, ventral view; C, male fused tenth gonocoxites, lateral view; D, male ninth sternum, caudal view; E, female genitalia, lateral view (modified from Piraonapicha *et al.*, 2021). Scale bars: 1 mm (A, D); 1.25 (B, C); 2.50 (D).

***Protohermes furcatus* Liu, Hayashi and Yang, 2008** (Figure 25)

Protohermes furcatus Liu, Hayashi and Yang, 2008: 31. Type locality: Thailand (Chiang Mai).

Non-type material examined. **NORTHERN:** 1♂ (THNHM-I-24145, pinned), Chiang Mai Province, Chom Thong District, 18°32'19.3"N, 98°33'00.1"E, 6.IX.2020, K. Piraonapicha leg.; 8♂ (THNHM-I-24148 to THNHM-I-24150, THNHM-I-24301 to THNHM-I-24305, pinned), Chiang Mai Province, Mae Ai District, 20°06'00.2"N, 99°16'22.4"E, 27.V.2008, T. Jeenthong leg.; 1♀ (THNHM-I-24109, pinned), same locality, date and collector; 3♂ (THNHM-I-24306 to THNHM-I-24308, pinned), same locality and collector, 28.V.2008.

Diagnosis. Head yellowish brown, dorsum of head with a pair of small black marks on posterolateral margins; male fused tenth gonocoxites narrowed caudally and tenth gonostylus distinctly bifurcated (Figure 26).

Distribution. Thailand (Chiang Mai) (Liu *et al.*, 2008 and this study).

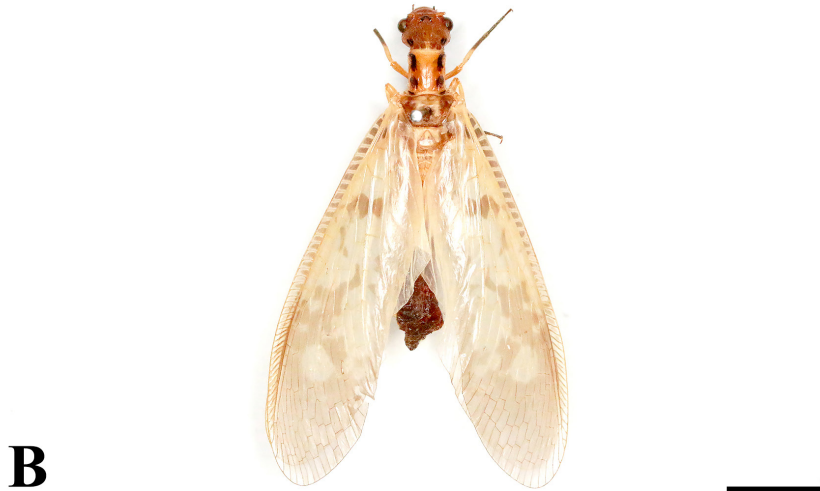


Figure 25. *Protohermes furcatus*, male, dorsal view.

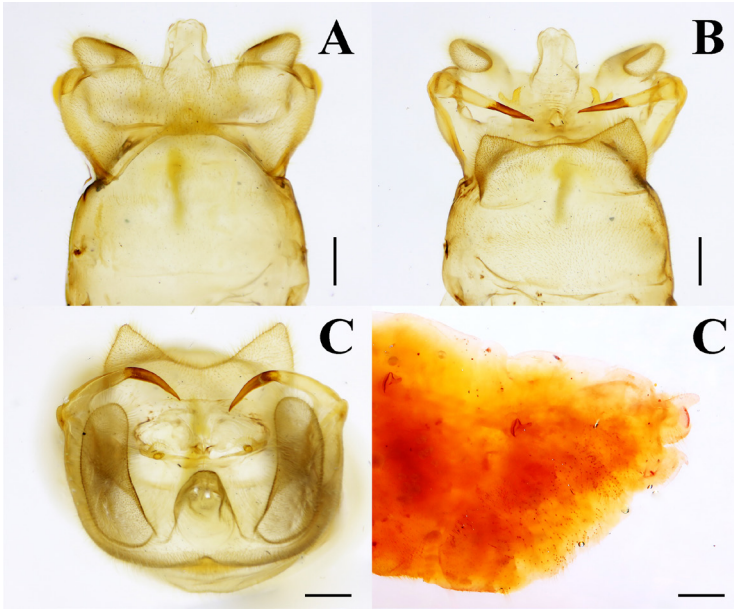


Figure 26. *Protohermes furcatus*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, male genitalia, caudal view. Scale bars: 1 mm.

