

Hemiboea malipoensis Y. H. Tan: A Newly Recorded Species for the Gesneriads of Vietnam*

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Abstract: *Hemiboea malipoensis* Y.H. Tan, recently described from Malipo County, Yunnan Province, China, is newly found in Quan Ba District, Ha Giang Province, North Vietnam, and the vouchers are kept in the herbaria of Institute of Ecology and Biological Resources, Hanoi, Vietnam (HN) and Komarov Botanical Institute, St. Petersburg, Moscow, Russia (LE). Its morphological description, color photos, phenology, ecology, conservation status and notes on genus *Hemiboea* of Vietnam are provided in this paper.

Key words: Gesneriaceae, *Hemiboea*, *H. malipoensis*, new record, Vietnam

0 Introduction

Hemiboea C.B. Clarke, a medium-sized genus of tribe Didymocarpaceae, subfamily Cyrtandroideae, in the family Gesneriaceae^[1], distributed in China, South Japan and North Vietnam^[2]. So far, 34 species and 6 varieties have been reported for this genus^[3], among them 35 taxa are found in South China, especially in limestone areas of Yunnan, Guizhou and Guangxi

Provinces^[4]. Recently, taxonomic treatments of Gesneriaceae has documented totally 7 species of *Hemiboea* in Vietnam; *H. rubibracteata* Z.Y. Li & Yan Liu recorded from Na Hang District, Tuyen Quang Province^[5], *H. ovalifolia* (W. T. Wang) A. Weber & Mich. Möller and *H. gracilis* Franch. found in Trung Khanh District, Cao Bang Province^[6], *H. longisepala* Z.Y. Li newly reported from Tam Dao District, Vinh Phuc Province, *H. subcapitata* C. B. Clarke and *H.*

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cavaleriei Lévl. widely seen in northern Vietnam^[7-8], and *H. crystallina* Y.M. Shui & W.H. Chen from karst region of China and Vietnam^[9]. It is remarkable that the *H. polanei* Pellegr. (1926), type species of the genus *Deinostigma* W. T. Wang (1992) widely accepted in taxonomic treatments of Gesneriaceae in the world^[10-11], but was popularly used in publications from Vietnam^[7-8, 12-13]. Because *H. sinovietnamica* W.B. Xu & X.Y. Zhuang described from the collection at Sino - Vietnam boundary in Guangxi Province^[14] was reported with its distribution in Vietnam but not indicated by voucher specimen and specific locality in Vietnam^[4] and we have not seen this species in Vietnam therefore the species is not included in this paper.

During floristic surveys of limestone mountains in Quan Ba District, Ha Giang Province from 2016 to 2018, several collections of a *Hemiboea* species were collected. This species is characterized by larger spherical involucre, each with 12–20 longitudinal veins, (3)3.5–4.0 cm in diameter and corolla yellow, glabrous, with a ring of hairs adnate to 6–7 mm above the corolla tube base inside (Fig. 1), which present morphological features of *Hemiboea malipoensis* Y.H. Tan^[15]. After carefully referring publications of *Hemiboea* known from China^[1-2, 4, 15-18] and Vietnam^[5-8, 12, 19-21], we surely conclude that this species has not been reported for the Gesneriads of Vietnam so we here describe and illustrate it for the flora of Vietnam. Moreover, its phenology, distribution, habitat and ecology, and a key of *Hemiboea* in Vietnam are also provided in this paper.

1 *Hemiboea malipoensis* Y. H. Tan, Phytotaxa 174 (3): 165-172. 2014

Vernacular name: Đại thư malipo (Vietnamese)

Type: (China. Yunnan Province): Malipo County, Xiajinchang, Shanggaotang, limestone forests, 23° 8' 6"N, 104° 51' 16"E, 1 250 m, 4 November 2011, Yun-Hong Tan 6055 (holotype HITBC!, isotypes IBK!).

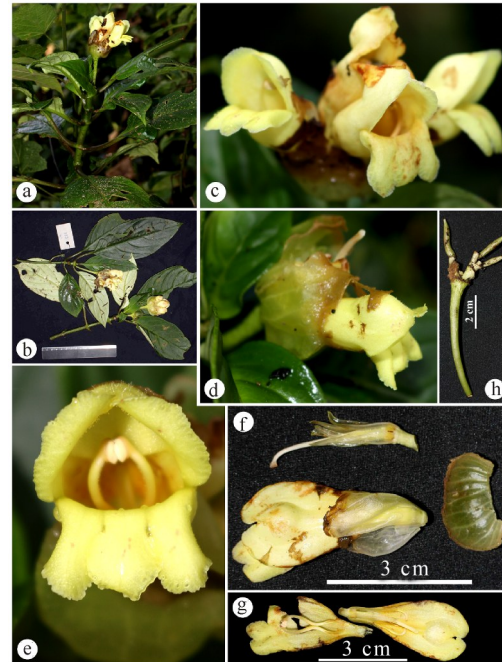


Fig. 1 (a) Habitat; (b) Habit & cymes; (c) Cymes; (d) Flower in front view; (e) Flower and involucre lateral view; (f) Remnant rotten involucre, involucre, corolla, pistil and calyx; (g) Opened corolla showing interior surface and parts of corolla; (h) Peduncle bearing fruits.

