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Research article

Review of Belostomatidae (Hemiptera: Heteroptera) in Thailand

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Abstract

Importance of the work: This is the first research report on the taxonomy of Belostomatidae in Thailand, with extensive distribution records.

Objectives: To characterize the belostomatid fauna and provide biological information and a taxonomic key of belostomatids in Thailand.

Materials & Methods: Approximately, 500 specimens of giant water bugs were collected from natural habitats in different localities in Thailand during 1995–2020 using a light trap and an aquatic D-net. Specimens were identified to the specific taxonomic level based on morphological characteristics.

Results: Three species, representing two genera of the Belostomatidae, were found in Thailand: *Diplonychus rusticus*, *Lethocerus indicus* and *L. patruelis*. Members of this family were commonly found in a wide variety of aquatic habitats, such as rice paddies, vegetated ponds and slow-flowing streams. Specimens of *D. rusticus* were collected from peat swamps in southern Thailand. Numerous specimens of *L. indicus* were collected from the light trap. The intraspecific variations of specimens were observed in members of each species in Thailand. The distinguishing morphological characters for the belostomatid species in Thailand include body size and shape, number of claws and markings on the pronotum and sternum.

Main finding: This research confirmed that there are three species of Belostomatidae in Thailand, with *Diplonychus rusticus* and *L. indicus* being widely distributed throughout the country, while *L. patruelis* was identified from sites in northern and southern Thailand.

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Introduction

The family Belostomatidae (Hemiptera: Heteroptera: Nepomorpha) is one of the most common groups of insects in aquatic habitats throughout the world (Damgaard and Zettel, 2014). Members of this family have been reported in every continent, except Antarctica (Andersen and Weir, 2004; Chen et al., 2005). This family is represented by two subfamilies consisting of 11 genera and 150 species (Perez Goodwyn, 2006; Ribeiro, 2007; Polhemus and Polhemus, 2008; Henry, 2009; Morse, 2009; Estévez and Ribeiro, 2011; Moreira et al., 2011; Ribeiro et al., 2018). The subfamily Belostomatinae is the larger group in the Belostomatidae with eight genera: *Abedus* Stål, 1862; *Appasus* Amyot and Serville, 1843; *Belostoma* Latreille, 1807; *Diplonychus* Laporte, 1833; *Horvathinia* Montandon, 1911; *Hydrocyrius* Spinola, 1850; *Limnogeton* Mayr, 1853; *Weberiella* De Carlo, 1966 (Ribeiro et al., 2018). The subfamily Lethocerinae contains the largest heteropterans with the body length reaching 120 mm (Perez Goodwyn, 2006). This subfamily consists of three genera: *Benacus* Stål, 1861, *Kirkaldyia* Montandon, 1909 and *Lethocerus* Mayr, 1853 (Perez Goodwyn, 2006; Ribeiro et al., 2018).

In Thailand, three species of Belostomatidae have been reported from various publications: *Diplonychus rusticus* (Fabricius, 1781), *Lethocerus indicus* (Lepeletier and Serville, 1825) and *L. patruelis* (Stål, 1854) (Nieser, 1996; Polhemus and Polhemus, 2013; Sareein et al., 2019). *Diplonychus rusticus* and *L. indicus* are commonly found throughout the country, whereas *L. patruelis* has been reported from certain areas in Thailand. Until now, there has been no single publication that intensively focused on these giant water bugs species in Thai fauna. Therefore, the current study included extensive records of members of the Belostomatidae in Thailand based on current taxonomic, ecological, and biological knowledge.

Materials and Methods

The specimens of giant water bugs were collected from natural habitats in different localities in Thailand during 1995–2020 using a light trap and an aquatic D-net (Cook et al., 2020; Raruanysong et al., 2014). Approximately 500 specimens of belostomatids were examined in this study, specifically, 263 specimens of *Diplonychus* from 58 localities and 254 specimens of *Lethocerus* from 26 localities. Specimens were pinned or preserved in 95% ethyl alcohol and deposited in the Enns Entomology Museum, University of Missouri-Columbia, USA and in the Insect Collection, Department of Entomology, Kasetsart University, Bangkok, Thailand. Specimens were identified to the species level using a stereo microscope and the keys in Andersen and Wier (2004), Chen et al. (2005), Perez Goodwyn (2006), Polhemus and Polhemus (2013) and Sareein et al. (2019). Collection co-ordinates were obtained using a global positioning system (map datum WGS 84).