***Protohermes triangulatus* Liu, Hayashi and Yang, 2007** (Figures 27, 33J)

Protohermes triangulatus Liu, Hayashi and Yang, 2007: 39. Type locality: China (Yunnan: Xiping).

Protohermes triangulatus: Liu *et al.*, 2009: 31; Yang and Liu, 2010: 182, fig. 70.

Non-type material examined. NORTHERN: 2♂ (THNHM-I-24065, THNHM-I-24066, in alcohol), Chiang Mai Province, Chom Thong District, 18°32'19.3"N, 98°33'00.1"E, 6.IX.2020, K. Piraonapicha leg.; 4♂ (THNHM-I-24352 to THNHM-I-24355, pinned), Chiang Mai Province, Mae Ai District, Pha Hom Pok N.P., 20°06'00.2"N, 99°16'22.4"E, 28.V.2008, T. Jeenthong leg.; 1♂ (THNHM-I-24356, pinned), same locality and collector, 27.V.2008; 1♀ (THNHM-I-24043, in alcohol), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 29.VII.2019, L. Khaton leg.; 1♂ (THNHM-I-24044, in alcohol), same locality and collector, 15.IV.2020; 2♂ (THNHM-I-24045 and THNHM-I-24046, in alcohol), same locality and collector, 7.V.2020; 1♀ (THNHM-I-24047, in alcohol), same locality, date, and collector; 6♂ (THNHM-I-24048 to THNHM-I-24053, pinned), same locality and collector, 12.V.2020; 1♂ (THNHM-I-24054, in alcohol), same locality, date, and collector; 8♀ (THNHM-I-24055 to THNHM-I-24062, pinned), same locality, date, and collector; 38 larvae (unknown sex, THNHM-I-24512, in alcohol), same locality and collector,

6.III.2020. **NORTHEASTERN:** 1♂ (THNHM-I-24063, in alcohol), Loei Province, Phu Ruea District, 17°21'12.8"N, 101°24'23.1"E, 706 m a.s.l., 3.V.2020, K. Piraonapicha leg.; 1♀ (THNHM-I-24064, in alcohol), same locality, date, and collector.

Diagnosis. Head yellowish brown, with two marks located close to posterolateral corners (a small spot and a small subtriangular marks); pronotum with two pairs large blackish markings on each side; male ninth sternum with nearly straight lateral margin, posterior margin with deep incision (V-shaped) (Figure 28).

Distribution. China (Yunnan) (Liu *et al.*, 2007), Thailand (Chiang Rai [Liu *et al.*, 2009], Chiang Mai, Nan Provinces [this study]), Vietnam (Son La) (Liu *et al.*, 2009).

