

The praying mantis family Toxoderidae (Order Mantodea) in Thailand

Pannapat Tarapipattanakun

195-196, Moo 1, Bang Bo, Bang Bo, Samut Prakan, 10560 Thailand

Article history

Received: 29 April 2025

Accepted: 22 June 2025

Published online: 31 July 2025

Corresponding author

Pannapat Tarapipattanakun

E-mail: pannapattarapipattanakun@gmail.com

Editor

Dr. Weeyawat Jaitrong

E-mail: polyrhachis@yahoo.com/
weeyawat@nsm.or.th

Abstract

The praying mantis of the family Toxoderidae in Thailand are studied. Eighteen species of family are known and listed. Diagnosis and high resolution images for each species are provided. A key to the genera of the family in Thailand is also given. *Toxodera pfanneri* Roy, 2009 and *Toxodera beieri* Roy, 2009 are recorded for the first time in Thailand. Male genitalia of *Toxodera pfanneri* Roy, 2009 are described.

Keyword: Praying mantis, Toxoderidae, Species, Thailand, Images, Genera key, *Toxodera pfanneri*, *Toxodera beieri*, First record, Male genitalia

INTRODUCTION

Toxoderidae Saussure, 1869 is a family within the order Mantodea. This family has a few characteristics that makes them outstanding from other Mantodea. The member of the family have a very long prothorax that is nearly half as long as the entire body, most of their cerci are distinctly flattened, and the eyes with elongation (Roy, 2009; Wieland, 2013; Unnahachote, 2022). The family comprises 25 genera found predominantly in the Afrotropical and Oriental regions. Among them, seven genera were reported from Thailand (Schwarz and Roy, 2019; Patel *et al.*, 2016; Mukherjee *et al.*, 2014; Roy, 2009; Unnahachote *et al.*, 2019; Unnahachote, 2022): *Heterochaetula* Wood-Mason, 1889 (Oxythespinae: Heterochaetulini); *Toxomantis* Giglio-Tos, 1914 (Toxoderinae: Calamothespini); *Aethalochroa* Wood-Mason, 1877 (Toxoderinae: Aethalochroini); *Toxoderopsis* Wood-Mason, 1889 (Toxoderinae: Toxoderopsini); *Paratoxodera* Wood-Mason, 1889 (Toxoderinae: Toxoderini); *Stenotoxodera* Roy, 2009 (Toxoderinae: Toxoderini); *Toxodera* Audinet-Serville, 1837 (Toxoderinae: Toxoderini). Recently, six species of the genus *Toxodera* have been known in Thailand (Roy, 2009; Unnahachote *et al.*, 2019; Unnahachote, 2022). *Toxodera beieri* and *T. pfanneri* have been previously reported in various countries in Southeast Asia but not yet found in Thailand (Roy, 2009; Patel, Singh and Singh, 2016). In the present, the Thai species belonging to this family are listed, with *T. beieri* and *T. pfanneri* being documented for the first time in Thailand.

MATERIALS AND METHODS

This study is mainly based on specimens deposited in the collection of the Natural History Museum of the National Science Museum Thailand (THNHM) and the private collection of the author (PTPC). Additional specimens were from the private collection of Thornthan Unnahachote (TUPC) and the private collection of Phalakorn Yeunyang (PYPC). The specimens were mounted and dried. Male genitalia of *Toxodera pfanneri* Roy, 2009 were stored in 10% KOH solution for one day, then put in glycerin after cleaning in water for detailed observation.

Most morphological observations were made with a American Scientific ATL 10 stereomicroscope. Specimens were photographed using Canon EOS 6D attached to EF 100mm f/2.8L Macro IS USM. Genitalia were taken using Nikon Digital Sight DS-R1 camera connected to Nikon AZ100M stereoscope.

Abbreviations used for morphology and male genitalia are as follows (Wieland, 2013; Brannoch *et al.*, 2017; Schwarz and Roy, 2019): **DS**, discoidal spines; **PvS**, posteroventral spines; **pva**, ventral process (right phallomere); **fda**, main posterior lobe (right phallomere); **sdp**, secondary distal process; **L4A**, sclerite extending over the ventral wall (left phallomere); **aafa**, anterior lobe of phalloid apophysis; **pafa**, posterior lobe of phalloid apophysis; **paa**, posterior process (left phallomere).

RESULTS AND DISCUSSION

In total, 18 species from seven genera of the praying mantises in the family Toxoderidae were reported during this study. Unnahachote (2022) previously reported six species from the genus *Toxodera*, after examined the specimens, *Toxodera pfanneri* Roy, 2009 and *Toxodera beieri* Roy, 2009 were newly recorded to Thailand, making it the most diversified genus which currently comprised of eighth species, found predominantly in southern part of Thailand. To date, the most used key to genera was the key provided by Roy (2009) however, it is limited to the tribe Toxoderini, the comprehensive key is still needed.

Key to genera of family Toxoderidae in Thailand

- 1 Head and compound eyes longer than wide. *Toxomantis* Giglio-Tos, 1914
- Head prominently or slightly wider than long; Compound eyes oval-shaped without non-visual elongation or horizontally conical in shape. 2
- 2 Femur of both mesothoracic and metathoracic legs without any lobe, short genicular spur presented. *Heterochaetula* Wood-Mason, 1889
- Femur of both mesothoracic and metathoracic legs presented of lobe; genicular spur long or short. 3
- 3 Head slightly wider than long; compound eyes oval-shaped without non-visual elongation. *Aethalochroa* Wood-Mason, 1877
- Head distinctly wider than long; compound eyes horizontally conical in shape with or without non-visual elongation. 4
- 4 Unequal wavy lobe presented distally on forecoxa. ... *Toxoderopsis* Wood-Mason, 1889
- Forecoxa without unequal wavy lobe at the distal end. 5
- 5 Pronotum straight from lateral view; lobes presented along median keel, with the largest lobe located near abdomen. *Paratoxodera* Wood-Mason, 1889
- Pronotum distinctly curved upward from lateral view. 6
- 6 Pronotum curved upward and distinctly thin in lateral view. *Stenotoxodera* Roy, 2009
- Pronotum distinctly triangular in shape and curved upward, pronotum distinctly thick in lateral view. *Toxodera* Audinet-Serville, 1837

Aethalochroa* Wood-Mason, 1877**Aethalochroa kaltenbachii* Schwarz & Unnahachote, 2025**

(Figure 1)

Aethalochroa kaltenbachii Schwarz & Unnahachote, 2025: 242, Figures 1–6, 8–10.

Material examined: Northeastern Thailand. One male, Nong Khai Province, Mueng District, Nong Kom Koh Subdistrict, 17°51'08.2"N, 102°44'02.7"E, 7.XI.2024, T. Dharithai leg (TUPC).

Diagnosis: Head slightly wider than long, vertex with process. Compound eyes oval-shaped without elongation, lower frons transverse. Pronotum straight in lateral view, metazone very elongated significantly longer than prozone. Lateral margin of pronotum finely toothed. Inner side of forefemur curved, tibial spur groove located near base, 3 DS and 5 PvS. Mesothoracic and metathoracic legs with lobe on femur and tibia. Posteroventral lobe on femur is slightly bigger than anterodorsal. Anterodorsal lobe of tibia expanded nearly half as long as tibial length. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Hindwing with large dark spot and followed by pattern. Abdomen elongated with small lobe on sternite. Cerci flatten and long.

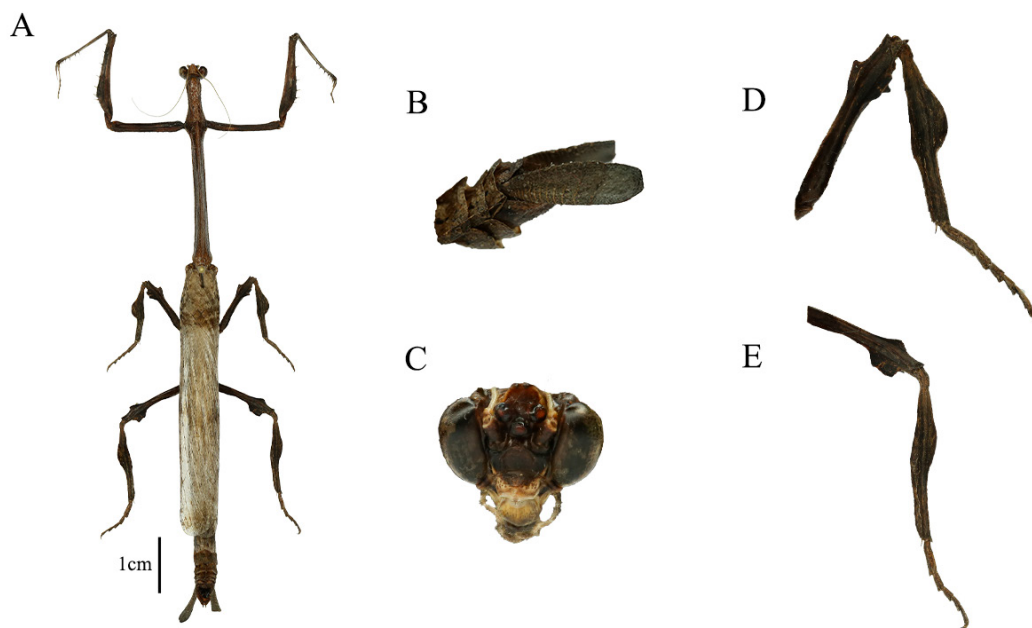


Figure 1. *Aethalochroa kaltenbachii*. A, dorsal habitus; B, Tip of the abdomen and cerci; C, head in frontal view; D, mesothoracic leg; E, metathoracic leg (B–E without scale bar).