Description and illustration (Fig. 1): Terrestrial and lithophytic perennial herb. Stems erect, up to 150 cm tall, simple or branched, glabrous, polished, lenticellate and usually covered by dark purple or violet spots, with (8)10–16(20) nodes; internodes cylindrical, (0.5)2–5(7) cm long, (0.6)0.7–0.9(1) cm in diameter. Leaves decussate, 8–16, petiolate; petiole (1.5)2.0–3.5(6.5) cm long, glabrous with dark purple spots or patches; leaf blade fleshy, thickly papery when dry, adaxially green, abaxially celadon green, from oblanceolate, oval to obovate, (9)12–19(21) × (4.5)5.5–7.5 (9.5) cm, apex acute to shortly acuminate, base narrowly cuneate to oblique, margin entire or with shallowly glandular teeth, glabrous on both sides; lateral veins (5)6–7(8) on each side of midrib, veins slightly sunken adaxially and raised abaxially. Cymes axillary or subterminal, 3–5(8) flowered; peduncle (2.5)3–5 (6.5) cm long, ca. 5 mm in diameter, glabrous, densely verrucose at receptacle; involucre subglobose or

broadly longitudinally compressed ovoid, (3.0)3.5–4.0 cm in diameter, pale green, glabrous, with 12–20 longitudinal veins, apex acute and usually rotten when flowers open; involucre membranous, transparently dull white. Pedicel (4)5–7(8) mm long, 3–4 mm in diameter, glabrous, verrucose. Calyx yellowish white to white, 5-parted from the base, lobes equal, narrowly lanceolate, (16)17–19(20) × 2.8–3.8 mm, glabrous, pellicular, with a midrib prominent abaxially, apex acute, outward. Corolla yellow, glabrous, 3.8–4.5 cm long. Corolla tube 2.8–3.1 cm long, ca. 1.4–1.6(1.7) cm wide at the orifice, 4–5(6) mm wide at the base, inside glabrous, with a ring of hairs adnate to 5–6 mm above the corolla tube base; limb distinctly 2-lipped; adaxial lip 10–14 mm long, cassidaceous, sparsely adaxial purple-spotted, abaxial extremely short glandular-puberulent, 2-lobed, lobes semi-round, ca. 4–5 × 10–11 mm, margin undulate or sinuate; abaxial lip 3-lobed almost to base, lobes ovate, 9–11 × 6–8 mm, margin undulate or sinuate. Stamens 2, anthers fused by entire adaxial surfaces of anthers, adnate to 10–12 mm above the corolla base; filaments linear, glabrous, geniculate at lower the middle, 16–18 mm long; anthers subrotund, glabrous, ca. 1.5–2.0 mm. Staminodes 3, glabrous, adnate to 10–12 mm above the corolla base, lateral two staminodes thick, 10–11 mm long, central staminode gracile, 5–6 mm long. Disc ring-like, yellow, 2–2.5 mm high, margin slightly repand, glabrous. Pistil 2.5–3.0 cm long; ovary linear, 11–13 × 3–3.5 mm, glabrous; style 14–17 mm long, glabrous, apex curved; stigma capitate, ca. 1.5 mm in diameter. Capsule linear, 19–28 mm long, 4–5 mm in diameter, glabrous, slightly curved.

Phenology: Flowering in October–November, fruiting in November, possibly to December.

Distribution and ecology: *Hemiboea malipoensis*, only known from Malipo County, southeastern Yun-

nan, China^[15], is newly recorded in Vietnam (Hà Giang Province, Quản Bạ District; Tùng Vài and Cao Mã Pờ Communes). *H. malipoensis* is found at humid, shaded places under the storey of evergreen broad-leaved forests on limestone mountains and usually accompanied with *Boehmeria* sp., *Loxostigma glabrifolium* D. Fang & K. Y. Pan, *Impatiens* spp., *Elatostema* sp., *Begonia* sp., *Asplenium prolongatum* Hook.