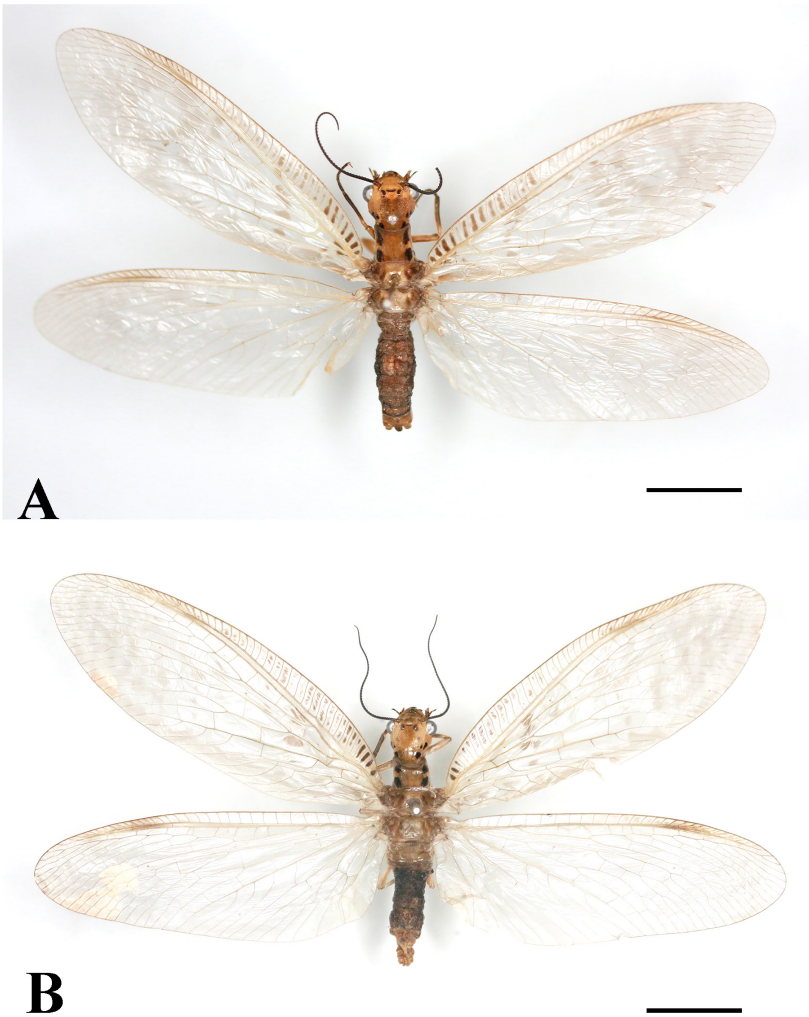


Figure 27. *Protohermes triangulatus*, dorsal view. A, male; B, female. Scale bars: 1 cm.

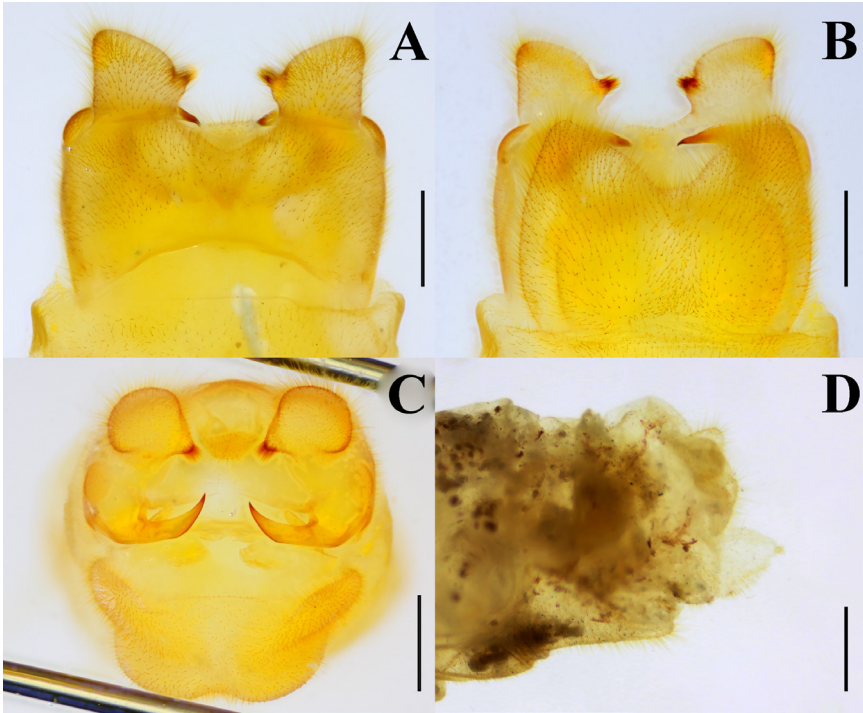


Figure 28. *Protohermes triangulatus*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, male genitalia, caudal view; D, female genitalia, lateral view. Scale bars: 1 mm.

***Protohermes* sp. 1**

Non-type material examined. *NORTHERN*: 1♀ (THNHM-I-24491, in alcohol), Chiang Mai Province, Mae Chaem District, Kew Mae Pan, 14.VIII.2019, K. Piraonapicha leg.

***Protohermes* sp. 2**

Non-type material examined. *NORTHERN*: 4♂ (THNHM-I-24476 to THNHM-I-24479, in alcohol), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 29.VII.2019, K. Piraonapicha leg.; 2♀ (THNHM-I-24480 to THNHM-I-24481, pinned), same locality and collector, 12.V.2020; 2♂ (THNHM-I-24483 to THNHM-I-24484, in alcohol), same locality and collector, 29.V.2019.