Heterochaetula* Wood-Mason, 1889**Heterochaetula tricolor* (Wood-Mason, 1876)**

(Figure 2)

Heterochaeta tricolor Wood-Mason, 1876: 441.

Material examined: Central Thailand. One male and 1 female, Sing Buri Province, In Buri District, Chi Nam Rai Subdistrict, 23.V.2023, unknown collector (PTPC).

Diagnosis: Head wider than long, vertex above the level of the eyes and slightly elevated at the middle without process. Compound eye with elongation, juxtaocular bulge protruding, lower frons transverse. Metazone of pronotum very elongated more than twice as long as prozone. Lateral margin of pronotum finely toothed. Forefemur with 4 DS, 4 PvS, tibial spur groove located at the middle of forefemur length, tibia with 11–13 PvS. Both mesothoracic and metathoracic legs without lobe and have genicular spur. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Hindwing with large black spot with black and yellow coloured pattern on outer area in females. Cerci flatten and long in males but shorter in females.

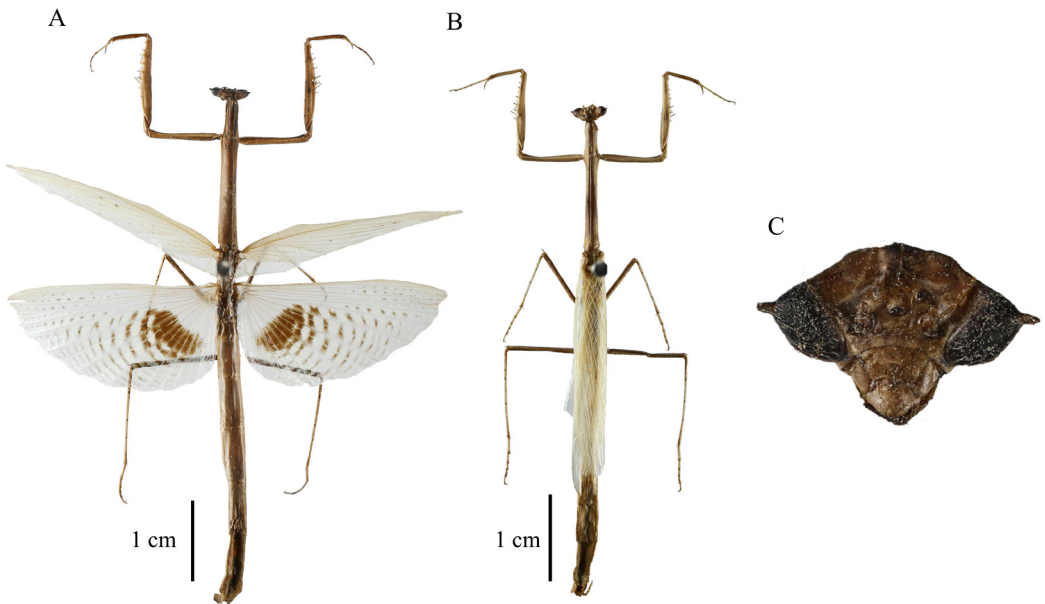


Figure 2. *Heterochaetula tricolor*. A, Dorsal habitus (female); B, Dorsal habitus (male); C, Head in frontal view (C without scale bar).

***Heterochaetula fissispinis* Wood-Mason, 1889**

(Figure 3)

Heterochaetula fissispinis Wood-Mason, 1889: 309.

Material examined: Central Thailand. One female, Phetchabun Province, Lom Sak District, 28.XII.2024, unknown collector (PTPC).

Diagnosis: Head wider than long, vertex above the level of the eyes, with the lowest point located medially, forming a shallow median depression. Compound eye with elongation, juxtaocular bulge protruding, lower frons transverse. Metazone of pronotum very elongated more than twice as long as prozone. Lateral margin of pronotum finely toothed. Forefemur with 4 DS, 4 PvS, tibial spur groove at the middle of forefemur length, tibia with 11 PvS. Both mesothoracic and metathoracic legs without lobe and have genicular spur. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Hindwing with pink coloured area followed by large black spot with black and yellow coloured pattern on outer area in females. Cerci flatten and long in males but shorter in females.

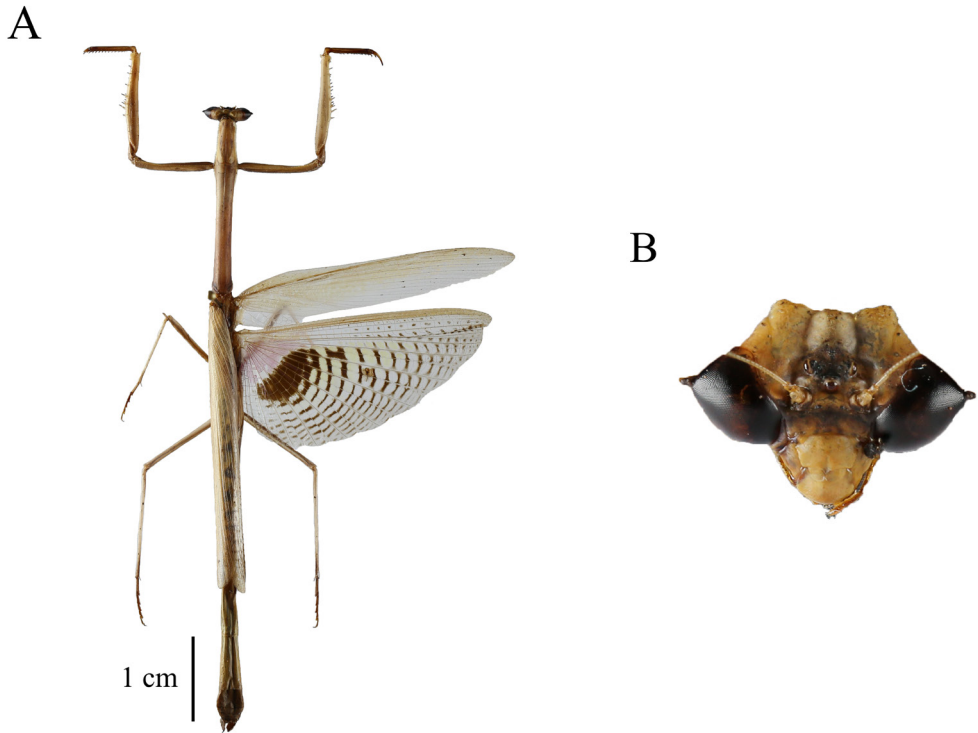


Figure 3. *Heterochaetula fissispinis*. A, Dorsal habitus; B, Head in frontal view (B without scale bar).

Paratoxodera* Wood-Mason, 1889**Paratoxodera meggitti* Uvarov, 1927**

(Figure 4)

Paratoxodera meggitti Uvarov, 1927: 658, Figures 1–4.

Material examined: Northern Thailand. One male, Nan Province, Bo Kluea District, Bo Kluea Tai Subdistrict, IV.2024, light trap, L. Khaton leg. (PTPC); 1 male, Chiang Rai Province, Mae Fa Luang District, Mae Fa Luang Subdistrict, Doi Tung, 1–7.IX.2019, K. Jiaranaissakul leg. (THNHM).

Diagnosis: Head triangular in shape, wider than long, vertex slightly convex. Compound eye conical in shape with long elongation, lower frons transverse. Pronotum straight in lateral view, metazone very elongated significantly longer than prozone. Pronotum with foliaceous lobes, the largest lobe located near the abdomen, a smaller lobe is presented along the median keel. Largest lobe that presented at posterior curved at the back, while concave at the front and pointed anteriorly at the apex. Tibia thin, tibial spur groove locates near base, femur with 3 DS, 7 PvS, small spine presented at apex. Both of mesothoracic and metathoracic legs with lobe on femur and coxa, tibia very long and thin. Lobe that presented on the coxa is smaller flated, three pointed tips, with the middle tip usually being the tallest. Posteroventral lobe on femur is a two connected bilobed shape lobe, the one that is located near the body is smaller in size, long genicular spur is presented. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated with large foliaceous lobes on tergite V, curved at the back and pointed anteriorly at the apex. Cerci flatten with pear-shaped.

