

New record of *Stylogomphus lawrenceae* Yang & Davies, 1996 (Odonata, Gomphidae) in Thailand and updates on its distribution

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Abstract. *Stylogomphus lawrenceae* Yang & Davies, 1996 is reported from reared specimens for the first time in Thailand. This is a range extension to the south from a previously known locality (China and the northern part of Laos). We also provide a comparison and updated distribution map of three known *Stylogomphus* species in Thailand.

Key words. Club-tailed, distribution map, dragonfly, gomphid, new distribution record

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INTRODUCTION

The genus *Stylogomphus* Fraser, 1922 currently comprises 15 known species (Paulson et al 2025). Of these, only *S. malayanus* Sasamoto, 2001 and *S. thongphaphumensis* Chainthong, Sartori & Boonsoong, 2020 have been reported from Thailand (Chainthong et al. 2020). This genus had been mentioned in Thailand by Sasamoto (2004), whose records showed the distribution of the genus *Stylogomphus* in Southeast Asia, with *S. lawrenceae* Yang & Davies, 1996 distributed in China and northern Laos, and an unknown *Stylogomphus* larvae in Thailand. Subsequently, Novelo-Gutiérrez and Sites (2019) discovered another *Stylogomphus* species, which is possibly a third member of this genus in Thailand. In the present study, we report adults and larvae of *S. lawrenceae* in Thailand based on reared specimens. We also provide an updated distribution map and habitats for the three *Stylogomphus* species in Thailand.

METHODS

The larvae were collected using a D-frame net from a sandy microhabitat in Chiang Rai province, northern Thailand. Fully grown larvae were reared in the field and the laboratory until the adults emerged. The exuviae and adults were preserved in 95% ethanol. Measurements (mm) and photographs were taken under a Nikon SMZ800 stereoscopic microscope. All specimens are deposited in the Aquatic Insects Collection (AIC) of the Zoological Museum, Kasetsart University (ZMKU), Bangkok, Thailand. The distribution map was performed using SimplMapp (Shorthouse 2010) and geographic coordinates from a GPS.

RESULTS

Stylogomphus lawrenceae Yang & Davies, 1996

Figures 1–5

New records. THAILAND – CHIANG RAI • Muang district, Nang Lae Nai waterfall; 20°03'08"N, 099°49'18"E; 529 m alt.; larvae collected on 04.V.2024; adult emerged on 04.V.2024 ♂ and 11.V.2024 ♀; Boonsatien Boonsoong & Chatayathon Phattanakul leg.; 12 larvae in ethanol, ZMKU (Odon-008) • Mae Yao district, Huai Mae Sai waterfall; 20°00'20"N, 099°42'58"E; 600 m alt.; 03.V.2024; Boonsatien Boonsoong & Chatayathon Phattanakul leg.; D-frame net kicking methods from sand habitat; 2 larvae in ethanol, ZMKU (Odon-009).

Identification. Adults of *Stylogomphus* were identified following the diagnostic characters of *S. lawrenceae* according to Sasamoto (2004). Males of *S. lawrenceae* (Figure 1) reported here were distinct from two known