***Protohermes* sp. 3**

Non-type material examined. *NORTHERN*: 21♂♂ (THNHM-I-24102 to THNHM-I-24117, pinned; THNHM-I-24118 to THNHM-I-24122, in alcohol), Nan

Province, Bo Kluea District, 12.V.2020, L. Khaton leg.; 11♀ (THNHM-I-24123 to THNHM-I-24131, pinned; THNHM-I-24132 to THNHM-I-24133, in alcohol), same locality, date and collector; 1♂ (THNHM-I-24134, pinned), same locality and collector, 4.IV.2020; 4♂ (THNHM-I-24141, pinned; THNHM-I-24135 to THNHM-I-24137, in alcohol), same locality and collector, 29.VII.2019; 2♀ (THNHM-I-24138 to THNHM-I-24139, in alcohol), same locality, date and collector. **NORTHEASTERN:** 1♂ (THNHM-I-24140, pinned), Loei Province, Phu Ruea District, 17°21'12.8"N, 101°24'23.1"E, 706 m a.s.l., K. Piraonapicha leg.

***Protohesmes* sp. 4**

Non-type material examined. NORTHERN: 4♂ (THNHM-I-24444 to THNHM-I-24446, pinned; THNHM-I-24440, in alcohol), Chiang Mai Province, Chom Thong District, 18°32'19.3"N, 98°33'00.1"E, 6.IX.2020, K. Piraonapicha leg.; 4♀ (THNHM-I-24447 to THNHM-I-24450, pinned), same locality, date and collector; 1♂ (THNHM-I-24442, in alcohol), same locality and collector, 17.IX.2019; 1♀ (THNHM-I-24443, in alcohol), same locality, date and collector.

***Protohermes* sp. 5**

Non-type material examined. NORTHERN: 1♂ (THNHM-I-24146, pinned), Nan Province, Bo Kluea District, 19°11'13.35"N, 101°10'5.91"E, 1,006 m a.s.l., 4.III.2020, K. Piraonapicha leg. THNHM; 1♀ (THNHM-I-24147, in alcohol), same locality, date, and collector.

Family Sialidae Leach, 1815

***Indosialis bannaensis* Liu, Yang and Hayashi, 2006 (Figures 29, 33K)**

Indosialis bannaensis Liu, Yang and Hayashi, 2006: 33. Type locality: China (Yunnan: Shangyong)

Indosialis bannaensis: Liu *et al.*, 2008: 48, figs. 1, 5–8, 19; Bowles and Contreras-Ramos, 2016: 486, figs. 1–11; Piraonapicha *et al.*, 2020: figs. 2–9.

Non-type material examined. NORTHEASTERN: 2♀ (THNHM-I-24362 to THNHM-I-24363, pinned), Loei Province, Wang Saphung District, Huai Lex stream,

17°21'9.76"N, 101°39'23.78"E, 336 m a.s.l., 30.VI.2019, K. Piraonapicha leg.; 8♀ (THNHM-I-24464 to THNHM-I-24471, in alcohol), same locality and collector, 17.V.2019; 3♂(THNHM-I-24452 to THNHM-I-24454, in alcohol), Loei Province, Wang Saphung District, Huai Lex stream, 17°22'0.52"N, 101°40'15.68"E, 311 m a.s.l., 8.IV.2018, K. Piraonapicha leg.; 3♀ (THNHM-I-24455 to THNHM-I-24457, in alcohol), Loei Province, Wang Saphung District, Huai Lex stream, 17°21'45.44"N, 101°40'5.75"E, 264 m a.s.l., 6.IV.2019, K. Piraonapicha leg.; 6♀ (THNHM-I-24458 to THNHM-I-24463, in alcohol), same locality and collector, 23.V.2019; 4♂ (THNHM-I-24359 to THNHM-I-24361, THNHM-I-24366, in alcohol), Buriram Province, Lahan Sai District, Ta Phraya N.P., Suriya Vithee Stream, 14°13'43.79"N, 102°53'53.34"E, 277 m a.s.l., 24.V.2017, K. Piraonapicha leg.; 18♀ (THNHM-I-24367 to THNHM-I-24384, in alcohol), same locality, date and collector; 40♀ (THNHM-I-24364 to THNHM-I-24365, pinned; THNHM-I-24403 to THNHM-I-24439, in alcohol), same locality, 13.V.2018, K. Piraonapicha and Y. Phuengnoi leg.; 18♂ (THNHM-I-24385 to THNHM-I-24402, in alcohol), same locality and collector. 2♀ (THNHM-I-24358, THNHM-I-24441r, in alcohol), Nakhon Rachasima Province, Soeng Sang District, Wang Sathien Waterfall, 14°16'10.69"N, 102°23'11.63"E, 264 m a.s.l., 11.V.2017, K Piraonapicha leg.