Conservation status: Based on the coordinate of type locality and our sites, and GeoCAT (<http://geocat.kew.org/editor>), the EOO and AOO of *H. malipoensis* are 32.348 km² and 16 km² respectively (polygon with red line and dots in Fig. 2). So far, only 4 localities of this species are recorded in the limestone mountains of Yunnan Province (South China) and Hà Giang Province (North Vietnam), but we believe that more *H. malipoensis* populations will be found in the limestone mountains of Yunnan and Hà Giang Provinces or other Provinces in southern China and northern Vietnam, then the EOO and AOO of this species will increase up and possible to thousands and hundreds square km respectively but the EOO and AOO possibly could not exceed 5 000 km² and 500 km² respectively (the polygon with black lines and blue dots in Fig. 2). Local people usually harvest stem and leaves of *H. malipoensis* to feed pigs and collect firewood in Cao Ma Po and Tung Vai Communes. These activities somewhat directly and indirectly caused a decline to the quality of *H. malipoensis* habitats. Moreover, our field surveys showed that *H. malipoensis* only occurred in limestone mountains of Tung Vai and Cao Ma Po communes which were severely fragmented by valleys with introduced plants of local people and transportation roads. According to the Guidelines for Using the IUCN Red List Categories and Criteria version 13^[22], we assess this taxon as Endangered species (EN B2ab(iii)).

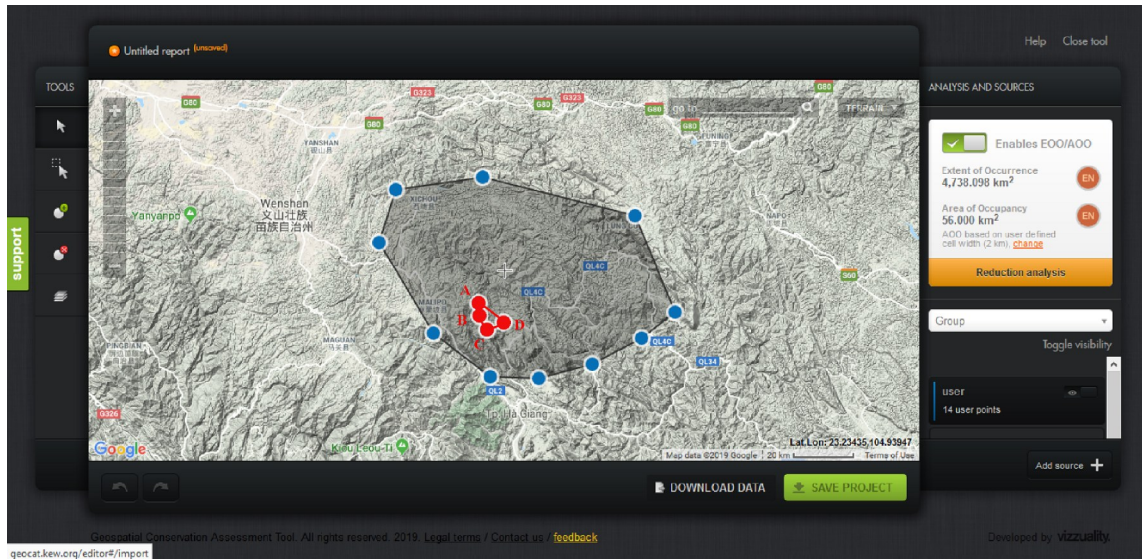


Fig.2 Distribution and calculation of EOO and AOO of *H. malipoensis*

Examined specimens: VIETNAM. Ha Giang Province, Quan Ba District, Tung Vai commune, Thang Village, evergreen broad-leaved forest on limestone mountain, under shaded places, around point 23°03'19"N, 104°52'52"E, at elevation of 1 200 m a. s.l. Terrestrial and lithophytic perennial herb, flower yellow, locally common, November 22, 2016, *Nguyen Sinh Khang et al.*, NSK 843 (HN!). Ha Giang prov., Quan Ba distr., Tung Vai com., Thung Pang vill., around point 23°04'39"N 104°56'07"E, steep rocky slopes near hill top composed with stratified highly eroded limestone at elevation 1 000–1 100 m a. s.l., remnants of primary evergreen broad-leaved very humid forest. Erect terrestrial and lithophytic herb to 1.5 m tall in shady place, flowers light yellow, locally very common, 17 October 2018, *L. Averyanov, Nguyen Sinh Khang, T. Maisak & Truong Duc Thieu*, VR 886 (LE!, HN!). Ha Giang prov., Quan Ba distr., Cao Ma Po com., Va Thang 1 vill., around point 23°05'53"N, 104°51'26"E, steep alluvial slopes and flattened mountain summits based on limestone at elevation 1 400–1 500 m a. s.l., primary evergreen broad-leaved very humid forest. Erect terrestrial herb to 1 m tall among shady rocks, flowers pale yellow, not com-

mon, 22 October 2018, *L. Averyanov, Nguyen Sinh Khang, T. Maisak & Truong Duc Thieu*, VR 1232 (LE!, HN!).