Results and Discussion

Key to Genera and species of Belostomatidae occurring in Thailand (modified from Perez Goodwyn, 2006; Polhemus and Polhemus, 2013).

1. Smaller species with body length excluding siphon < 20 mm; body rounded (Fig. 1A); eyes triangular (Fig. 1G); fore tarsus with two small claws (Fig. 1D) (Belostomatinae) ……*Diplococcus rusticus* (Fabricius)

1’ Larger species with body length excluding siphon > 50 mm; body elongated (Fig. 1B and 1C); fore tarsus with a single claw (Fig. 1E and 1F) (Lethocerinae)……...*Lethocerus* (Mayr)

2. Pronotum with one pair of wide light stripes (Fig. 1H); mesosternum and metasternum with distinctive black markings (Fig. 1J)……*Lethocerus indicus* (Lepeletier and Serville)

2’ Pronotum with one pair of thin light stripes with distinctly posterior dark markings (Fig. 1I); mesosternum and metasternum with faint brown markings (Fig. 1K)……..…… ……..……..….*Lethocerus patruelis* (Stål)

Genus Diplonychus Laporte, 1833

This genus consists of five species and is distributed from Asia through Australia, except for the Bismarck and Solomon Islands (Andersen and Wier, 2004; Chen et al., 2005; Polhemus and Polhemus, 2013). *Diplonychus rusticus* (Fabricius) is the only species that has been reported from Southeast Asia, including Thailand (Nieser, 1996; Polhemus and Polhemus, 2013). Specifically, *D. rusticus* was reported from central, northern and southern Thailand (Vitheepradit, 2000; Sites and Vitheepradit, 2010). Members of this genus are commonly found at margins of vegetated lentic habitats (Andersen and Wier, 2004; Chen et al., 2005).

Diplonychus rusticus (Fabricius, 1781)

Nepa rustica Fabricius, 1781: 333
Diplonychus rusticus Laporte, 1833: 18
Appasus marginicollis Dufour, 1863: 393
Sphaerodema molestum Fernando and Cheng, 1974: 41
Diplonychus indicus Ventaktsan and Rao, 1980: 299

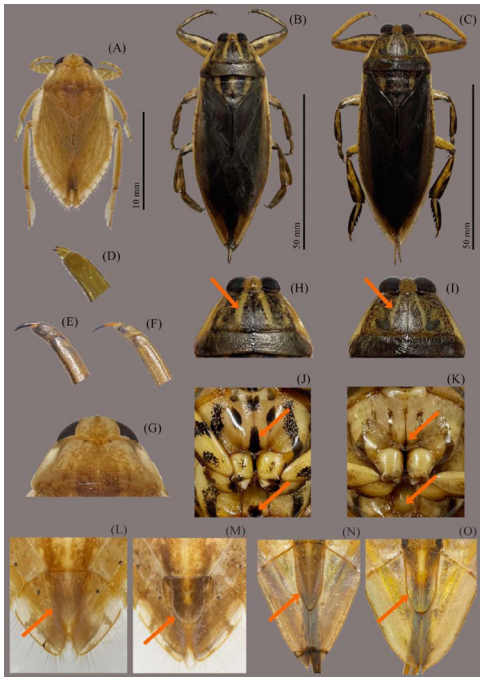

Fig. 1 Morphology of Belostomatidae of Thailand: dorsal habitus (A) *Diplonychus rusticus*, (B) *Lethocerus indicus*, (C) *Lethocerus patruelis*; fore tarsus and claws of (D) *D. rusticus*, (E) *L. indicus*, (F) *L. patruelis*; head and pronotum of (G) *D. rusticus* with eyes triangular, (H) *L. indicus* with one pair of wide light stripes, (I) *L. patruelis* with one pair of narrow light stripes; ventral view, mesosternum and metasternum of (J) *L. indicus* with distinctive black markings, (K) *L. patruelis* with faint brown markings; genital operculum or genital plate in adults of (L) male of *D. rusticus*, (M) female of *D. rusticus*, (N) male of *L. indicus*, (O) female. of *L. indicus*

Diagnosis

This species can be recognized by a rounded body (Fig. 1A) and triangular eyes (Fig. 1G) and distinguished from *Lethocerus* spp. by a smaller body (< 20 mm) and a fore tarsus with 2 claws (Fig. 1D), whereas the latter species have a larger body (> 50 mm) and a fore tarsus with a single claw (Figs. 1E and 1F).