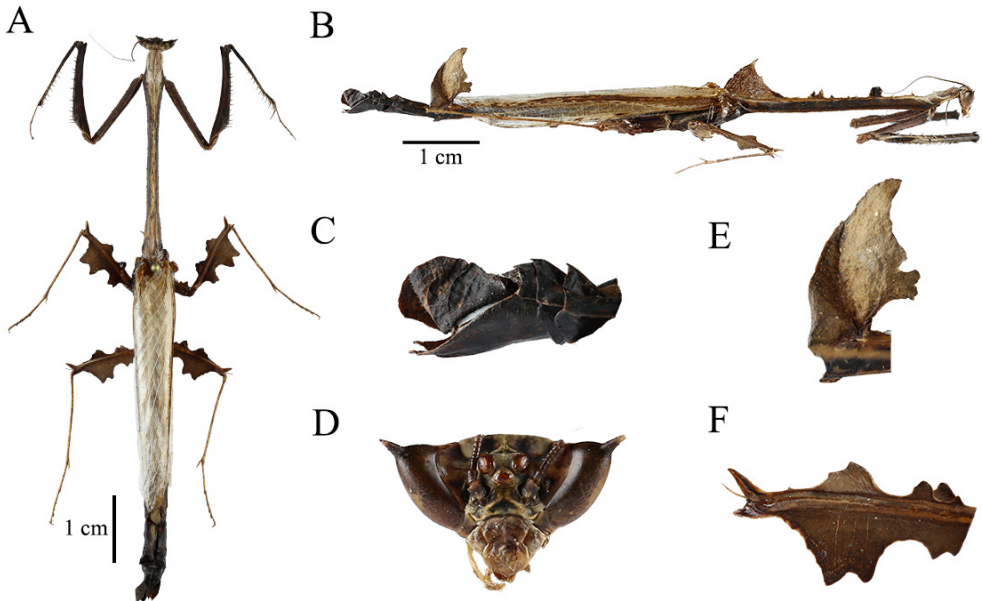


Figure 4. *Paratoxodera meggitti*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Lobe on tergite V; F, Metathoracic femur (C–F without scale bar).

***Paratoxodera cornicollis* Wood-Mason, 1889**

(Figure 5)

Paratoxodera cornicollis Wood-Mason, 1889: 325.

Material examined: Southern Thailand. One male, Surat Thani Province, Phanom District, Khlong Sok Subdistrict, 28.XI.2019, C. Hübner leg. (TUPC).

Diagnosis: Head triangular in shape, wider than long, vertex slightly convex. Compound eye conical in shape with long elongation, lower frons transverse. Pronotum straight in lateral view, metazone very elongated significantly longer than prozone. Pronotum with spine like lobes, the largest lobe located posterior near the abdomen and very curved pointed anteriorly, smaller one along the median keel. Tibia thin, tibial spur groove located near base, femur with 3 DS, 7 PvS, small spine presented at apex. Both of mesothoracic and metathoracic legs with lobe on femur. Posteroventral lobe on femur is a connected bilobed shape lobe and three pointed tips lobe. Bilobed shape lobe is smaller in size and located near body, genicular spur curved, tibia very long and thin. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated with foliaceous lobes on tergite VI and VII, lobe on tergite VI is larger and pointed upward. Cerci flatten with pear-shaped.

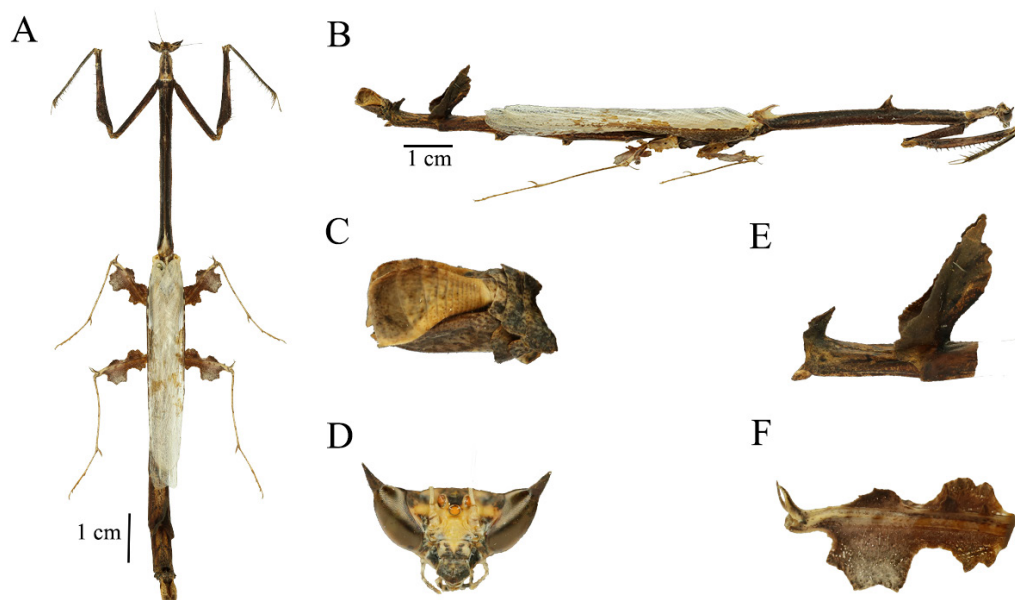


Figure 5. *Paratoxodera cornicollis*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Lobe on tergite VI and VII; F, Metathoracic femur (C–F without scale bar).

***Paratoxodera gigliotosi* Roy, 2009**

(Figure 6)

Paratoxodera gigliotosi Roy, 2009: 149, Figures 45–48.

Material examined: Southern Thailand. One male, Surat Thani Province, Phanom District, Khlong Sok Subdistrict, 10.I.2020, C. Hübner leg. (TUPC).

Diagnosis: Head triangular in shape, wider than long, vertex slightly convex. Compound eye conical in shape with long elongation, lower frons transverse. Pronotum straight in lateral view, metazone very elongated significantly longer than prozone. Pronotum with foliaceous lobes, the largest lobe located posterior near the abdomen and very curved pointed anteriorly, smaller two foliaceous lobe along the median keel. Tibia thin, tibial spur groove locates near base, femur with 3 DS, 7 PvS, small spine presented at apex. Both of mesothoracic and metathoracic legs with lobe on femur. Posteroventral lobe on femur is bilobed, the one that is located near the body is smaller in size, larger lobe is rounded, tibia very long and thin. Genicular spur very thin, long and curved. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated with foliaceous lobes on tergite VI and VII, lobe on tergite VI is largest, wrinkles, very wide and foliaceous. Cerci flatten with pear-shaped.

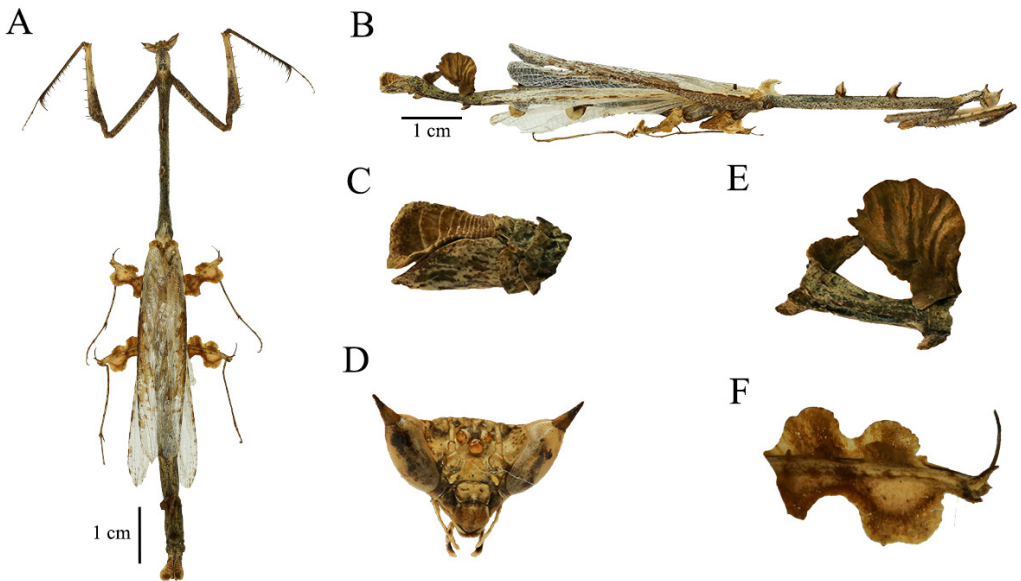


Figure 6. *Paratoxodera gigliotosi*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Lobe on tergite VI and VII; F, Metathoracic femur (C–F without scale bar).

Stenotoxodera* Roy, 2009**Stenotoxodera porioni* Roy, 2009**

(Figure 7)

Stenotoxodera porioni Roy, 2009: 173, Figures 66–69.

Material examined: Southern Thailand. One female, Nakhon Si Thammarat Province, Ron Phibun District, Hin Tok Subdistrict, 25.V.2025, Local collector leg. (PTPC); 1 male, Nakhon Si Thammarat Province, Tropical rain forest, Krung Ching Waterfall, 21.I.2007, N. Pinkhaw leg. (THNHM-I-00011229, THNHM).

