

Potter wasps of the genus *Labus* (Hymenoptera, Vespidae, Eumeninae) from Vietnam, with description of two new species

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Abstract

Taxonomy of the potter wasps of the genus *Labus* from Vietnam is reviewed, with six species recorded. Of them, one species previously identified as *L. clypeatus* van der Vecht, 1935 is described as new, namely *L. angulus*, **sp. nov.** Another new species, *Labus obtusus* **sp. nov.**, is also described. In addition, a key to all species of the genus occurring in Vietnam is given.

Keywords

Labus, solitary wasps, new species, Vietnam

Introduction

The genus *Labus* was created by de Saussure (1867), and Bingham (1897) subsequently designated *Labus spiniger* as type. Up to now, the genus contains 16 species, all distributed in the Oriental region (van der Vecht 1935; Giordani Soika 1960, 1973, 1986, 1991; Gusenleitner 1988; Girish Kumar et al. 2014; and Li and Carpenter 2018).

Nguyen et al. (2014) recorded the genus and two species, *Labus clypeatus* van der Vecht, 1935 and *Labus lofuensis* Giordani Soika, 1973 from Vietnam. Careful examination of the specimens of the first taxon show that it is not *Labus clypeatus* but a new species close to it, which shares the character of propodeum posteriorly on each side without a tooth above the apical spine, but it has apical teeth of the clypeus sharper and frontal ocellus larger. Recently, Li and Carpenter (2018) recorded two other species from Vietnam, namely *Labus amoenus* van der Vecht, 1935 and *Labus pusillus* van der Vecht, 1963.

In this paper, based on specimens deposited in the Institute of Ecology and Biological Resources (IEBR), two new species of the genus *Labus* from Vietnam are described and figured. A key to all species occurring in Vietnam is also presented.

Material and methods

All material including the holotype of the new species is deposited in the Institute of Ecology and Biological Resources (IEBR), Hanoi, Vietnam. The adult morphological and color characters were observed using pinned and dried specimens under a stereoscopic microscope. Measurements of body parts were made with an ocular micrometer attached to the microscope. “Body length” indicates the length of head, mesosoma and the first two metasomal segments combined. Terminology follows Carpenter and Cumming (1985) and Yamane (1990). Photographic images were made with a Nikon SMZ 800N Digital Stereo Microscope, using Helicon Focus 7 software; the plates were edited with Photoshop CS6.

In the descriptions of adult morphology, the following abbreviations are used: The abbreviations F, S and T refer to numbered flagellomeres, metasomal sterna and metasomal terga, respectively; IED-c and ISD-c refers to collectors of the Insect Ecology Department and Insect Systematic Department, IEBR.

Taxonomic accounts

Genus *Labus* de Saussure, 1867

Labus de Saussure, 1867, Reise Novara, Zool. 2 (1), Hym: 3, genus.

Type species. *Labus spiniger* de Saussure, 1867, by subsequent designation of Bingham 1897: 348.

Labus angulus Nguyen & Carpenter, sp. nov.

<http://zoobank.org/88E70FB5-4FAE-42E6-8962-D224179CD050>

Figs 1–7

Labus clypeatus van der Vecht, 1935: Nguyen et al. 2014: 11, misidentification.

Material examined. *Holotype*, female, Vietnam: Dien Bien, 21°56'16.7"N, 102°52'58"E, alt. 500 m, 22 Jul. 2009, Nguyen TPL, Pham HP & Kojima J leg., deposited in IEBR.

Dianosis. This species can be distinguished from all other congeners by the following combination of characters: Propodeum with posterior excavation not margined above; metasomal segment I long and slender, swollen part slightly longer than half the total length of the petiole; TI in dorsal view more than 9 times as long as wide at base; TII with thick lamella, about 1.16 times as long as wide in dorsal view; female frontal fovea much larger than anterior ocellus, oval.

Description. Female (Fig. 7). Holotype: Body length 7.2 mm; fore wing length 6.2 mm.