Material examined

Thailand: Kalasin province: Phu Pan National Park, 4-VI-1998, Sites, Simpson, Vitheepradit, L-148 (1 female); Phu Pan National Park, 4-VI-1998, Sites, Simpson, Vitheepradit, L-151 (2 males, 1 female); Phu Pan National Park, Huay Wein Prai, 5-VI-1998, Sites, Simpson, Vitheepradit, L-153 (1 male, 2 females); Phu Pan National Park, blacklight at Park HQ, 6-VI-1998, Sites, Simpson, Vitheepradit, L-160 (17 males, 10 females); Phu Pan National Park, Lahm Huay Noi, 7-VI-1998, Sites, Simpson, Vitheepradit, L-161 (9 males, 9 females); Phu Pan National Park, Lahm Huay Noi, 8 km S of Ban Kahm Perm, 7-VI-1998, Sites, Simpson, Vitheepradit, L-162 (1 female); Phu Pan National Park, water supply pond at Park HQ, 7-VI-1998, Sites, Simpson, Vitheepradit, L-165 (1 male); Phu Pan National Park, blacklight at Park HQ pond, 7-VI-1998, Sites, Simpson, Vitheepradit, L-166 (3 males); Krabi province: Mueang district, 08º02.625'N 98º48.517'E, 13 m, 8-VIII-2005, Sites, Vitheepradit, Prommi, Simpson, L-863 (2 males); Nuea Khlong district, 08º01.045'N 99º00.450'E, 37 m, 9-VIII-2005, Sites, Vitheepradit, Prommi, Simpson, L-867 (5 males, 3 females); Nuea Khlong district, 08º01.045'N 99º00.450'E, 37 m, 8-I-2006, Vitheepradit, Prommi, L-903 (1 female); Nuea Khlong district, 08º01.045'N 99º00.450'E, 37 m, 14-VI-2006, Sites, Vitheepradit, Prommi, L-952 (3 males, 2 females); Thalang district, 08º02.625'N 98º48.517'E, 24 m, 8-I-2006, Vitheepradit, Prommi, L-902 (1 male); Phang Nga province: Takua Thung district, 08º24.533'N 98º27.434'E, 10 m, 2-VI-2005, Sites, Vitheepradit, Prommi, L-826 (3 males, 1 female); Khao Lampi-Hat Thai Mueang National Park, 08º28.312'N 98º13.672'E, 1 m, 2-VI-2005, Vitheepradit, Prommi, L-824 (1 male); Khao Lampi-Hat Thai Mueang National Park, 08º28.312'N 98º13.672'E, 1 m, 3-VIII-2005, Vitheepradit, Prommi, L-847 (5 males, 15 females); Khao Lampi-Hat Thai Mueang district, 08º18.655'N 98º17.552'E, 19 m, 4-VIII-2005, Vitheepradit, Prommi, Simpson, L-849 (1 female); Khao Lampi-Hat Thai Mueang National Park, 08º28.312'N 98º13.672'E, 1 m, 8-VI-2006, Sites, Vitheepradit, Prommi, L-932 (1 female); Khura Buri district, 09º18.005'N 98º22.798'E, 5 m, 3-I-2006, Sites, Vitheepradit, Prommi, L-878 (3 males, 7 females); Khao Lampi-Hat Thai Mueang National Park, 08º28.312'N 98º13.672'E, 1 m, 4-I-2006, Sites, Vitheepradit, Prommi, L-884 (4 males, 5 females); Khura Buri district, 9º18.005'N 98º22.798'E, 5 m, 7-VI-2006, Sites, Vitheepradit, Prommi, L-924 (2 males, 4 females); Mueang district, 08º31.750'N 98º32.001'E, 28 m, 3-VI-2005, Sites, Vitheepradit, Prommi, L-827 (2 males, 2 females); Mueang district, 08º31.750'N 98º32.001'E, 28 m, 5-I-2006, Sites, Vitheepradit, Prommi, L-887 (6 males, 2 females); Takua Pa district, 08º52.469'N 98º22.679'E, 17 m, 1-VI-2005, Vitheepradit, Prommi, L-819 (1 male, 1 female); Takua Pa district, 08º51.391'N 98º15.989'E, 12 m, 1-VI-2006, A. Sites, Vitheepradit, Prommi, L-929 (2 males, 2 females); Thai Mueang district, 08º18.655'N 98º17.552'E, 19 m, 5-I-2006, Sites, Vitheepradit, Prommi, L-886 (3 males, 4 females); Thai Mueang district: 08º18.655'N 98º17.552'E, 19 m, 9-VI-2006, Sites, Vitheepradit, Prommi, L-935 (3 males, 4 females); Mueang district, 08º31.750'N 98º32.001'E, 28 m, 12-VI-2006, Sites, Vitheepradit, Prommi, L-946 (7 females);