Diagnosis: Head triangular in shape, wider than long, vertex convex, vertex higher than juxtaocular bulge. Compound eye conical in shape with long elongation, lower frons transverse. Pronotum very elongated, metazone longer than prozone. Pronotum very thin and curved upward in lateral views, small spine like projection presented along median keel. Tibia thin, tibial spur groove located near base, femur with 3 DS, 7 PvS, small spine presented at apex. Mesothoracic and metathoracic legs with violin shaped lobe on femur, posteroventral lobe slightly concave at the middle, the one near the body is smaller than the other side of the concave part. Tibia very long and thin, genicular spur presented. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen, forewing with brown spots. Abdomen elongate and large foliaceous lobes presented on tergite V, lobe on tergite V is wide, curved and wavy. Cerci long, bifid at the tip and the lower lobe is longer.

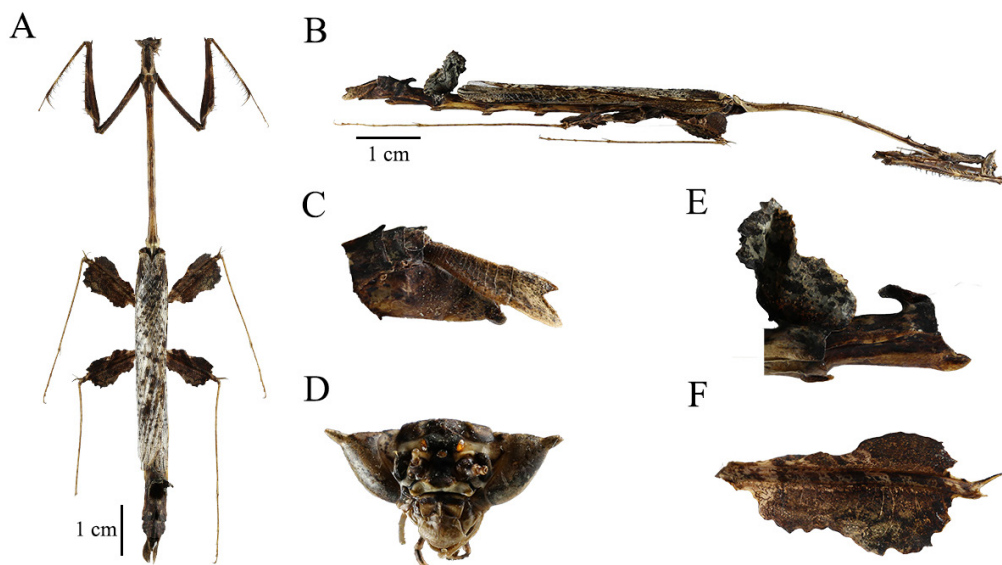


Figure 7. *Stenotoxodera porioni*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Lobe on tergite V and VI; F, Mesothoracic femur (C–F without scale bar).

***Stenotoxodera pluto* (Rehn, 1909)**

(Figure 8)

Toxodera pluto Rehn, 1909: 182, Figures 5–7.

Material examined: Southern Thailand. One male, Surat Thani Province, Phanom District, Khlong Sok Subdistrict, 5.II.2020, C. Hübner leg. (TUPC).

Diagnosis: Head triangular in shape, wider than long, vertex convex, vertex higher than juxtaocular bulge. Compound eye conical in shape with long elongation, lower frons transverse. Pronotum very elongated, metazone longer than prozone. Pronotum very thin and curved upward in lateral views, small spine like projection presented along median keel. The largest lobe located posterior near the abdomen and very curved pointed anteriorly, pronotum almost black, darker than the rest of the body. Tibia thin, tibial spur groove locates near base, small spine presented at apex, 3 DS and 6–7 PvS. Both of mesothoracic and metathoracic legs with light brown coloured lobe with dark line curved out of the body on femur. Posteroventral lobe on femur is slightly rounded and a little wavy on the edges. Anteroventral lobe is uneven and very wavy. Tibia very long and thin, genicular spur very long and thin while curved. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated and foliaceous lobes presented on tergite VI and VII. Lobe on tergite VI is larger a very curved, almost semi circle in the front and almost straight at the back. Cerci flatten and long, widest point at the tip.

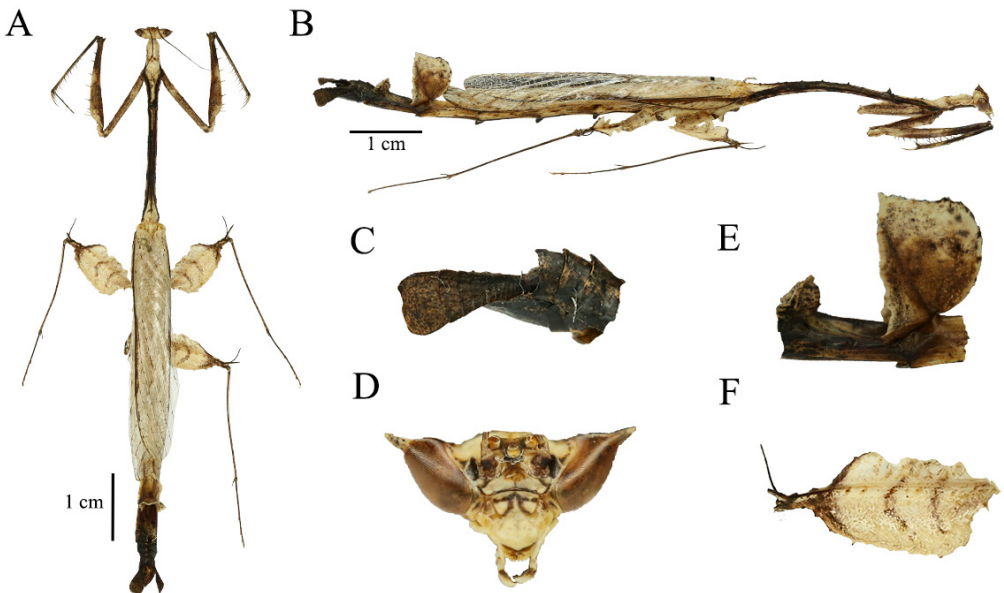


Figure 8. *Stenotoxodera pluto*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Lobe on tergite VI and VII; F, Mesothoracic femur (C–F without scale bar).

Toxomantis* Giglio-Tos, 1914**Toxomantis sinensis* Giglio-Tos, 1914**

(Figure 9)

Toxomantis sinensis Giglio-Tos, 1914: 11.

Material examined: Northeast Thailand. One male, Nakhon Ratchasima Province, Wang Nam Kheao District, Sakaerat Environmental Research Station, 24.I.1968, S. Pongsa leg. (THNHM-I-00011232, THNHM).

Diagnosis: Head longer than wide, compound eyes vertically conical in shape with elongation, lower frons transverse. Vertex convex nearly straight. Pronotum elongated, metazone longer than prozone, medial keel presented at metazone. Lateral expansions presented but indistinct, margins jagged. Coxa of prothoracic leg is long but shorter than metazonal length, femur of prothoracic legs with spine at apex. Tibial spur groove located near base, 3 DS and 6 PvS, tibia with 6 PvS. Both femur and tibia of mesothoracic and metathoracic legs without lobe. Posterior of femur with small spine, femur with genicular spur. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated, subgenital plate long, slender and gradually tapering towards the tip. Cerci very long, flatten, wide and sloping at the tip.

Remark: The specimen (THNHM-I-00011232) deposited in the Natural History Museum of the National Science Museum Thailand was identified as female by Unnahachote (2022). However, upon careful examination, I have determined it to be male.

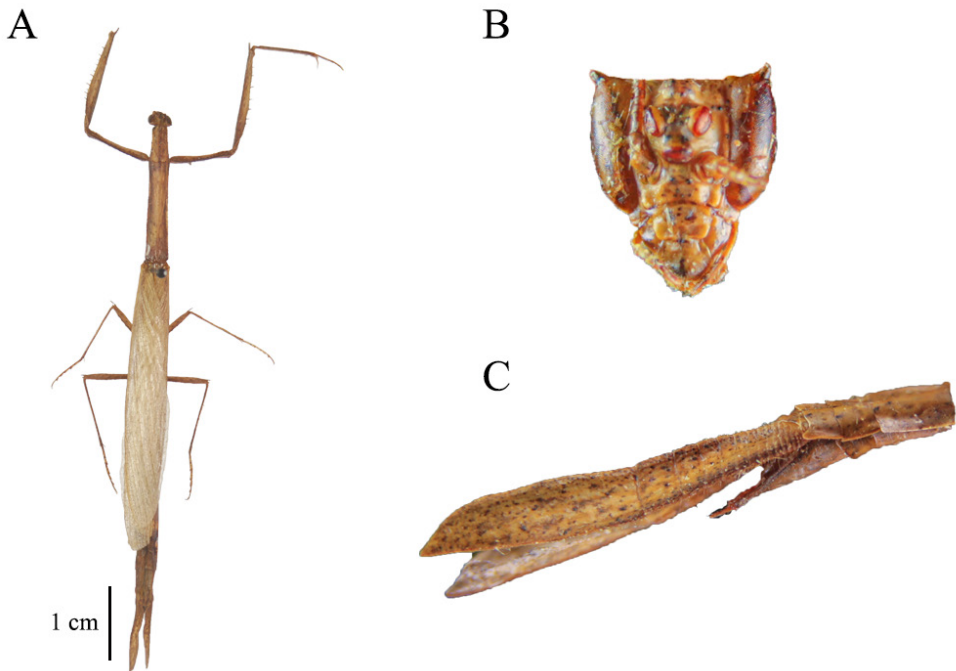


Figure 9. *Toxomantis sinensis*. A, Dorsal habitus; B, Head in frontal view; C, Tip of the abdomen and cerci (B–C without scale bar).