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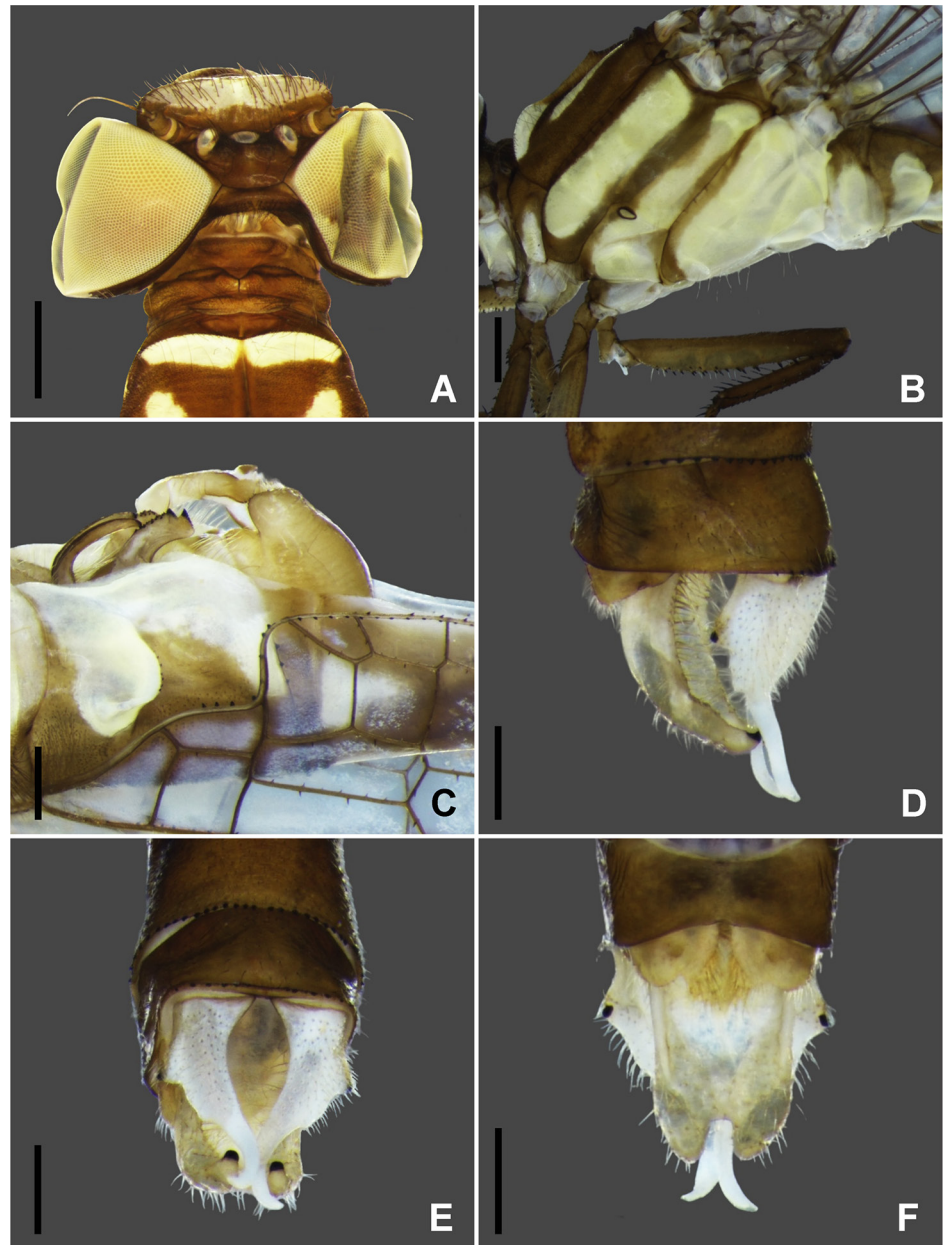


Figure 1. Male of *Stylogomphus lawrenceae* Yang & Davies, 1996. **A.** Head, dorsal view. **B.** Thoracic pattern, lateral view. **C.** Accessory genitalia, lateral view. **D.** Caudal appendages, lateral view. **E.** Caudal appendages, dorsal view. **F.** Caudal appendages, ventral view. Scale bars: A, B = 1 mm; C–F = 0.5 mm.