Phetchabun province: Khao Kho district, Ban Song Kom, vegetated pond, 1-VII-1998, Vitheepradit, Sawangsak, L-223 (1 male); Nam Nao district, Ban Srab Rak, vegetated pond, 3-VII-1998, Vitheepradit, Sawangsak, L-231 (2 males, 1 female); Lom Sak district, Ban Non Ma Ka, unplanted rice paddy, 3-VII-1998, Vitheepradit, Sawangsak, L-233 (5 males, 1 female); Lom Sak Sub-district, Ban Num Pu, 20-VI-1998, Vitheepradit, Sawangsak, L-200 (3 females); Vichienburi district, Yan Sow Sub district, Ban Num Pu, 25-VI-1998, Vitheepradit, Sawangsak, L-214 (3 males, 3 females); Vichienburi district, Yan Sow Sub-district, Ban Num Pu, 25-VI-1998, Vitheepradit, Sawangsak, L-215 (1 male); Phitsanulok province: Ban Songsalung, 9-VI-1998, Sites, Simpson, Vitheepradit, L-169 (1male); Nakhon Thai, 9-VI-1998, Sites, Simpson, Vitheepradit, L-168 (8 females); Namtok Chat Trakan, 9-VI-1998, Sites, Simpson, Vitheepradit, L-171 (1 female); Phuket province: Thalang district, 08º07.461'N 98º18.193'E, 19 m, 5-VIII-2005, Vitheepradit, Prommi, Simpson, L-858 (1 female); Thalang district, 08º08.325'N 98º17.927'E, 28 m, 5-VIII-2005, Vitheepradit, Prommi, Simpson, L-859 (2 males, females); Thalang district, 08º07.258'N 98º18.165'E, 20 m, 6-I-2006, Sites, Vitheepradit, Prommi, L-893 (1 male); Thalang district, 08º07.461'N 98º18.193'E, 19 m, 6-I-2006, Sites, Vitheepradit, Prommi, L-894 (1 male, 1 female); Thalang district, 08º08.325'N 98º17.927'E, 28 m, 6-I-2006, Sites, Vitheepradit, Prommi, L-896 (2 males, 3 females); Thalang district, 08º08.772'N 98º17.892'E, 23 m, 7-I-2006, Sites, Vitheepradit, Prommi, L-898 (2 males); Thalang district, 08º07.930'N 98º18.156'E, 24 m, 7-I-2006, Sites, Vitheepradit, Prommi, L-899 (3 females); Thalang district, 08º10.718'N 98º17.611'E, 23 m, 9-VI-2006, Sites, Vitheepradit, Prommi, L-936 (4 females); Thalang district, 08º07.930'N 98º18.156'E, 24 m, 24-VI-2006, Sites, Vitheepradit, Prommi, L-943 (1 female); Thalang district, Mai Khao peat swamp, UV pan trap, 08º07.461'N 98º18.193'E, 19 m, 7-I-2006, Sites, Vitheepradit, Prommi, L-900 (2 males, 1 female); Sakon Nakhon province: Phu Pan National Park, 17º03.969'N 103º58.133'E, 321 m, 24-IV-2004, Vitheepradit, L-637 (1 male); Satun province: Thale Ban, 9-VII- 1997, Sites, Permkam, L-133 (1 female); Songkhla province: Khu Khut Bird Sanctuary, 31-I-1995, B.J. Nichols, L-84 (12 males, 8 females); Suphan Buri province: Pla Ma district, 14º18'N 100º14'E, 11 m, 15-IV-2003, Vitheepradit, L-464 (2 males, 1 female); Ranong province: Suk Samran district, 09º20.397'N 98º24.772'E, 41 m, 24-V-2005, Vitheepradit, L-794 (1 male, 2 females); Ranong province: Suk Samran district, 09º20.397'N 98º24.772'E, 41 m, 2-VIII-2005, Vitheepradit, Simpson, Prommi, L-840 (1 female); Loei province: Nong Kang, rice paddy, 11-VI-1998, Sites, Simpson, Vitheepradit, L-179 (2 females); Nakhon Sawan province: Bung Boraphet, 15º42.42'N 100º11.20'E, 17 m, 3-VI-2006, Sites, Vitheepradit, Prommi, L-911 (1 female); Trang province: Sikao district, 07º30.170'N 99º20.541'E, 6 m, 10-VIII-2005, Sites, Vitheepradit, Prommi, Simpson, L-868 (4 males, 5 females); Sikao district, 07º30.170'N 99º20.541'E, 6 m, 10-I-2006, Vitheepradit, Prommi, L-908 (2 males, 1 female); Sikao district, 07º30.170'N 99º20.541'E, 6 m, 14-VI-2006, Sites, Vitheepradit, Prommi, L-955 (1 female).