Head in frontal view subcircular, about 1.1 times as wide as high (Fig. 1). Head with frontal fovea much larger than anterior ocellus, oval, with distinct border (Fig. 2). Gena almost as wide as eye; occipital carina complete, present along entire length of the gena. Inner eye margins strongly convergent ventrally, in frontal view nearly 1.45 times further apart from each other at vertex than at clypeus (Fig. 1). Clypeus in lateral view prominently convex at basal half, then slightly depressed and bent backward to apical margin; in frontal view about 1.18 times as wide as high (Fig. 1), with basal margin slightly convex medially and distinctly separated from antennal sockets; apical margin emarginated medially, forming a sharp tooth on each side (Fig. 1); width of the emargination about 1/4 width of clypeus between inner eye margin. Mandible with four prominent teeth. Antennal scape about 4.4 times as long as its maximum width, curved; FI about 1.26 times longer than wide, FII–III longer than wide, FIV–IX wider than long, terminal flagellomere bullet-shaped, as long as its basal width.

Mesosoma longer than wide in dorsal view (Fig. 3). Pronotal carina raised, pronotal corner strongly produced to form long and sharp projection (Fig. 2). Mesoscutum weakly convex, 1.2 times as long as wide between tegulae. Scutellum weakly convex, in lateral view at the same level as mesoscutum. Metanotum with a short, tooth-like, sharp tubercle in the middle. Propodeum (Fig. 4) excavated in the middle apically, with posterior excavation not margined above, with a distinct median longitudinal furrow, rounded between posterior and lateral surfaces.

Metasomal segment I much narrower than segment II, swollen part slightly longer than half of the length of the petiole (0.56 times as long as the total length of the petiole) (Fig. 5). TI in dorsal view about 9.35 times as long as wide at base, and 3.45 times as long as wide at apex (Fig. 5); TII with thick lamella, about 1.16 times as long as wide in dorsal view; SII in lateral view almost straight from base to one-third, and slightly convex then straight to apical margin (Fig. 6).

Body covered with short, silver hairs except lower part of propodeum with dense long silver hairs.

Clypeus with dense, coarse punctures in the middle area, punctures sparser and smaller at sides, each puncture bearing a silver bristle. Frons densely covered with very coarse punctures, border between punctures with minute punctures and raised to form reticulations. Vertex and gena with punctures similar to those on frons. Pronotum with punctures coarser than punctures on vertex and gena. Mesoscutum densely and



Figures 1–7. *Labus angulus* sp.nov., holotype, female **1** head, frontal view **2** head, dorsal-frontal view **3** mesosoma, dorsal view **4** propodeum, posterior view **5** TI, dorsal view **6** metasomal segments, lateral view **7** habitus. Scale bars: 0.5 mm.

coarsely covered with punctures similar to those on pronotum, punctures on scutellum dense, coarse and equal than those on mesoscutum, punctures on metanotum smaller. Mesepisternum with punctures similar to those on pronotum posterodorsally, minute

punctures anteroventrally; border between posterodorsal and anteroventral parts indistinct. Dorsal metapleuron with long striae, ventral metapleuron with short striae at inner side, and with sparse shallow punctures. Propodeum with sparse and strong punctures on dorsal and posterior parts, punctures on lateral parts sparser and shallower. T1 densely covered with strongly rugose punctures on basal half, with sparse and strong punctures on apical half, TII with sparse and small punctures.

Colour. Body black; following parts orange-yellow: an arcuate transverse band at basal margin of clypeus, large spot on each side of pronotum, two transverse spots on scutellum, spot on apical spine, outer side of tegulae and parategulae, apical band of T1 and II. Spot near apical margin of metasomal segment I brown. Legs black; following parts orange-yellow: spot at apical margin of fore and middle femur, fore tibia entirely and outer part of middle tibia.

Male. Unknown.

Distribution. North Vietnam.