Diagnosis. Head and prothorax orange in both sexes. Inner margin of left male mandible proximally with several small short setae; inner margin of right mandible with indistinct apical tooth followed by long and sharp preapical tooth and broad basal tooth; male gonocoxite 9 in lateral view broadly rounded, with apex strongly narrowed and curved dorsad; male ectoproct in lateral view subtriangular, with apex distinctly narrowed (Figure 30).

Distribution. China (Yunnan), Vietnam (Haut Donai), and Thailand (Buriram, Loei, Phitsanulok, Kalasin, and Nakhon Ratchasima) (Liu *et al.*, 2006, 2008, 2015; Bowles and Contreras-Ramos, 2016; Piraonapicha *et al.*, 2020).



Figure 29. *Indosialis bannaensis*, lateral view. A, male; B, female (modified from Piraonapicha *et al.*, 2020). Scale bars: 5 mm.

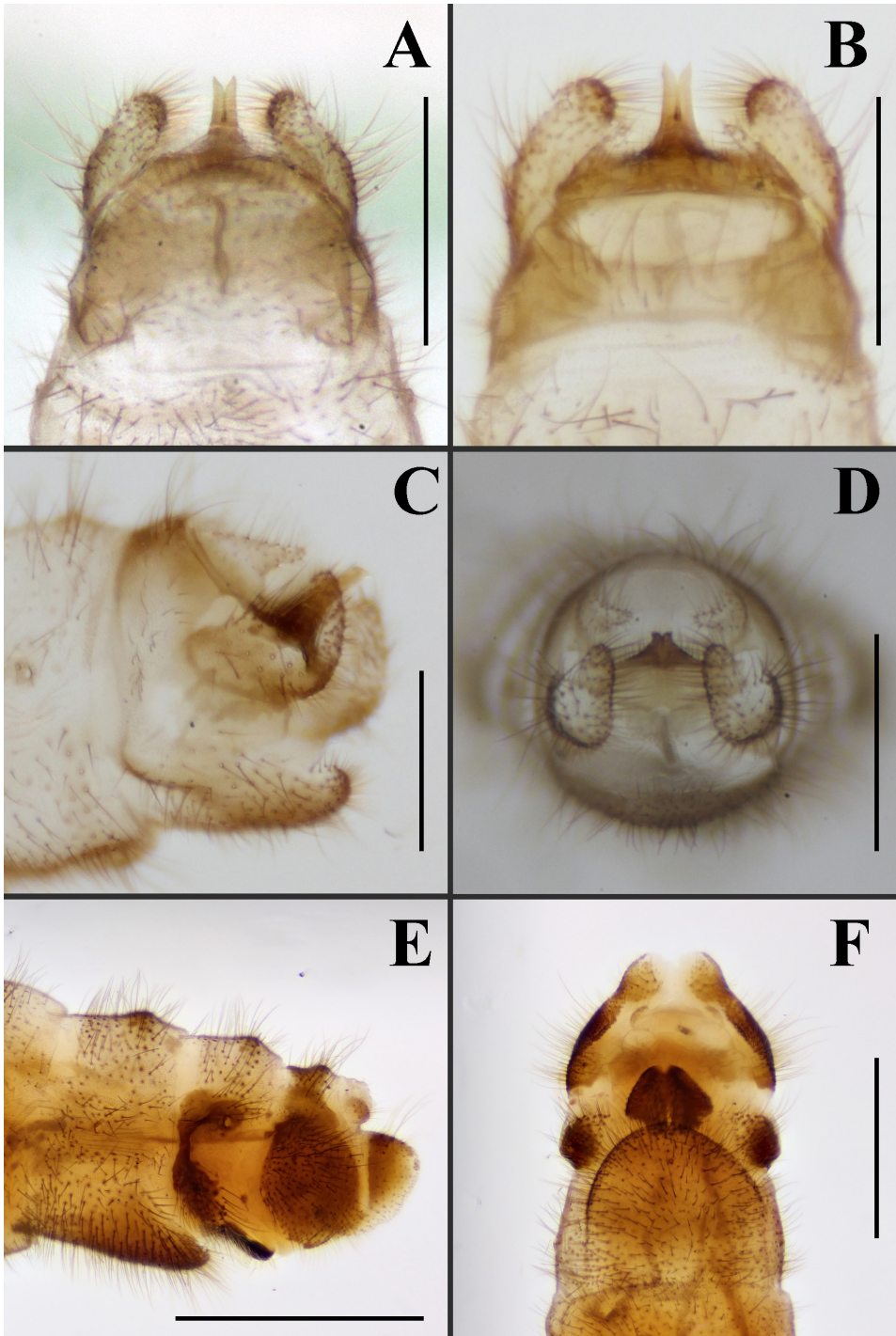


Figure 30. *Indosialis bannaensis*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, male genitalia, lateral view; D, male genitalia, caudal view female genitalia; E, female genitalia, lateral view; F, female genitalia, ventral view (modified from Piraonapicha *et al.*, 2020). Scale bars: 1 mm.

***Indosialis siamensis* Piraonapicha, Sangpradub, Jaitrong and Liu, 2020** (Figures 31, 33L)
Indosialis siamensis Piraonapicha, Sangpradub, Jaitrong and Liu, 2020: 246. Type locality:
Thailand (Loei: Wang Saphung).

Types. Holotype: ♂ (THNHM-I-16801, pinned), NE Thailand, Loei Province, Wang Saphung District, Huai Lek Stream, 17°21'9.76"N, 101°39'23.78"E, 336 m a.s.l.,



Figure 31. *Indosialis siamensis*, lateral view. A, male; B, female (modified from Piraonapicha *et al.*, 2020). Scale bars: 5 mm.