Previous records

Khon Kaen, Loei, Nakhon Pathom (Suksai et al., 2016; Reunura and Prommi, 2020)

Discussion

This species has been recorded from India to Japan, Southeast Asia and Australia (Andersen and Wier, 2004; Chen et al., 2005; Polhemus and Polhemus, 2013) and is one of the most diverse aquatic heteropterans in lentic systems in Thailand (Vitheepradit, 2000). Commonly, specimens have been found in vegetated ponds and rice paddies, though some were collected from the vegetated margin of streams and well-lit areas (Vitheepradit, 2000). This species has been collected from inundated ponds and peat swamps in Southern Thailand (Sites and Vitheepradit, 2010). Some male specimens were found with eggs on their backs, which was interpreted as parental care behavior. Examination revealed great variations among specimens, such as in color pattern and size. The intraspecific variation of this species has been noticed in other populations in other countries (Polhemus and Polhemus, 2013).

Genus Lethocerus Mayr, 1853

This genus consists of 22 species, of which 16 have been identified in North and South America and the remaining 6 in other regions (Perez Goodwyn, 2006). In Thailand, two species of *Lethocerus* have been reported: *L. indicus* (Lepeletier and Serville) and *L. patruelis* (Stål) (Perez Goodwyn, 2006; Sareein et al., 2019). *Lethocerus indicus* is a common species in Thailand (Pradit et al., 2022), while *L. patruelis* is more restricted in certain areas (Sareein et al., 2019). Members of this genus are commonly found in a wide variety of habitats, including natural wetlands, densely vegetated ponds, and slow-flowing streams (Andersen and Weir, 2004; Chen et al., 2005; Sareein et al., 2019). During the rainy season, *L. indicus* is known to select suitable habitats for breeding, such as small

densely vegetated temporary ponds and rice paddies, which contain few competitors and a high abundance of food, such as invertebrates, fish, and tadpoles (Hoffmann, 1931; Nesemann and Sharma, 2013). The male of this species displays parental care behavior by protecting the eggs until they hatch (Andersen and Weir, 2004; Chen et al., 2005).

Lethocerus indicus (Lepeletier and Serville, 1825)

Belostoma indica Lepeletier and Serville, 1825: 272
Amorgius indicus Green, 1901: 113
Lethocerus indicus Hale, 1924: 521

Diagnosis

This species can be recognized by the elongated body (Fig. 1B) and rounded eyes (Fig. 1H) and distinguished from *Diplonychus* by its larger body (> 50 mm) and a fore tarsus with a single claw (Fig. 1E), whereas the latter species has a smaller body (<20 mm) and a fore tarsus with 2 claws (Fig. 1D). Furthermore, this species can be distinguished from *L. patruelis* by a pronotum with one pair of wide light stripes (Fig. 1H), whereas the latter species has a pronotum with one pair of narrow light stripes (Fig. 1I).