Remarks. This species comes close to *Labus clypeatus* van der Vecht in having the propodeum with posterior excavation not margined above, and pronotum with long and sharp projection at the lateral corners, but it is different from the latter by the female head with frontal fovea much larger than anterior ocellus, oval (head with frontal fovea small, slightly larger than anterior ocellus, round in *L. clypeatus*), female clypeus with sharper teeth, and swollen part of the petiole longer than half the total length of the petiole (swollen part shorter than half the total length of the petiole in *L. clypeatus*).

Etymology. The specific name refers to the very sharp and long projecting lateral angle of the pronotum.

***Labus obtusus* Nguyen & Carpenter, sp. nov.**

<http://zoobank.org/DC8AE56E-26EE-450E-8947-75D001ED3B39>

Figs 8–14

Material examined. *Holotype*, male, Vietnam: Bidoup Nui Ba NP, Da Chais, Lac Duong, Lam Dong, 12°08'403"N, 108°38'56.3"E, alt. 1428 m, 4 Jun. 2013, Nguyen TPL leg., deposited in IEBR. Paratype: 1 male, same data as holotype.

Dianosis. This species can be distinguished from all other congeners by following combination of characters: Propodeum with posterior excavation not margined above; metasomal segment I with swollen part longer than half the total length of the petiole; T1 in dorsal view slightly less than 9 times as long as wide at base; TII in dorsal view almost as wide as long.

Description. Male (Fig. 14). Body length 6.9–7.1 mm (holotype 6.9 mm); fore wing length 5.9–6.1 mm (holotype 5.9 mm).

Head in frontal view subcircular, about 1.2 times as wide as high (Fig. 8). Head without frontal fovea. Gena slightly narrower than eye; occipital carina complete, present along entire length of the gena. Inner eye margins strongly convergent ventrally; in frontal view nearly 1.6 times further apart from each other at vertex than at clypeus (Fig. 8). Clypeus in lateral view prominently convex at basal half, then straight to api-

cal margin; in frontal view nearly as wide as long (Fig. 8), with basal margin slightly convex medially and distinctly separated from antennal sockets; apical margin emarginated medially, forming a sharp tooth on each lateral side (Fig. 8); width of the emargination less than 1/4 width of clypeus between inner eye margin. Mandible with four prominent teeth. Antennal scape about 4.2 times as long as its maximum width, curved; FI about 1.8 times longer than wide, FII–III longer than wide, FIV – VIII wider than long, FXI nearly 1.2 times as long as wide, FX small, FXI thin, slightly curved, and long, slightly more than 5 times as long as wide (Fig. 9).

Mesosoma longer than wide in dorsal view (Fig. 10). Pronotal carina raised, pronotal corner slightly produced to form short and blunt projection (Fig. 10). Mesoscutum weakly convex, 1.1 times as long as wide between tegulae. Scutellum weakly convex, in lateral view at the same level as mesoscutum. Metanotum with a short, tooth-like, blunt tubercle in the middle. Propodeum (Fig. 11) excavated in the middle apically, with posterior excavation not margined above, with a distinct median longitudinal furrow except the middle part with short transverse striation, border between posterior and lateral surfaces rounded.

Metasomal segment I much narrower than segment II, swollen part slightly longer than half of the length of the petiole (0.55 times as long as the total length of the petiole) (Fig. 12). TI in dorsal view about 8.8 times as long as wide at base, and 3.1 times as long as wide at apex (Fig. 12); TII with thick lamella, almost as wide as long in dorsal view; SII in lateral view almost straight to one-third from base, then slightly convex and straight to apical margin (Fig. 13).