Thai *Stylogomphus* species. Characteristics of the head (Figure 1B), thoracic pattern (Figure 1B), and accessory genitalia (Figure 1C) match those of *S. lawrenceae* of Sasamoto (2004). Male anal appendages had cerci with double latero-ventral teeth (Figure 1E). The epiproct was deeply incised to about 2/3 basally extending slightly curved and rather than apically diverging (Figure 1D–F), which matched the specimen from Laos, whereas in the specimen from China, the epiproct apically diverged (Sasamoto 2004). Female characters of *S. lawrenceae* (Figure 2A–C) and *S. thongphaphumensis* (Figure 2D–F) correspond to those used by Sasamoto (2004) and Chainthong et al. (2020). The female occiput of *S. lawrenceae* bears a Y-shaped horn-like protuberance (Figure 2A), but in *S. thongphaphumensis* and *S. malayanus*, this protuberance is lacking, and there is only slightly swollen towards the centre of the occiput (Figure 2D). In addition, the vulvar lamina is characteristically elongated and deeply bilobed in *S. lawrenceae* (Figure 2C) and *S. malayanus*. Compared with *S. thongphaphumensis*, the shape of the vulvar lamina is shortened and shallow (Figure 2F). The larvae of *S. lawrenceae*, *S. malayanus*, and *S. thongphaphumensis* were described by Yang and Davies (1996), Sasamoto (2001), and Chainthong et al. (2020). The larva of *S. lawrenceae* has the third antennal segment (Figure 3A) with long flat setae on the inner side and short, flat setae on the outer side at the base of the antennal segment, with 4 or 5 teeth located at the apical margin of prementum (Figure 3B), which is similar to *S. thongphaphumensis* (Figure 3E, F). Both species have pale markings on the abdomen (Figure 4A, B, E, F). The third antennal segment of *S. malayanus* has long, flat setae on the inner side and short flat setae on the outer side along the entire antennal segment (Figure 3C) and 3 teeth at the apical margin of the prementum (Figure 3D). The abdomen has black, dense, scattered irregular markings (Figure 4C, D).