Material examined

Thailand: Buri Ram province: Khaen Dong district, 15°17.051'N 103°11.688'E, 134 m, 1-XII-2019, KU team (5 males, 3 females); Khu Mueang district, light trap in rice paddy, 15°23.463'N 103°00.982'E, 138 m, 20-XII-2019, KU team (8 males, 24 females); Chanthaburi province: Khao Khichakut district, 12°57.043'N 102°00.643'E, 42 m, 31-X-2020, KU team (5 males, 3 females); Soi Dao district, 13°11.338'N 102°20.604'E, 144 m, 31-VIII-2020, KU team (4 males, 5 females); Chiang Mai province: Doi Lor district, 18°28.756'N 098°44.531'E, 319 m, 6-X- 2019, KU team (2 males, 4 females); Doi Lor district, 18°32.149'N 098°47.183'E, 338 m, 8-X-2019, KU team (3 males, 4 females); Sansai district, 18°55.295'N 099°05.137'E, 373 m, 7-XII-2019, KU team (3 males, 8 females); Khon Kaen province: Phon district, 15°47.234'N 102°30.794'E, 173 m, 16-IX-2018, KU team (1 male, 4 females); Phon district, 15°48.4 23'N 102°30.746'E, 188 m, 28-V-2019, KU team (3 males, 2 females); Krabi province: Phanom district, 08°16.009'N 099°02.858'E, 52 m, 15-VII-2020, KU team (2 males); Lamphun province: Pa Sang district, 18°26.490'N 098°50.935'E, 306 m, 9-XII-2019, KU team (4 males, 1female); Nakhon Ratchasima province: Bua Yai district, light trap in rice paddy, 15°43.201 'N 102°22.788'E, 187 m, 12-VI-2018, KU team (7 males, 5 females); Prathai district, 15°27.689'N 102°42.356'E, 164 m, 20-XII-2019, KU team (15 females); Nakhon Sawan province: Tha Tako district, 15°40.513'N 100°21.583'E, 22 m, 3-XII-2019, KU team (3 males, 7 females); Tha Tako district, light trap in rice paddy, 15°45.405'N 100°28.991'E, 32 m, 4-XII-2019, KU team (8 males, 7 females); Nakhon Si Thammarat province: Chulabhorn district, 08°07.129'N 099°53.057'E, 9 m, 16-VII-2020, KU team (3 males); Pak Phanang district, 08°19.01 6'N 100°07.775'E, 2 m, 16-VII-2020, KU team (2 males). Thung Yai district, 08°21.308'N 099°25.531'E, 41 m, 15-VII-2020, KU team (2 males); Phatthalung province: Mueang district, 07°37.518'N 100°07.975'E, 2 m, 18-VII-2020, KU team (1 male); Phitsanulok province: Noen Maprang district, light trap in rice paddy, 16°31.1 23'N 100°38.136'E, 59 m, 10-I-2020, KU team (2 males, 3 females); Noen Maprang district, light trap in rice paddy, 16°20.831'N 100°38.935' E, 66 m, 2-VII-2020, KU team (2 males, 3 females); Si Sa Ket province: Kantharalak district, light trap at Huai Ta Mai reservoir, 14°43.892'N 104°34.666'E, 145 m, 30-XI-2019, KU team (3 males, 12 females); Kantharalak district, light trap in rice paddy, 14°36.870'N 104°37.787'E, 193 m, 1-XII-2019, KU team (12 males, 27 females); Songkhla province: Hat Yai district, light trap at Khao Kho Hong, 07°0.3166'N 100°30.990'E, 216 m, 11-XI-2020, KU team (7 males, 10 females); Phayao province: Chiang Muan district, 18°58.935'N 100°14.589'E, 284 m, 4-VII-2020, KU team (5 males, 4 females); Mae Chai district, 19°21.196'N 099°53.203'E, 425 m, 27-II-2022, KU team (2 males, 4 females).