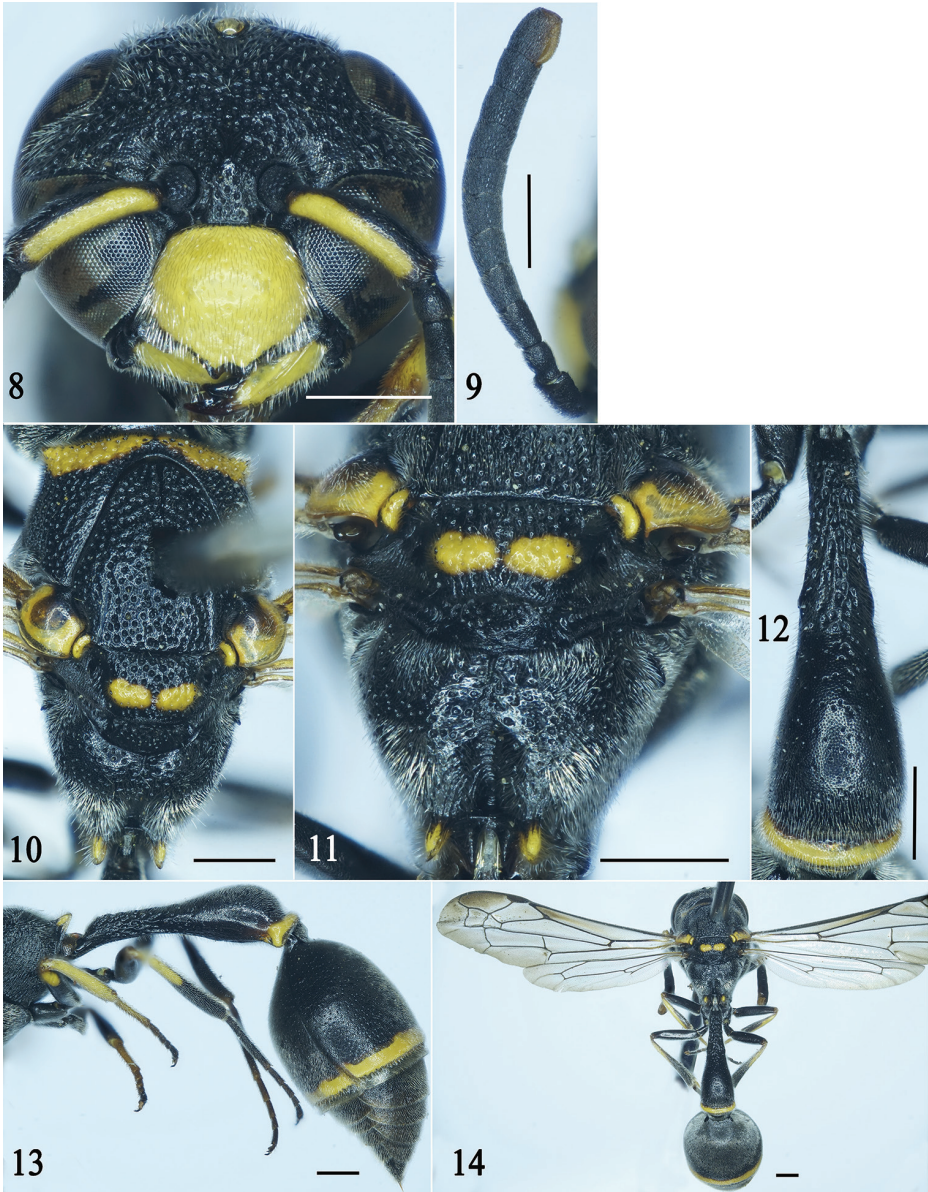
Body covered with short, silver hairs except clypeus, mandible and lower part of propodeum with dense long silver hairs.

Clypeus with sparse and shallow punctures in the middle area, almost smooth at sides. Frons densely covered with very coarse punctures, border between punctures not raised. Vertex and gena with punctures similar to those on frons. Pronotum with punctures coarser than punctures on vertex and gena, spaces between punctures raised to form reticulation. Mesoscutum densely and coarsely covered with flat-bottomed punctures, punctures on scutellum dense, coarse and equal to those on mesoscutum, punctures on metanotum smaller. Mesepisternum with punctures similar to those on pronotum posterodorsally, minute punctures anteroventrally; border between posterodorsal and anteroventral parts indistinct. Dorsal metapleuron with some long striae, ventral metapleuron with short striae at inner side, and with some sparse shallow punctures. Propodeum with sparse and strong punctures on dorsal and posterior parts, punctures on lateral parts sparser and shallower. TI densely covered with strongly rugose punctures on basal half, with sparse and strong punctures on apical half, TII with sparse and small punctures.