Toxoderopsis* Wood-Mason, 1889**Toxoderopsis taurus* Wood-Mason, 1889**

(Figure 10)

Toxoderopsis taurus Wood-Mason, 1889: 320.

Material examined: **Central - Northeast Thailand.** One male, Khao Yai, 31.V.1970, H.E. Meelure leg. (THNHM-I-00011231, THNHM). **Northeastern Thailand.** One female, Surin Province, Sangkha District, Phra Kaew Subdistrict, Ban Nong Nam Sai, 15.VIII.2023 (nymph), Local collector leg. (PTPC); 1 male, Sakon Nakhon Province, 19.IX.2018, B. Kaewka leg. (TUPC).

Diagnosis: Head wider than long, vertex convex, conical compound eyes with long elongation. Projection formed between ocular, lower frons transverse. Pronotum elongated, metazone significantly longer than prozone. Pronotum straight and triangular especially in metazone and medial keel presented. Surfaces of pronotum are very rough, covered with small pointed bumps, lateral edge spiky, featuring pointed tubercles. Tibia thin, tibial spur groove located near base, small spine presented at apex, 3 DS and 6 PvS. Unequal wavy lobe presented on distal end of forecoxa. Both of mesothoracic and metathoracic legs with small lobe on femur, spine like and largest on posteroventral lobe, genicular spur long. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated, overall cerci with three pointed tips but bifid at last cercomere.

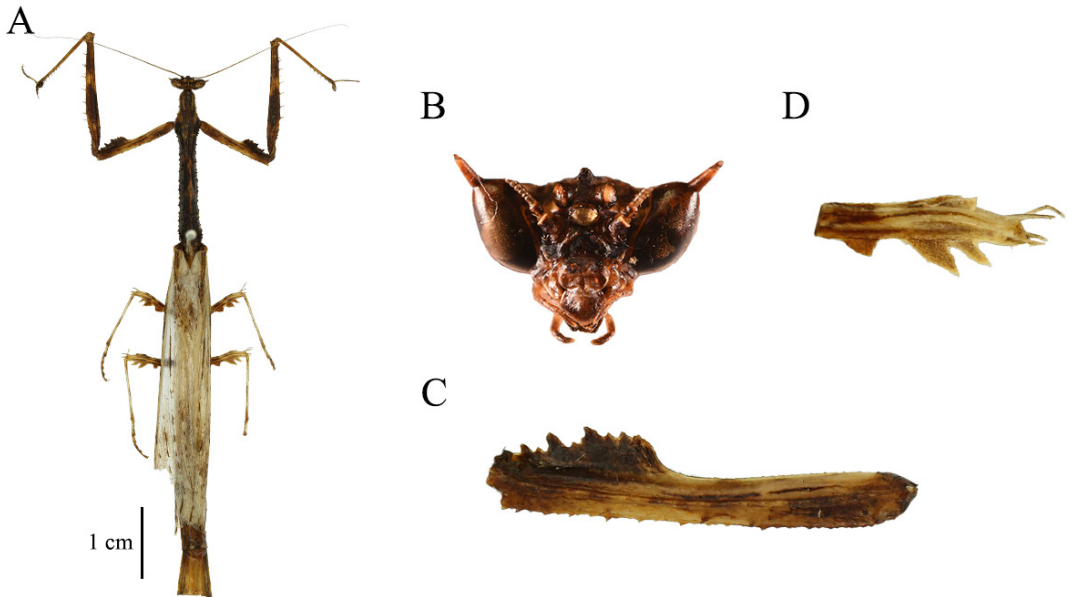


Figure 10. *Toxoderopsis taurus*. A, Dorsal habitus; B, Head in frontal view; C, Prothoracic coxa; D, Metathoracic femur (B–C without scale bar).

Toxodera* Audinet-Serville, 1837**Toxodera pfanneri* Roy, 2009**

(Figure 11–12)

Toxodera pfanneri Roy, 2009: 123, Figures 18B, 23–25.

Material examined: Southern Thailand. One male, Phuket Province, Kathu District, Pa Tong Subdistrict, 25.XI.2024, Local collector leg. (PTPC).

Diagnosis: Head triangular in shape, wider than long. Compound eyes conical in shape with long elongation, lower frons transverse. Pronotum elongated, metazone significantly longer than prozone. Pronotum very triangular in shape, curved upward and very thick in lateral view. Dorsal and lateral margins of pronotum rough caused by very small spine. Tibia of prothoracic legs thin, tibial spur groove locates near base, dorsal surfaces of femur smooth. Femur slender and very curved at the back, very long and curved spine presented at apex, 3 DS and 6 PvS. Both of mesothoracic and metathoracic legs with lobe on femur, tibia long and thin. Posteroventral lobe jagged, each tip is pointed and point outward from the body. Anterodorsal lobe is less wavy, more rounded and shorter than posteroventral lobe, genicular spur long. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated and foliaceous lobes presented on tergite V and VI. Lobe on tergite V is the largest, wavy but no tip distinctly longer than the other. Tergite VI lobe small, very curved and pointed anteriorly. Cerci flatten and long, bifid at the tip.

Male genitalia: Right phallomere with well developed **pva** projection, very well sclerotized, long and bifurcated at the tip, **fda** well sclerotized at the tip, long, curved and covered with small hair on the margin. Ventral phallomere with sclerotized **sdp**, **L4A** broad. Left phallomere with great distance between **aafa** and **pafa**, **pafa** is a spine, **aafa** very curved, both are well sclerotized, **paa** slanted up and well sclerotized.

Remarks: This species is recorded for the first time in Thailand.

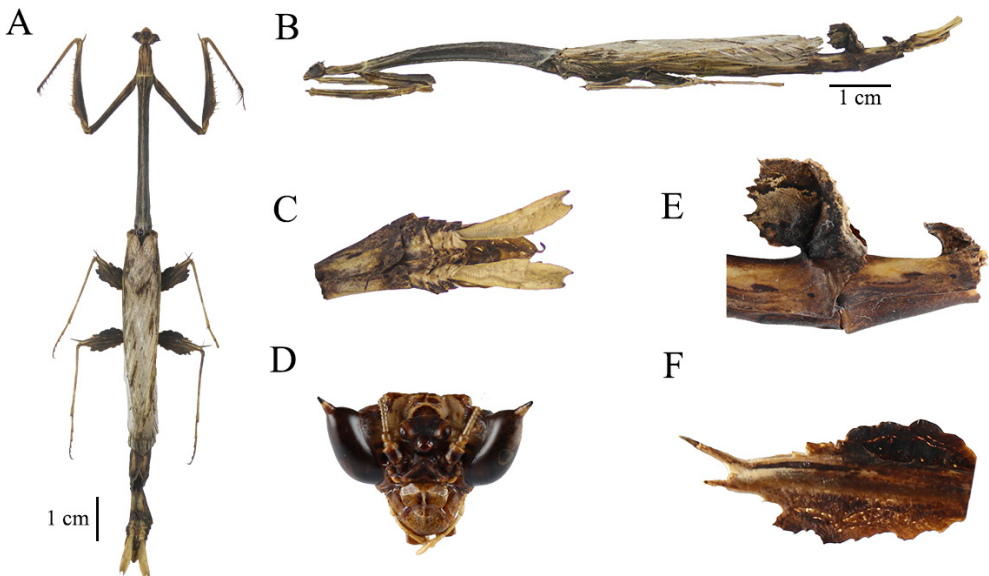


Figure 11. *Toxodera pfanneri*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Lobe on tergite V and VI; F, Metathoracic femur (C–F without scale bar).

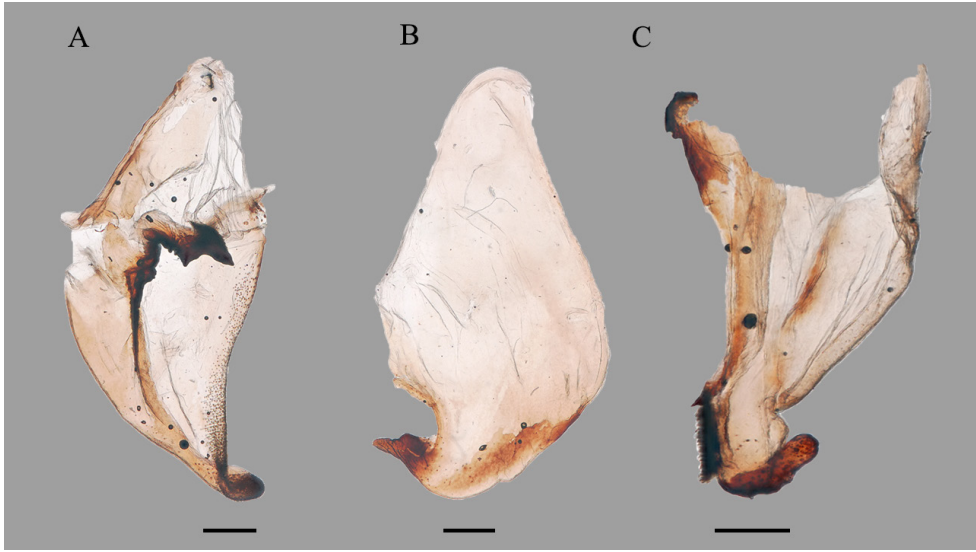


Figure 12. Male genitalia of *Toxodera pfanneri*. A, Right phallomere; B, Ventral phallomere; C, Left phallomere (scale bar 1 mm).