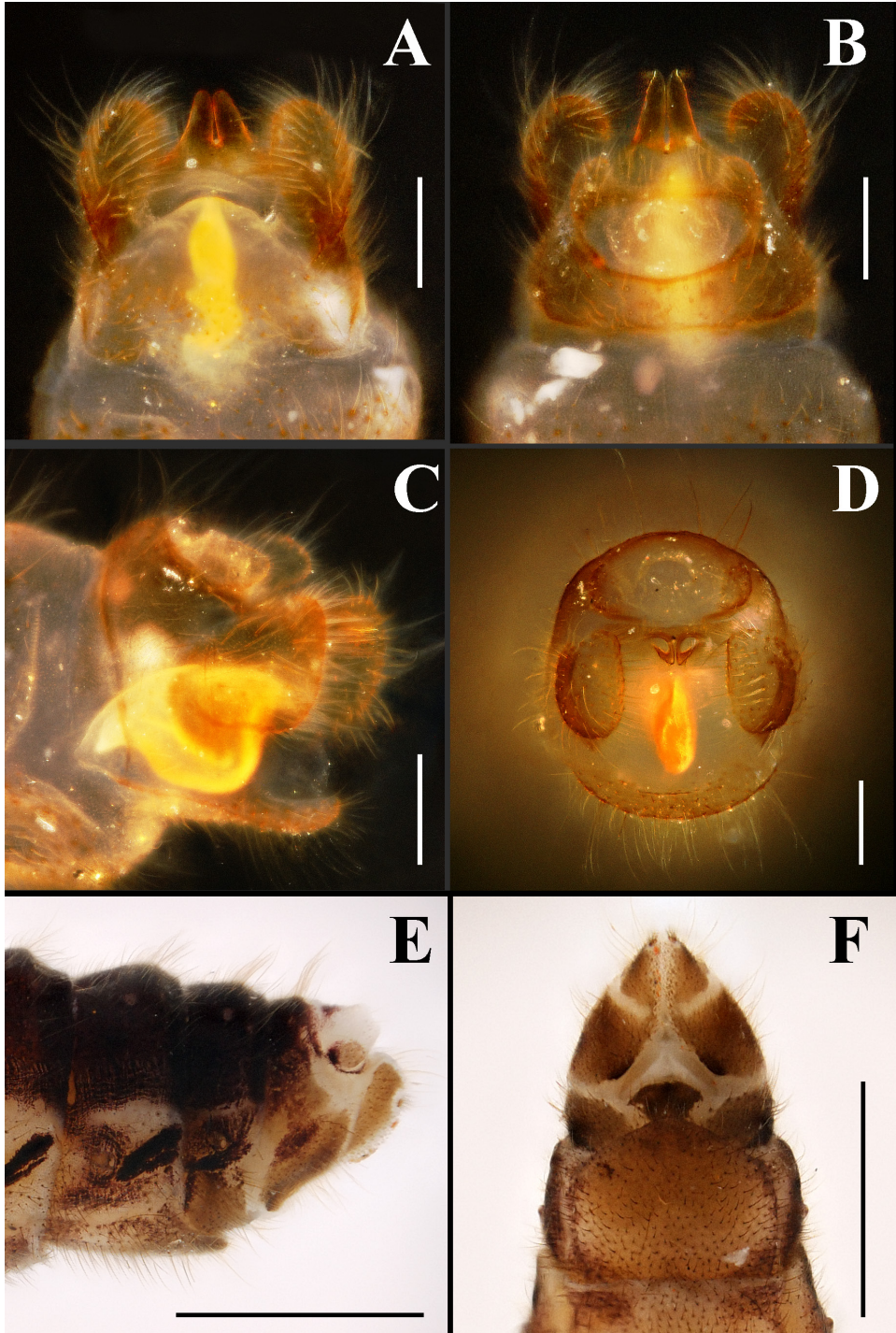


Figure 32. *Indosialis bannaensis*, genitalia. A, male genitalia, dorsal view; B, male genitalia, ventral view; C, male genitalia, lateral view; D, male genitalia, caudal view (modified from Piraonapicha *et al.*, 2020); E, female genitalia, lateral view; F, female genitalia, ventral view. Scale bars: 1 mm.

30.III.2020, K. Piraonapicha leg. **Paratypes:** 3♂ (THNHM-I-16802 to THNHM-I-16804, pinned), NE Thailand, Loei Province, Wang Saphung District, Huai Lek Stream, 17°21'9.76"N, 101°39'23.78"E, 336 m a.s.l., 30.III.2020, K. Piraonapicha leg.; 1♀ (THNHMI-16805, pinned), same locality and collector, 13.V.2019, THNHM; 1♀ (THNHM-I-16806, pinned), same locality and collector, 28.V.2019.

Diagnosis. Head and prothorax brown in both sexes. Inner margin of left male mandible without small setae; inner margin of right mandible with distinct apical tooth followed by long and sharp preapical tooth and broad basal tooth; male gonocoxite 9 in lateral view broadly rounded, with apex slightly narrowed and curved dorsad; male ectoproct in lateral view subtriangular, with convex apex (Figure 32).

Distribution. Thailand (Loei) (Piraonapicha *et al.*, 2020).

Discussion

Here, six species of Corydalidae from Thailand are added, including *Acanthacorydalis asiatica*; *Ctenochauliodes yangi*; *Neochauliodes meridionalis*; *Neo. tonkinensis*; *Neoneuromus ignobilis*; *Neon. indistinctus*. Currently, eight genera and 21 species of Megaloptera are known from Thailand which are approximately 5% of Megaloptera reported worldwide. Most specimens of the order in this study were collected from Northern and Northeastern, and few specimens from the Southern Thailand. Thailand has been described as a natural gateway or zoogeographical crossroads to Indochina in the north and the Sundaic region in the south (Luangjame *et al.*, 1997), and it is considered one of biodiversity hotspot due to its rich diversity, high endemism, and great habitat loss (Myers *et al.*, 2000; Plant, 2014; The Sustainability Consortium WRI, 2019). Consequently, Thailand is a most interesting region for future new findings of Megaloptera.