Colour. Body black; following parts yellow: clypeus except black apical margin, large spot on each side of pronotum, two transverse spots on scutellum, spot on apical spine, outer side of tegulae and parategulae; apical band of TI, II and SII. Legs black; following parts yellow: spot at apical margin of middle femur and hind tibia, middle tibia entirely.

Female. Unknown.

Distribution. South Vietnam.



Figures 8–14. *Labus obtusus* sp. nov., holotype male **8** head, frontal view **9** right antenna **10** mesosoma, dorsal view **11** propodeum, posterior view **12** T1, dorsal view **13** metasomal segments, lateral view **14** habitus. Scale bars: 0.5 mm.

Remarks. This species comes close to *Labus angulus* sp. nov. in having the swollen part of metasomal segment I longer than half of the total length of the petiole, and propodeum with posterior excavation not margined above, but it is different from the latter in having the pronotum with short and blunt projections at lateral corners (pronotum with long and sharp projections at lateral corners in *L. angulus*).

Etymology. The specific name refers to the obtuse lateral projections at the corners of the pronotum.

***Labus amoenus* van der Vecht, 1935**

Figs 15, 16

Labus amoenus van der Vecht, 1935, Treubia 15: 159, 161 (key), 162, fig. 1a–f, male, female – “West-Java: ... Buitenzorg” (holotype male Leiden).

Notes. This species has been recorded from Vietnam (Ha Giang province in the northern part of the country) by Li and Carpenter (2018). In our study, the species has been newly recorded from a central province, Quang Nam.

Material examined. VIETNAM: **Quang Nam:** 1 male, Phuoc My, Phuoc son, 450–500m, 26 May 2006; 1 male, Phuoc Son, Phuoc Hiep, 300m, 30 Jul. 2004, ISD-c. INDONESIA: **West Java:** 1 female, Buitenzorg Djasinga, 6.vi.1937, M.A. Lieftinck leg.; 1 male, Tjibarangbang Djasinga, 15.xi.2016, E.v.d.Vecht B leg.

Distribution. India: Meghalaya; Laos; Malaysia; Singapore; Indonesia: Java, Sumatra (including Bangka); Vietnam; China.

***Labus clypeatus* van der Vecht, 1935**

Figs 17, 18

Labus clypeatus van der Vecht, 1935, Treubia 15: 162 (key), 166, male, female, fig. 11-m – “Middle-Java: ... Semarang” (holotype male Leiden).

Material examined. VIETNAM: **Dak Lak:** 1 female, Krong Buk, Pong Giang, Buon Ho, 12°56'56.9"N, 108°16'33.8"E, alt. 706 m, 23 Jul. 2012, Nguyen TPL leg.

Distribution. Vietnam; Indonesia: Java.