***Toxodera beieri* Roy, 2009**

(Figure 13)

Toxodera beieri Roy, 2009: 111, Figures 13–17.

Material examined: Southern Thailand. One male, Nakhon Si Thammarat Province, Thung Song District, .I.2021, Local collector leg. (PYPC).

Diagnosis: Head triangular in shape, wider than long. Compound eyes conical in shape with long elongation, lower frons transverse. Pronotum elongated, metazone significantly longer than prozone. Pronotum very triangular in shape, curved upward and very thick in lateral view. Metazone very slanted down and almost flatten near prozone, pronotum margin covered with small spine. Tibia of prothoracic legs thin, tibial spur groove located near base, coxa surface rough caused by very small spine. Femur slender and slightly curved at the back, dorsal margin bifurcated at apex, 3 DS and 6 PvS. Both of mesothoracic and metathoracic legs with lobe on femur, tibia long and thin. Posteroventral lobe bilobed shaped, green-yellow coloured with two curved dark band on each lobe are similar sizes. Anterodorsal lobe is smaller in size, genicular spur long and curved pointed out of the body. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated and foliaceous lobes presented on tergite V and VI. Lobe on tergite V is bigger, trilobed green-yellow coloured, very curved at the front and pointed posteriorly at the tip. Lobe on tergite VI looks very similar but smaller in size and less trilobed. Cerci flatten and long.

Remarks: This species is recorded for the first time in Thailand.

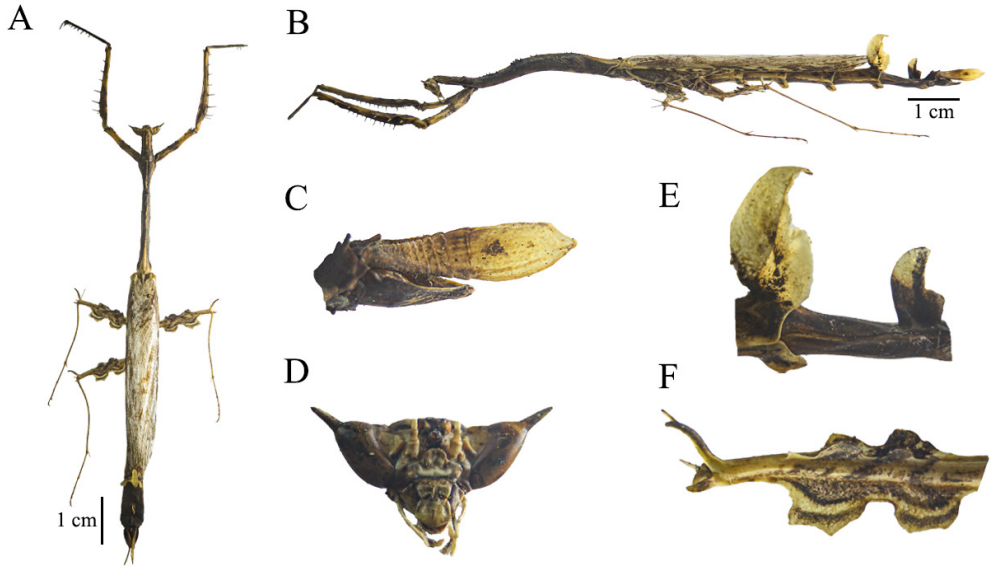


Figure 13. *Toxodera beieri*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Lobe on tergite V and VI; F, Metathoracic femur (C–F without scale bar).

***Toxodera integrifolia* Werner, 1925**

Toxodera integrifolia Werner, 1925: 485, plate 24, figure 3a.

Material examined: No material examined. Recorded in Roy (2009) and Patel *et al.* (2016).

Diagnosis: Head triangular in shape, wider than long. Compound eyes conical in shape with long elongation, lower frons transverse. Pronotum yellow and very elongated, metazone significantly longer than prozone. Pronotum very triangular in shape, curved upward and very thick in lateral view, margin covered with small spine. Prothoracic legs red or dark orange, tibia thin, tibial spur groove located near base, small spine presented at apex. Both mesothoracic and metathoracic legs with yellow and dark orange to red lobe. Posteroventral lobe is dark orange to red coloured semi-ellipse shaped with light colour or yellow band, genicular spur long. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated and foliaceous lobes presented on tergite V and VI. Lobe on tergite V is the biggest with yellow coloured and darker band. Cerci long and flatten, the tip is the broadest and slightly bifid.

***Toxodera fimbriata* Werner, 1930**

(Figure 14)

Toxodera fimbriata Werner, 1930: 9, plate 1–3.

Material examined: Southern Thailand. One male, Narathiwat Province, Wang District, Loh Jood Subdistrict, Hala-Bala Wildlife Research Station, 5°48'26"N, 101°50'45"E, Altitude 119 m, 23.III.2018, W. Jaitrong leg. (THNHM-I-00011230, THNHM).

Diagnosis: Head triangular in shape, wider than long. Compound eyes conical in shape

with long elongation, lower frons transverse. Pronotum elongated, metazone significantly longer than prozone. Pronotum very triangular in shape, curved upward and very thick in lateral view. Dorsal margins with small spine, lateral view with long and curved spine at the posterior end. Metazone darker on the side and lighter on the margins. Tibia of prothoracic legs thin, tibial spur groove located near base. Femur slender, small spine presented at apex. Both of mesothoracic and metathoracic legs with lobe on femur, tibia long and thin. Postero-ventral lobe very thorny, genicular spur long. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated and foliaceous lobes presented on tergite V and VI. Lobe on tergite V is long and very curved at front and concave, serrated at the back. Cerci long and flatten, bifid at the tip with narrower and very longer on the other one.

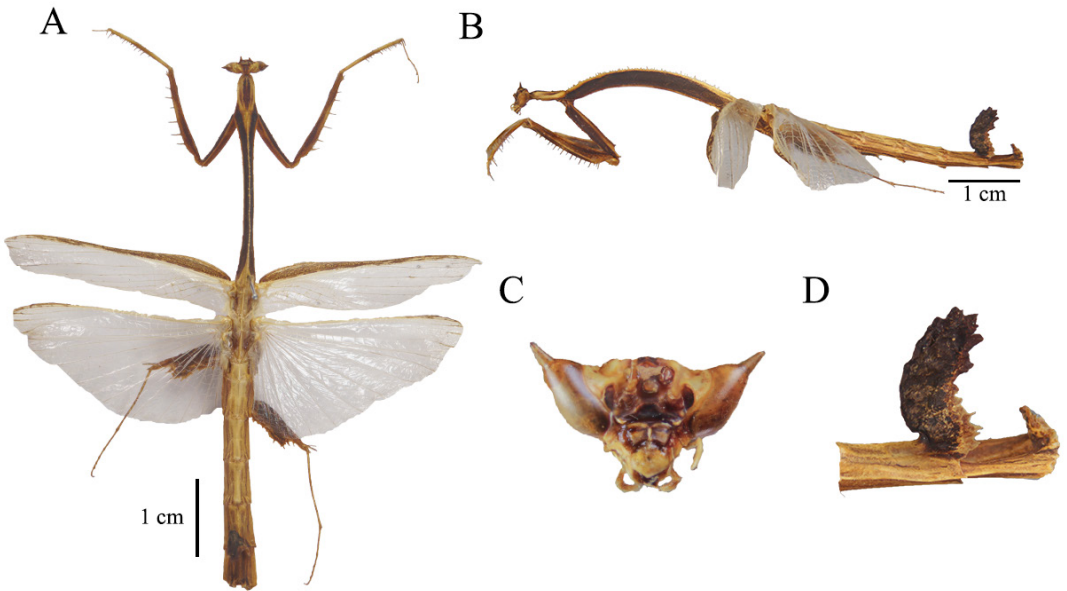


Figure 14. *Toxodera fimbriata*. A, Dorsal habitus; B, Lateral habitus; C, Head in frontal view; D, Lobe on tergite V and VI. (C–D without scale bar).

***Toxodera maxima* Roy, 2009**

(Figure 15)

Toxodera maxima Roy, 2009: 104, Figures 5–12.

Material examined: Southern Thailand. One male, Surat Thani Province, Tha Chana District, Prasong Subdistrict, 27.X.2020, C. Bunyatikan leg. (TUPC).