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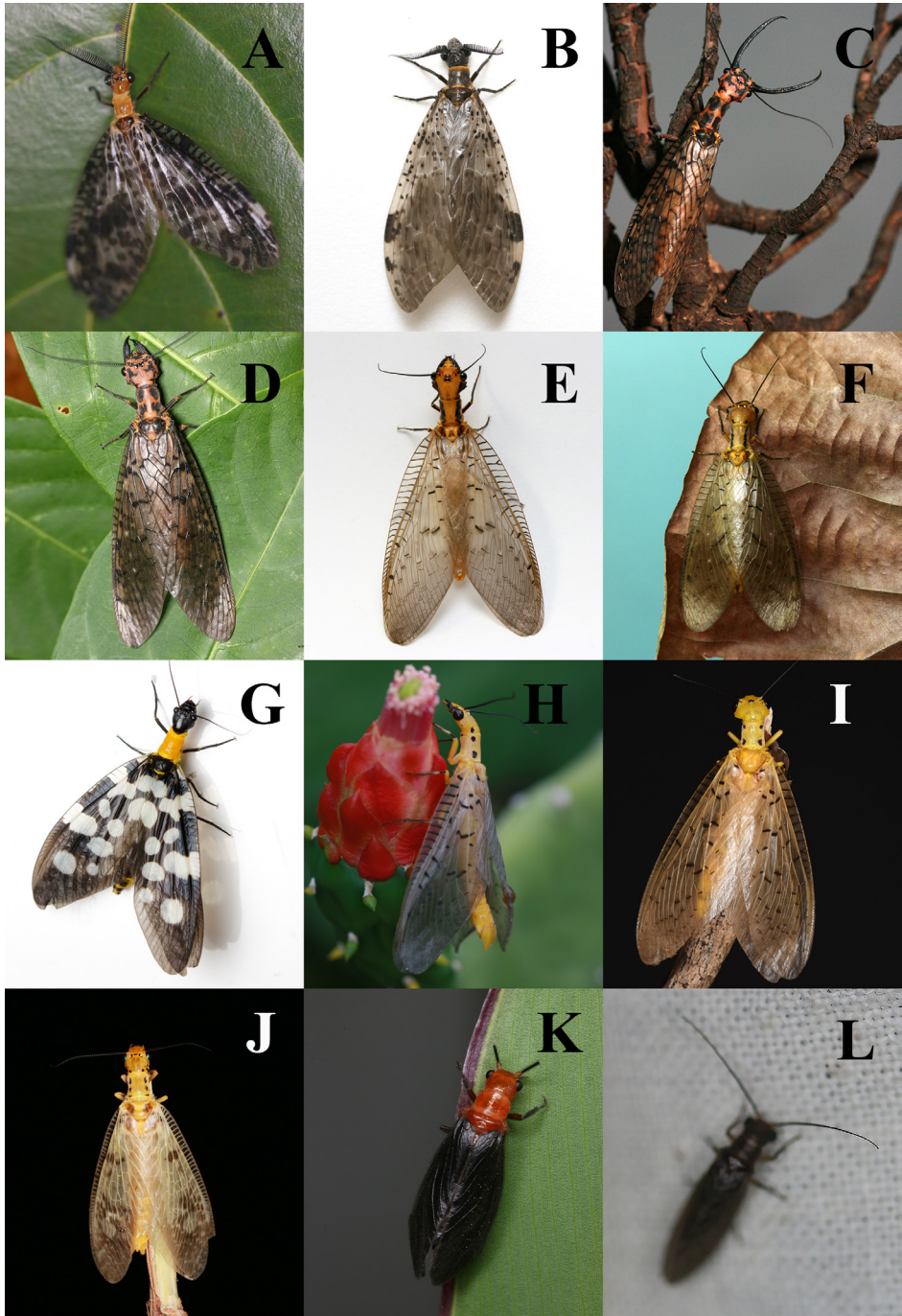


Figure 33. Living adults of some Megaloptera in Thailand. A, *Neochauliodes punctatolus*, male; B, *Neochauliodes tonkinensis*, male; C, *Acanthacorydalis asiatica*, male; D, *A. asiatica*, female; E, *Neoneuromus ignobilis*, male; F, *Neoneuromus indistinctus*, male; G, *Neurhermes sumatrensis*, female (Photo Wuttipon Pathomwattananurak); H, *Nevromus aspoeck*, male; I, *Nevromus jeenthongi*, male (Photo Thornthan Unnahachote); J, *Protohermes triangulatus*, male; K, *Indosialis bannaensis*, female; L, *Indosialis siamensis*, male.

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