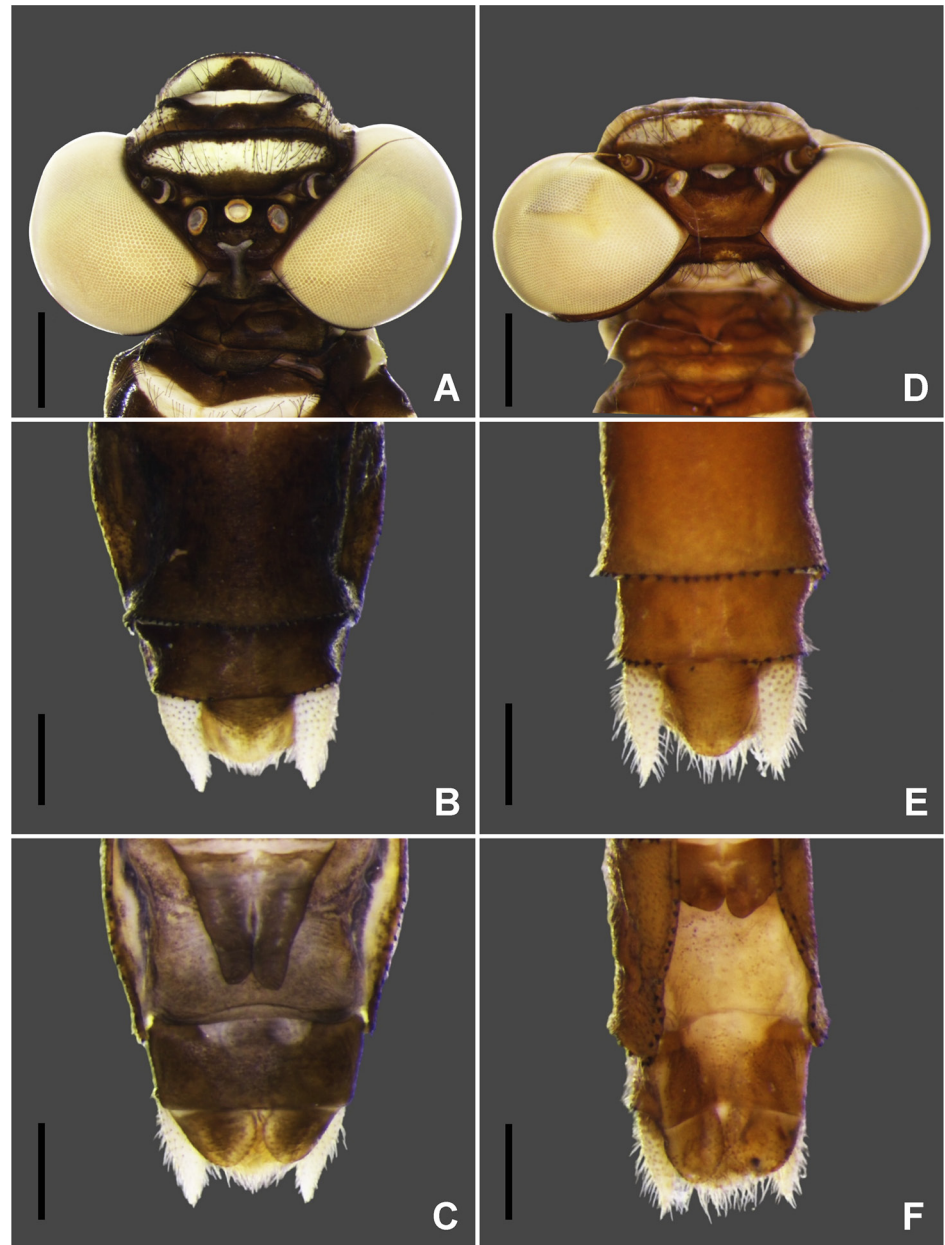


Figure 2. Female of *Stylogomphus* Fraser, 1922. **A–C.** *S. lawrenceae* Yang & Davies, 1996. **A.** Head, dorsal view (arrow indicated Y-shaped protuberance). **B.** Caudal appendages, dorsal view. **C.** Caudal appendages, ventral view. **D–F.** *S. thongphaphumensis* Chainthong, Sartori & Boonsoong, 2020. **D.** Head, dorsal view. **E.** Caudal appendages, dorsal view. **F.** Caudal appendages, ventral view. Scale bars: A, D = 1 mm; B, C, E, F = 0.5 mm.

DISCUSSION

The morphology of adults and larvae of *Stylogomphus lawrenceae*, *S. malayanus*, and *S. thongphaphumensis* were compared. In adults, *S. lawrenceae* and *S. malayanus* share the characters of the shapes of vulvar lamina and epiproct (Sasamoto 2004; Chainthong et al. 2020). The larvae of *S. lawrenceae* more closely resemble *S. thongphaphumensis* than *S. malayanus* in terms of the setae pattern on the third antennal segment, number of teeth at the apical margin of prementum, and markings on the abdomen. *Stylogomphus lawrenceae* was previously recorded only in China and northern Laos (Sasamoto 2004), but we now report this species from Chiang Rai province (northern of Thailand) near the Laos border. This is the first report of *S. lawrenceae*, making it the third species of *Stylogomphus* in Thailand. The three species of *Stylogomphus* in Thailand consist of *S. thongphaphumensis* (Chainthong et al. 2020), *S. malayanus*, and *S. lawrenceae*. *S. thongphaphumensis* is distributed in the western and northern parts of Thailand (Kanchanaburi, Phetchaburi, Ching Mai and Chiang Rai) and is restricted to the northern part of the Isthmus of Kra. The distribution of *S. malayanus* seems to overlap in the isthmus region, as it occurs in both Malaysia and Thailand (Prachuap Khiri Khan), whereas *S. lawrenceae* is distributed only in the northern part of Thailand (Figure 5). Another important contribution presented here is that adults and larval stages of these three species can be identified by the shape of the adult male anal appendages, the adult female occiput, and the third antennal segment of the larvae. Therefore, this knowledge contributes a more comprehensive understanding of these species and facilitates the sustainable management of their habitats in Thailand.