Diagnosis: Head triangular in shape, wider than long. Compound eyes conical in shape without elongation, lower frons transverse. Pronotum elongated, metazone significantly longer than prozone. Pronotum very triangular in shape, curved upward and very thick in lateral view. Dorsal and lateral margins of pronotum rough caused by very small spine. Tibia of prothoracic legs thin, tibial spur groove located near base. Femur slender and slightly curved at the back, small spine presented at apex, 3 DS and 6 PvS. Mesothoracic and metathoracic

legs with bilobed hourglass-like shape lobe on femur, posteroventral lobe with dark band and concave at the middle, the one near the body is smaller than the other side of the concave part. Tibia very long and thin, genicular spur long. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated and foliaceous lobes presented on tergite VI and VII. Lobe on tergite VI is bigger, posterior base is sharp wavy. Cerci long and flatten, bifid at the tip slightly longer on lower lobe.

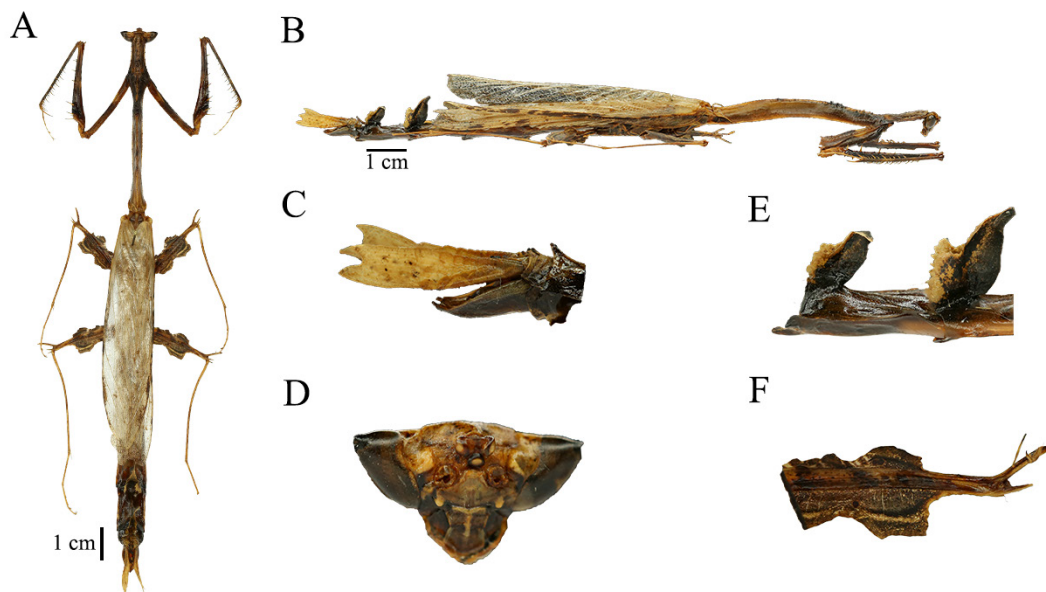


Figure 15. *Toxodera maxima*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Lobe on tergite VI and VII; F, Metathoracic femur (C–F without scale bar).

***Toxodera hauseri* Roy, 2009**

(Figure 16)

Toxodera hauseri Roy, 2009: 130, Figures 31–34.

Material examined: Northern Thailand. One male, Nan Province, Bo Kluea District, Bo Kluea Tai Subdistrict, IV.2024, light trap, L. Khaton leg. (PTPC).

Diagnosis: Head triangular in shape, wider than long. Compound eyes conical in shape with long elongation, lower frons transverse. Pronotum elongated, metazone significantly longer than prozone. Pronotum very triangular in shape, curved upward and very thick in lateral view. Dorsal margins with small spine, lateral view with long and curved spine at the posterior end. Prozone with small tubercles near keeled. Metazone darker on the side and lighter on the margins. Tibia of prothoracic legs thin, tibial spur groove located near base. Femur slender and curved at the back, small genicular spur presented at apex, 3 DS and 6 PvS. Both of mesothoracic and metathoracic legs with lobe on femur, tibia long and thin. Posteroventral lobe jagged, slightly concave at the middle, genicular spur long. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated and foliaceous lobes presented on tergite V and VI. Lobe on tergite V

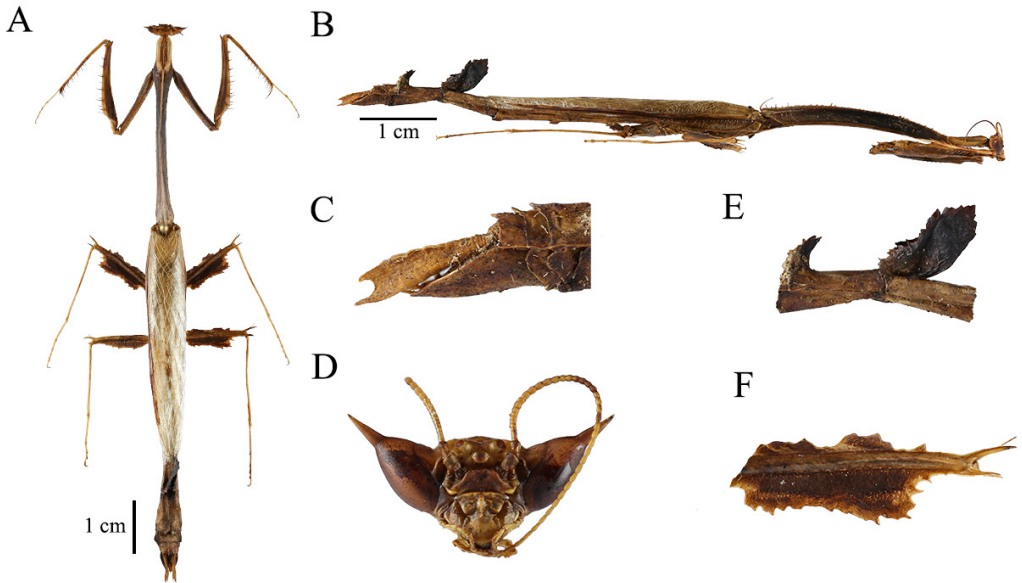


Figure 16. *Toxodera hauseri*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Lobe on tergite V and VI; F, Mesothoracic femur (C–F without scale bar).

is round and curved at the front, slightly concaved to straight and jagged at the back. Cerci long and flatten, bifid at the tip with slightly longer on the other one.

***Toxodera maculata* Ouwens, 1913**

(Figure 17)

Toxodera maculata Ouwens, 1913: 122, Plate 1.

Material examined: Northern Thailand. Two males, Nan Province, Bo Kluea District, Bo Kluea Tai Subdistrict, IV.2024, light trap, L. Khaton leg. (PTPC); 1 male, same locality, 21.V.2025, L. Khaton leg. (PTPC); 1 male, Chiang Rai Province, Mae Fa Luang District, Doi Tung, VI.2018, K. Jiaranaaisakul leg. (THNHM).

Diagnosis: Head triangular in shape, wider than long. Compound eyes conical in shape with elongation, lower frons transverse. Pronotum elongated, metazone significantly longer than prozone. Pronotum very triangular in shape, curved upward and very thick in lateral view. Dorsal and lateral margins of pronotum rough caused by very small spine. Tibia of prothoracic legs thin, tibial spur groove located near base. Femur slender and curved at the back, femur dark alternating with light coloured, long and curved spine presented at apex, 3 DS and 6–7 PvS. Mesothoracic and metathoracic legs with lobe. Posteroventral lobe wavy, slightly concaved at the middle. Anterodorsal lobe slightly jagged on the edges, almost as long as posteroventral lobe, genicular spur long. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated and foliaceous lobes presented on tergite V and VI. Lobe on tergite V is biggest, various shape, thorny at the front with one or more distinctly long projection. Cerci long and flatten, bifid at the tip and almost equal in length, or one is slightly longer than the other.

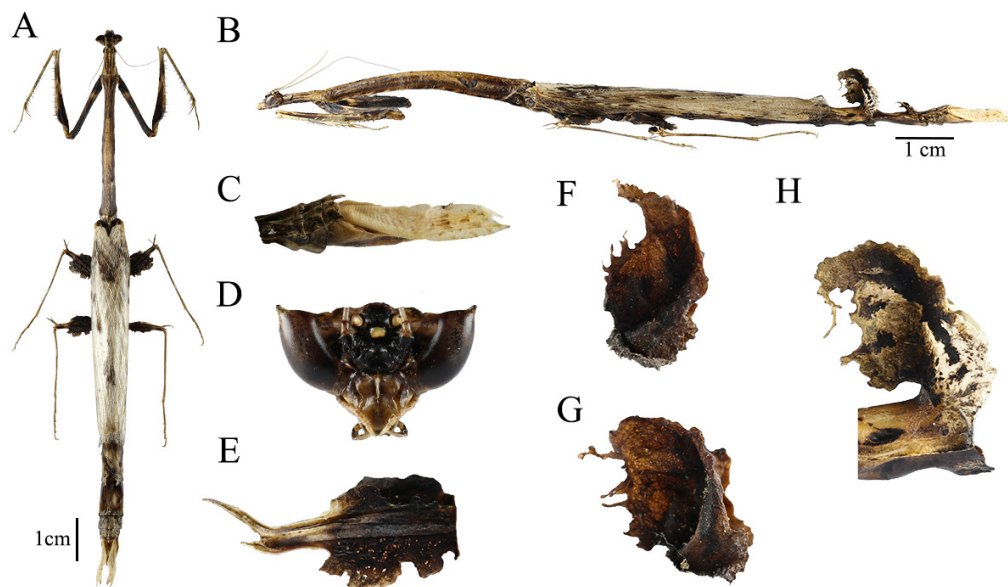


Figure 17. *Toxodera maculata*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Metathoracic leg; F–H, Lobe on tergite V. (C–H without scale bar).