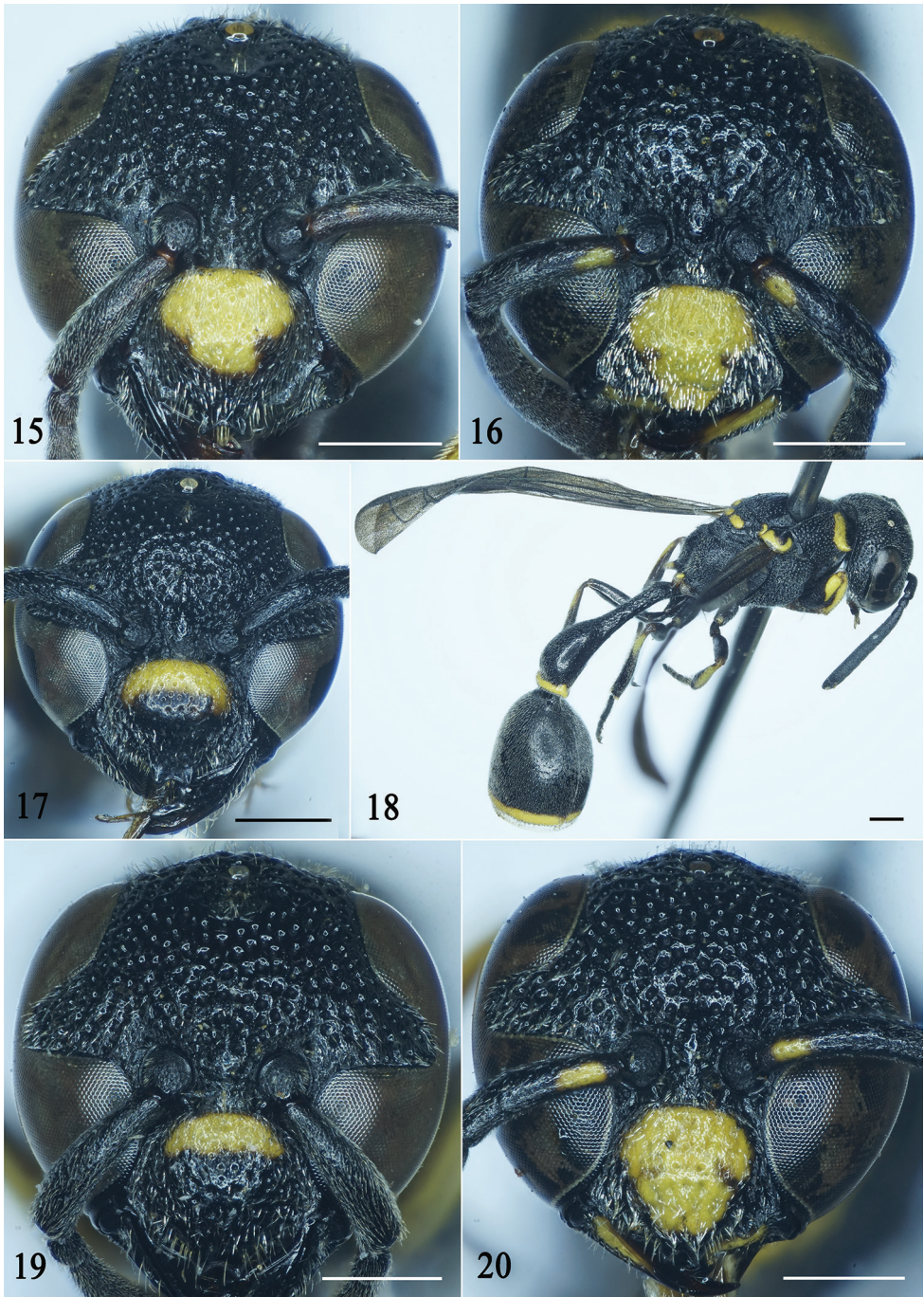
***Labus lofuensis* Giordani Soika, 1986**

Figs 19, 20

Labus lofuensis Giordani Soika, 1973, Boll. Mus. Civ. Stor. Nat. Venezia 24: 99, male, female – “China: Lofu Mount” (holotype male London).

Notes. This species has been recorded from Vietnam (Bac Giang province) by Nguyen et al. (2014). In our study, the species has been newly recorded from several other provinces in the northern part such as Bac Kan, Lang Son, Hanoi, Hai Phong.

Material examined. VIETNAM: **Bac Kan:** 2 females, Kim Hy NP, Vu Muon, Bach Thong, 22°15'51"N, 105°58'42"E, 5.viii.2012, Kojima J, Nugroho H &



Figures 15–20. **15, 16** *Labus amoenus*: **15** female head, frontal view **16** male head, frontal view **17, 18** *Labus clypeatus*, female: **17** head, frontal view **18** habitus **19, 20** *Labus lofuensis*: **19** female head, frontal view **20** male head, frontal view. Scale bar: 0.5 mm.