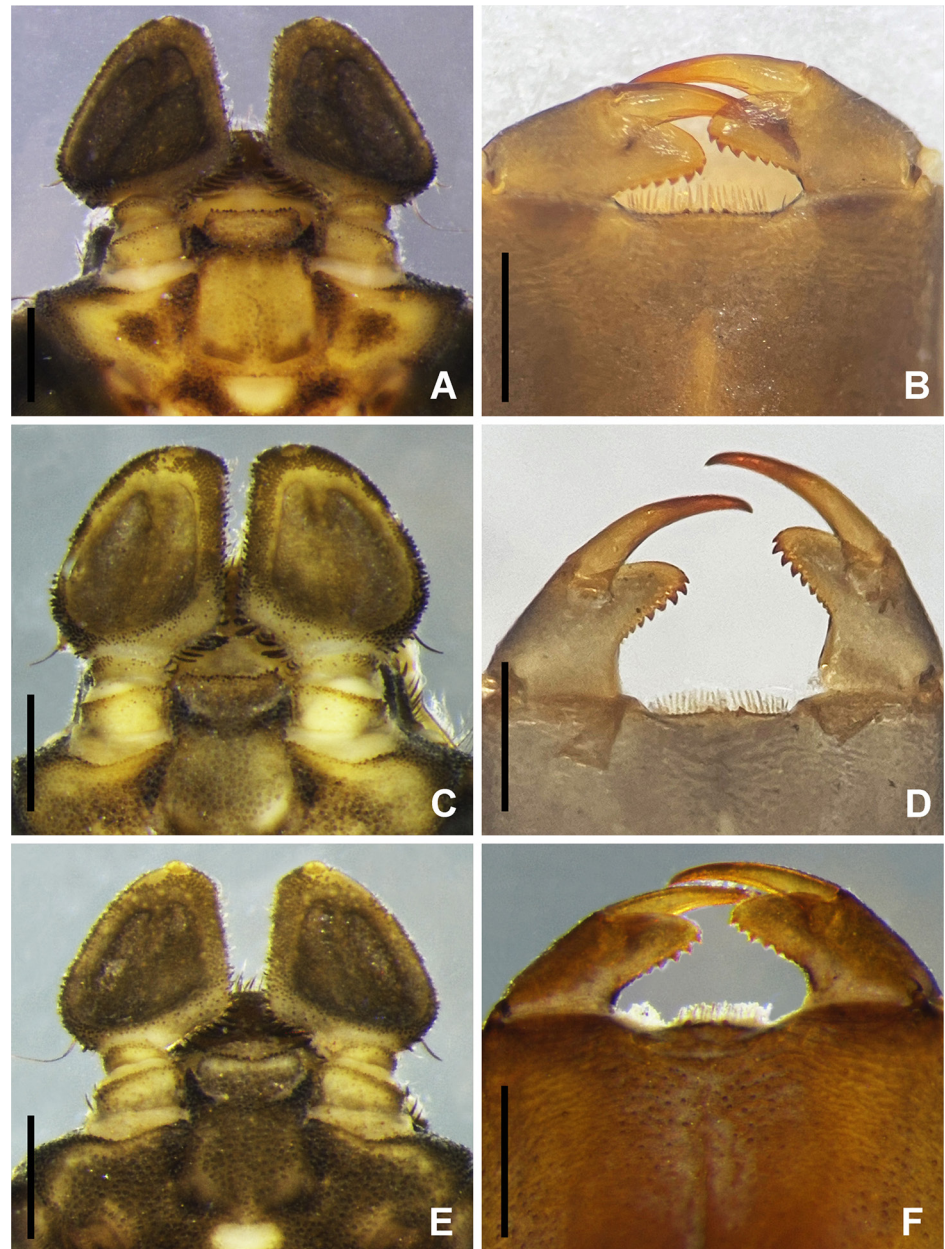


Figure 3. Larvae of *Stylogomphus* Fraser, 1922. **A, B.** *S. lawrenceae* Yang & Davies, 1996. **A.** Antennae, dorsal view. **B.** Prementum with labial palps, ventral view. **C, D.** *S. malayanus* Sasamoto, 2001. **C.** Antennae, dorsal view. **D.** Prementum with labial palps, ventral view. **E, F.** *S. thongphumensis* Chainthong, Sartori & Boonsoong, 2020. **E.** Antennae, dorsal view. **F.** Prementum with labial palps, ventral view. Scale bars: 0.5 mm.

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

This research was approved by the Institutional Animal Care and Use Committee, Faculty of Science, Kasetsart University, Thailand under Project number ACKU6-SCI-019.