***Toxodera denticulata* Audinet-Serville, 1837**

(Figure 18)

Toxodera denticulata Audinet-Serville, 1837: 28, Plate 2.

Material examined: Northern Thailand. One male, Nan Province, Bo Kluea District, Bo Kluea Tai Subdistrict, 3.IV.2025, light trap, P. Tarapipattanakun & L. Khaton leg. (PTPC).

Diagnosis: Head triangular in shape, wider than long. Compound eyes conical in shape with long elongation, lower frons transverse. Pronotum elongated, metazone significantly longer than prozone. Pronotum very triangular in shape, curved upward and very thick in lateral view. Dorsal margins very jagged, lateral view with long and curved spine at the posterior end. Tibia of prothoracic legs thin, tibial spur groove located near base. Femur slender, dark alternating with light coloured, small spine presented at apex, 3–4 DS and 5–6 PvS. Both of mesothoracic and metathoracic legs with lobe on femur, tibia long and thin. Posteroventral lobe is bilobed shape lobe, outer lobe is slightly bigger, curved dark band presented on each lobe. Anterodorsal lobe is smaller in size, genicular spur long and curved point out of the body. Both males and females are brachypterous, both forewing and hindwing shorter than tip of the abdomen. Abdomen elongated and distinct foliaceous lobes presented on tergite V and VI. Lobe on tergite V is biggest, trilobed and curved at the front, tip very narrow and pointed upward. The smallest lobe presented on tergite IV, under the wing. Cerci long and flatten, bifid at the tip, the one on the bottom is longer than the other.

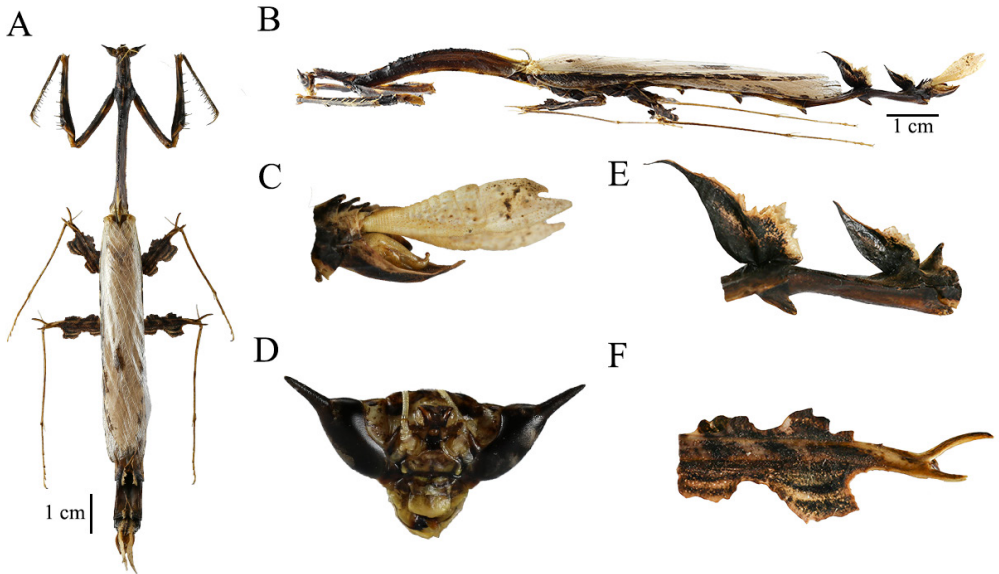


Figure 18. *Toxodera denticulata*. A, Dorsal habitus; B, Lateral habitus; C, Tip of abdomen and cerci; D, Head in frontal view; E, Lobe on tergite V and VI; F, Mesothoracic femur (C–F without scale bar).

CONCLUSION

The family Toxoderidae in Thailand comprises seven genera within two subfamilies and five tribes. Among these genera, *Toxodera* exhibits the greatest diversity. Previously, six *Toxodera* species were recorded in Thailand (Roy, 2009; Unnahachote *et al.*, 2019; Unnahachote, 2022): *Toxodera denticulata*, *Toxodera hauseri*, *Toxodera integrifolia*, *Toxodera maculata*, *Toxodera fimbriata*, and *Toxodera maxima*. Subsequent examination and collection of specimens have revealed two newly recorded species of this genus, *Toxodera pfanneri* and *Toxodera beieri*. Currently, a total of 18 Toxoderid species have been documented in Thailand.

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to everyone who supported me throughout this research. My heartfelt thanks go to Dr. Weeyawat Jaitrong, for his invaluable guidance, constructive feedback and encouragement during this project. I would like to gratefully thank to Tadsanai Jeenthong for the permission to use specimens deposited in Natural History Museum of the National Science Museum Thailand. I would like to express my gratitude to Yudthana Samung from Department of Medical Entomology, Mahidol University. This work would not be possible without Thornthan Unnahachote for his expertise and additional specimens used in this study. I would like to thank the local collectors for their help in collecting specimens during this research. Finally, I want to thank my family for always supporting and encouraging me during this study.

REFERENCES

- Audinet-Serville, J.G. 1837. Nouveau genre d'Orthoptères (*Toxodera denticulata*) de la famille des Mantides. *Annales de la Société Entomologique de France* 6: 25–29.
- Brannoch, S.K., F. Wieland, J. Rivera, K.D. Klass, O. Béthoux and G.J. Svenson. 2017. Manual of praying mantis morphology, nomenclature, and practices (Insecta, Mantodea). *ZooKeys* 696: 1–100. <https://doi.org/10.3897/zookeys.696.12542>
- Giglio-Tos, E. 1914. Mantidi raccolti da S.A.R. la Duchessa d'Aosta nella regione dei grandi laghi dell'Africa equatoriale. Revisione della sottofamiglia dei Toxoderini. *Annuario del Museo zoologico della R. Università di Napoli (Nuova Serie)* 4(15): 1–17.
- Mukherjee, T.K., R. Ehrmann and P. Chatterjee. 2014. Checklist of Mantodea (Insecta) from India. *Priamus* 30(Supplement): 1–62.
- Ouwens, P.A. 1913. Eenige weinig bekende Mantis of Roofsprinkhanen van Java. *De Tropische Natuur* 9(2): 122–123.
- Patel, S., G. Singh and R. Singh. 2016. Checklist of global distribution of Tarachodidae and Toxoderidae (Mantodea: Dictyoptera). *International Journal of Contemporary Research and Review* 7(12): 20256–20270.
- Rehn, J.A.G. 1909. A contribution to the knowledge of the Orthoptera of Sumatra. *Bulletin of the American Museum of Natural History* 26: 177–211.
- Roy, R. 2009. Revision of the Toxoderini novo sensu (Mantodea, Toxoderinae). *Revue Suisse de Zoologie* 116(1): 93–183.
- Schwarz, C.J. and R. Roy. 2019. The systematics of Mantodea revisited: an updated classification incorporating multiple data sources (Insecta: Dictyoptera). *Annales de La Société Entomologique de France (N.S.)* 55(2): 101–196. <https://doi.org/10.1080/00379271.2018.1556567>
- Schwarz, C.J. and T. Unnahachote. 2025. A new species of *Aethalochroa* Wood-Mason, 1877 (Mantodea: Toxoderidae) from mainland SE Asia, with a reassessment of *Oestomantis* Giglio-Tos, 1914. *Annales de La Société Entomologique de France (N.S.)* 61(3): 241–255. <https://doi.org/10.1080/00379271.2025.2486825>
- Unnahachote, T. 2022. New records of Toxoderid species (Dictyoptera: Mantodea: Toxoderidae) from Thailand. *Thai Specimens* 2: 1–15.
- Unnahachote, T., Y. Samung, S. Waengsothorn and W. Jaitrong. 2019. New records of praying mantis (Mantodea) from Thailand. *Far Eastern Entomologist* 395: 23–32.
- Uvarov, B.P. 1927. LXXXII.—A new mantid from Burma. *Annals and Magazine of Natural History* 19 (114): 658–659. <https://doi.org/10.1080/00222932708655557>
- Werner, F. 1925. Vierter Beitrag zur Mantodeenfauna von Niederländisch-Indien. *Treubia* 6(3–4): 476–486.
- Wieland, F. 2013. The phylogenetic system of Mantodea (Insecta: Dictyoptera). *Species, Phylogeny and Evolution* 3: 3–222. <https://doi.org/10.17875/gup2013-711>
- Wood-Mason, J. 1876. Description of a new species of Mantidae with pointed eyes. *The Annals and Magazine of Natural History; Zoology, Botany, and Geology, [Fourth Series]* 18: 441–443. <https://www.biodiversitylibrary.org/page/24295564>
- Wood-Mason, J. 1889. The Ethiopian and Oriental representatives of the Mantodean subfamily Vatiidae. *Journal of the Asiatic Society of Bengal* 58(2): 306–326.