Previous records

Bueng Kan, Buri Ram, Chiang Mai, Chiang Rai, Kanchanaburi, Kalasin, Lamphun, Nakhon Pathom, Nakhon Ratchasima, Nakhon Phanom, Nakhon Sawan, Nong Bua, Lamphu, Nong Khai Kalasin, Maha Sarakham, Nan, Khon Kaen, Payao, Surat Thani, Surin, Tak, Ubon Ratchathani (Perez Goodwyn, 2006; Sareein et al., 2019; Reunura and Prommi, 2020; Pradit et al., 2022).

Discussion

This species is common in Thailand (Pradit et al., 2022) and is generally found in a wide variety of habitats, including natural wetlands, densely vegetated ponds, slow-flowing streams and paddy fields (Andersen and Weir, 2004; Chen et al., 2005; Sareein et al., 2019). This species has been recorded from Borneo and Java Indonesia, China, Hong Kong, India, Japan, Korea, Laos, the Philippines, Sumatra, Thailand and

Vietnam (Hoffmann, 1931; Perez Goodwyn, 2006; Nesemann and Sharma, 2013; Sareein et al., 2019; Phommavongsa et al., 2022; Pradit et al., 2022). In Thailand, this species is one of most famous edible insects (Kiatbenjakul et al., 2015). Generally, local people set up light traps during the rainy seasons to collect this species for sale in markets. Populations of *L. indicus* have significantly decreased in natural habitats in Thailand (Hanboonsong et al., 2013). Thus, a large number of *Lethocerus* has been imported from neighboring countries for use as an edible insect (Hanboonsong et al., 2013).

Lethocerus patruelis (Stål, 1854)

Belostoma patruele Stål, 1854: 241
Lethocerus persicus Menke, 1963: 258–259
Lethocerus patruelis Kanyukova and Kerzhner, 1980: 597–599

Diagnosis

This species can be recognized by its elongated body (Fig. 1C) and rounded eyes (Fig. 1I) and distinguished from *Diplonychus* by its larger body (> 50 mm) and a fore tarsus with a single claw (Fig. 1F), whereas the latter species has a smaller body (<20 mm) and a fore tarsus with 2 claws (Fig. 1D). Furthermore, it can be distinguished from *L. indicus* by a pronotum with one pair of narrow light stripes (Fig. 1I), whereas the latter species has a pronotum with one pair of wide light stripes (Fig. 1H).

Material examined

Thailand: Phatthalung province: Mueang district: 07°37.518'N 100°07.975'E, 2 m, 18-VII-2020, KU team (3 males); Nakhon Si Thammarat province: Pak Phanang district: 08°19.016'N 100°07.775'E, 2 m, 16-VII-2020, KU team (1 male); Thung Song district: 08°11.866'N 099°35.641'E, 46 m, 17-VII-2020, KU team (2 males).

Previous records

Chiang Rai, Surat Thani (Sareein et al., 2019).

Discussion

This species is commonly found in Europe (Albania, Bulgaria, Croatia, Greece, Italy, Israel, Macedonia, Montenegro, Romania and Turkey) and Asia (India, Iran, Iraq, Myanmar, Pakistan and Yemen) (Polhemus, 1995; Perez Goodwyn, 2006; Cianferoni and Nardi, 2013; Dulčić et al., 2015). This species has been reported from Chiang Rai and Surat Thani provinces, Thailand (Sareein et al., 2019). The current study added records from Nakhon Si Thammarat and Phatthalung provinces. Although *L. patruelis* was collected throughout the country, this species is clearly less abundant than *L. indicus*. Generally, this species is found in a wide variety of habitats, such as natural wetlands, densely vegetated ponds, slow-flowing streams and paddy fields (Cianferoni and Nardi, 2013; Grozeva et al., 2013; Davranoglou and Karaouzas, 2021; Sareein et al., 2019).

Conclusions

This study presented data regarding specimens of the Belostomatidae collected from natural habitats in Thailand during 1995–2020, confirming the actual distributions of three species of the Belostomatidae in Thailand: *Diplonychus rusticus* in the subfamily Belostomatinae and *Lethocerus indicus* and *Lethocerus patruelis* in the subfamily Lethocerinae. *D. rusticus* and *L. indicus* are common species and widely distributed throughout Thailand, while *L. patruelis* has been reported only from Chiang Rai, Nakhon Si Thammarat, Phatthalung, and Surat Thani provinces.

Conflict of Interest

The authors declare that there are no conflicts of interest.

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