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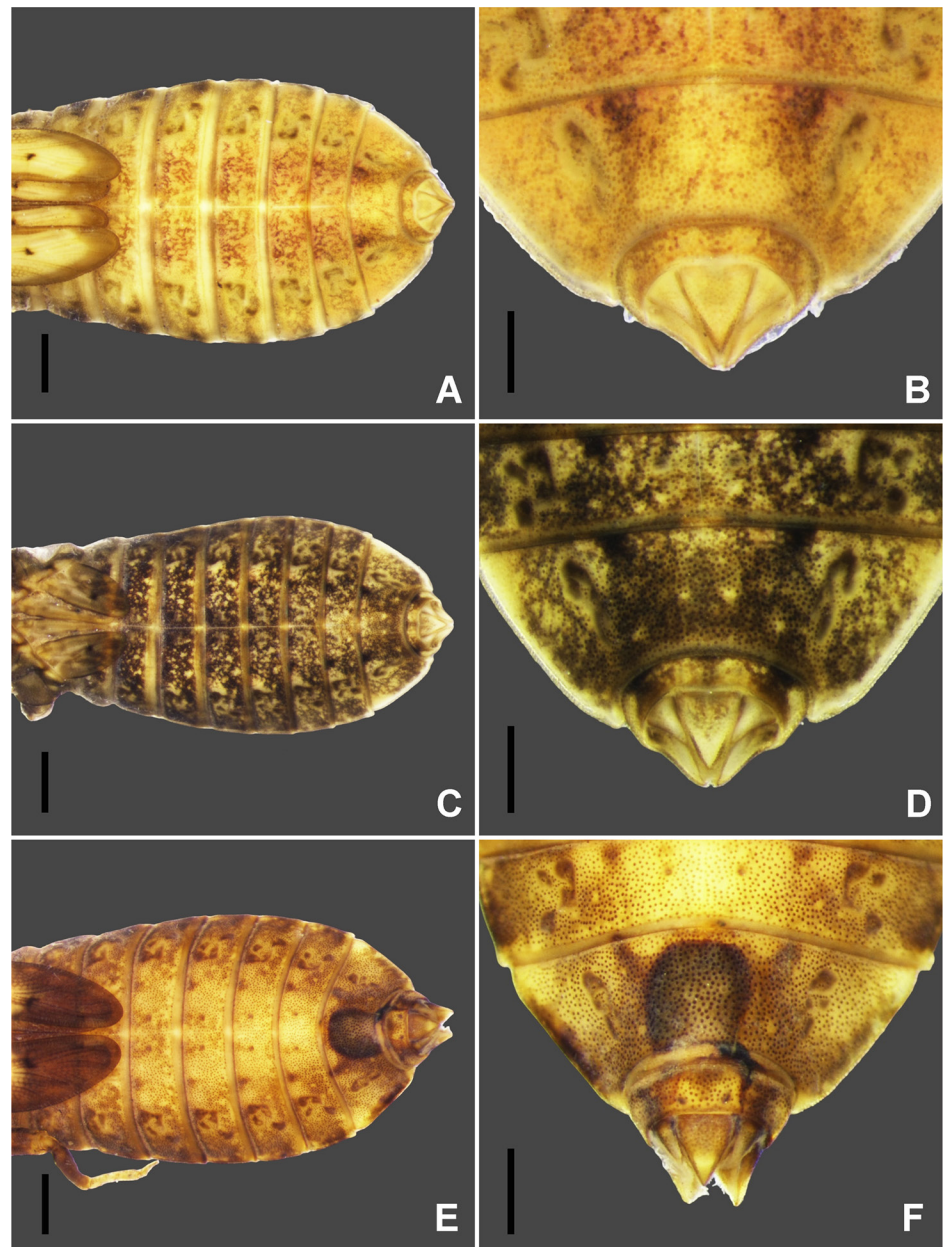



Figure 4. Larvae of *Stylogomphus* Fraser, 1922. **A, B.** *S. lawrenceae* Yang & Davies, 1996. **A.** Abdomen, dorsal view. **B.** Anal appendages, dorsal view. **C, D.** *S. malayanus* Sasamoto, 2001. **C.** Abdomen, dorsal view. **D.** Anal appendages, dorsal view. **E, F.** *S. thongphumensis* Chainthong, Sartori & Boonsoong, 2020. **E.** Abdomen, dorsal view. **F.** Anal appendages, dorsal view. Scale bars: A, C, E = 1 mm; B, D, F = 0.5 mm.