IED-c; **Lang Son:** 3 females, Na Sen, Hoang Dong, 31.x.2014, 21°51'42"N, 106°43'54"E, Nguyen DD, Nguyen LTP & Nguyen PM; 8 males, Na Sen, Hoang Dong, 31.x.2014, 21°51'42"N, 106°43'54"E, Nguyen DD, Nguyen TPL & Nguyen PM; **Ha Noi:** 1 male, Van Hoa, Ba Vi, Ba Vi NP, 3.vi.2001, Nguyen TPL; **Bac Giang:** 2 females, Khe Dan, Tuan Dao, Son Dong, 4.vii.2010, Tran DD; 2 male, Khe Dan, Tuan Dao, Son Dong, 4.vii.2010, Tran DD; 1 male, Yen Tu NR, Son Dong, 150 m, 2.viii.2010, Pham HP; 1 male, Thanh Son, Son Dong, 7.vii.2010, Tran DD; **Hai Phong:** 1 female, Cat Ba NP, 11.vi.2006; 1 female, Xuan Dam, Cat Ba, 27.iv.2013, Nguyen DD.

Distribution. China: Guangdong, Macau, Hainan; Vietnam.

Labus pusillus van der Vecht, 1963

Labus pusillus van der Vecht, 1963, Zool. Verh., Leiden 60: 6, fig. 1b, c, female, male – “Deiyannewela, Kandy, Ceylon” (holotype female Basel).

Notes. This species has been recorded from Vietnam (Nghe An province) by Li and Carpenter (2018).

Material examined. No specimen is available for our study.

Distribution. Sri Lanka; India: Andhra Pradesh, Assam, Goa, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Pondicherry, Sikkim, Tamil Nadu, Uttarakhand, West Bengal; Nepal; Bhutan; Vietnam; China.

Key to species of *Labus* de Saussure, 1867 from Vietnam

The characters used are applicable to both sexes unless the sex is specified. The characters are taken from the specimens of two new described species in this paper, *L. clypeatus* (female) and *L. amoenus* (male) from Vietnam, *L. amoenus* (female) from Indonesia, and from the description of *L. pusillus* following van der Vecht (1963).

- | | | |
|---|---|----------------------------------|
| 1 | Propodeum with posterior excavation not margined above | 2 |
| – | Propodeum with posterior excavation margined above..... | 5 |
| 2 | TI with the total length much more than 9 times as long as wide at base, pronotum with long and sharp projection at the lateral corners | 3 |
| – | TI with the total length less than 9 times as long as wide at base, pronotum with shorter and blunter projection at the lateral corners | 4 |
| 3 | Metasoma segment I with swollen part less than half of the total length of the petiole, head with frontal fovea slightly larger than anterior ocellus, round, border not distinct | <i>L. clypeatus</i> van der Vech |
| – | Metasoma segment I with swollen part slightly more than half of the total length of the petiole, head with frontal fovea much larger than anterior ocellus, oval, border distinct..... | <i>L. angulus</i> sp. nov. |

- 4 TI in dorsal view less than 7 times as long as wide at base; basal half cover with slightly rugose punctures. Male clypeus with slightly convex basal margin, apical teeth sharp ***L. pusillus* van der Vecht**
- TI in dorsal view more than 8 times as long as wide at base; basal half cover with strongly rugose punctures. Male clypeus with strong convex basal margin, apical teeth blunter ***L. obtusus* sp. nov.**
- 5 Female head with frontal fovea deep, distinctly defined, and round; punctures on apical half of petiole and TII stronger and denser; the yellow part of scutellum not divergent, transverse and without roundly projecting posterior angles (or projection very weak) ***L. lofuensis* Giordani Soika**
- Female head with frontal fovea shallower, not distinctly defined, and oval; punctures on apical half of petiole and TII weaker and sparser; the yellow part of scutellum with slightly divergent sides and roundly prominent projecting posterior angles ***L. amoenus* van der Vecht**

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