Author contributions

Conceptualization: BB, CP, DC. Data curation: DC. Formal analysis: BB, CP, DC. Funding acquisition: BB, CP. Investigation: BB, DC. Methodology: DC, CP. Resources: BB, CP, DC. Supervision: BB. Visualization: CP. Project administration: BB. Software: BB, CP. Validation: BB. Writing original draft: DC, CP, BB. Writing review and editing: BB, CP, DC.

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Data availability

All data that support the findings of this study are available in the main text.

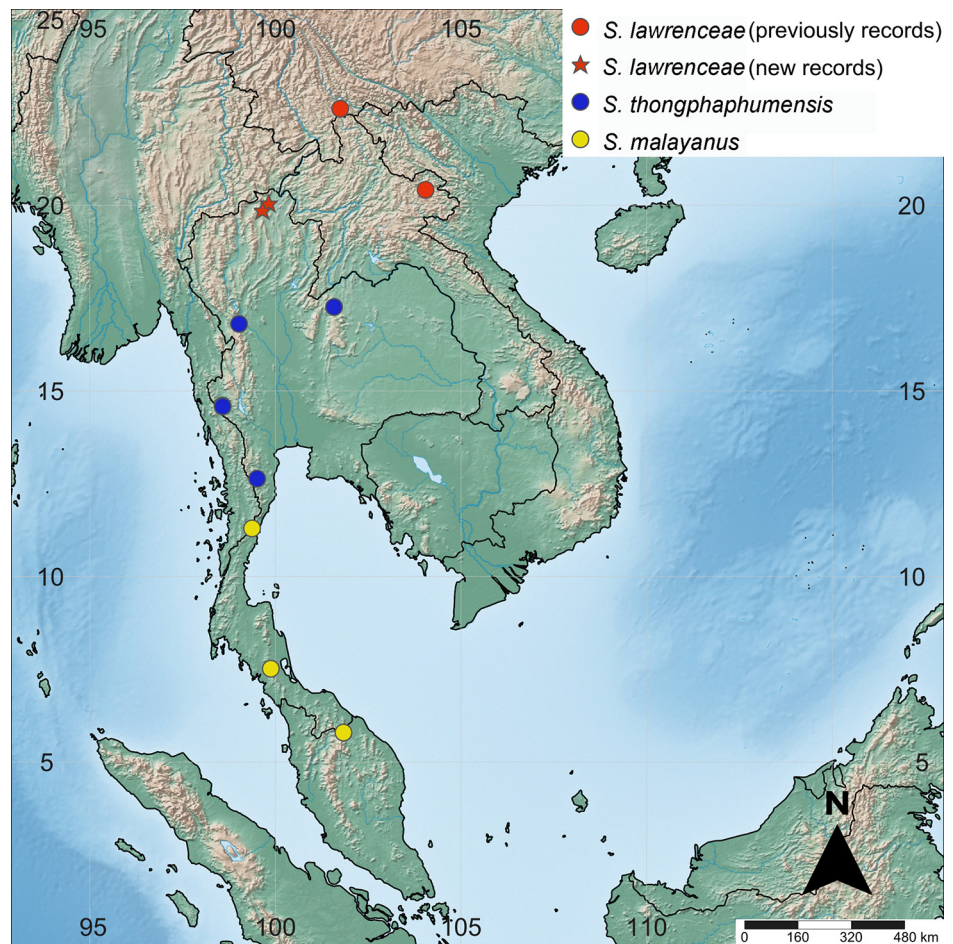


Figure 5. Distribution map of three species of *Stylogomphus* Fraser, 1922.

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