2 Notes on taxonomy and identification key for *Hemiboea* in Vietnam

In comparison with *H. malipoensis* population from Malipo County^[15], our plants sometimes have more nodes and leaves, up to 20 nodes with 16 decussate leaves (*vs.* up to 16 nodes, and 10 leaves), longer petiole, (1.5)2.0–3.5(6.5) cm long (*vs.* 2–4 cm), bigger leaves, (9)12–19(21) × (4.5)5.5–7.5(9.5) cm, (*vs.* 10.5–17.5 × 5.0–8.5 cm), more longitudinal veins of involucre, 12–20 (*vs.* 6–12). Those characteristics are quantitative and not stable in this species. The distinguished characteristics of *H. malipoensis* are green, broadly longitudinally compressed ovoid or subglobose involucre, transparently white or pale membranous involucre, calyx 5-lobed from the base, segments equal, glabrous, corolla yellow, without glandular puberulent outside, and having a ring of hairs adnate to 5–6 mm above the corolla tube base, cassidaceous shape of adaxial lip, anthers fused by entire adaxial surfaces of anthers.

According to Zhang et al.^[15], *H. malipoensis* was morphologically closed to *H. cavaleriei* var. *pausinervis* W.T. Wang & Z.Y. Li and *H. magnibracteata* Y.G. Wei & H.Q. Wen. After examining the type specimens and descriptions of the two species, we found that *H. malipoensis* was easily distinguished from the *H. cavaleriei* var. *pausinervis* W.T. Wang & Z.Y. Li with type specimens collected in Guangxi, Napo, 17/10/1979, D. Fang et S. P. Liao 22325^[23], deposited in PE (holotype PE00030787!, isotype PE00030788!) by leaf apex usually broadly acute (*vs.* narrowly acute to acuminate), corolla 3.8–5.5 cm long, glabrous outside (*vs.* 3–3.5 cm, glandular puberulent), and from the *H. magnibracteata* Y.G. Wei & H.Q. Wen described from Guangxi, Huanjiang County, Mulun village, Hongdong, alt. 650 m, 16 Aug. 1994, Fl. Mulung Exped. M 0224^[24] with holotype IBK00191645!, isotype IBK00191646!, PE00154620! by calyx 5-parted from the base (*vs.* calyx campanulate, 5-lobed from above middle), cymes 6–10 flowered, peduncles 3–3.5 cm long (*vs.* 3–6 flowered, ca. 1.5 cm long), corolla yellow, glabrous outside (*vs.* white to yellow, glandular puberulent outside). *H. malipoensis* also significantly differs from *H. cavaleriei* Lévl., which has type specimens (holotype E00135154!; isotype E00135153!, E00061241!), collected from Kouy-Tchéou: Pin-Fa, 16 Sept. 1902, Jul. Cavalerie 492^[25] by the former having leaf blade glabrous, (5)6–7(8) lateral veins on each side of midrib, margin entire or rarely undulate (*vs.* sparsely pubescent, 6–14, crenulate), corolla glabrous (*vs.* glandular puberulent outside), and anther completely coherent (*vs.* apically coherent).

Molecular data show *H. malipoensis* belongs to a clade including *H. longzhouensis*, *H. longganensis*, and *H. bicornuta*^[15] or related to *H. rubibracteata*^[3], however the *H. malipoensis* obviously differs from *H. longzhouensis* W. T. Wang ex Z. Y. Li^[23] by leaf glabrous (*vs.* adaxially pubescent), corolla yellow (*vs.* white), glabrous inside (*vs.* sparsely glandular puberulent), from *H. longganensis* Z. Y. Li^[23] by leaf oblanceolate, oval to obovate, glabrous, 5–8 lateral veins on each side of midrib (*vs.* narrowly elliptic-lanceolate,

abaxially sparsely pubescent, 8–12 lateral veins on each side), cymes 3–5(8) flowered, glabrous (*vs.* 2–3 flowered, glandular pubescent), involucre glabrous (*vs.* glandular pubescent), calyx and margin glabrous abaxially (*vs.* glandular puberulent), corolla glabrous outside (*vs.* glandular puberulent), pistil glabrous (*vs.* sparsely glandular puberulent), from *H. bicornuta* (Hayata) Ohwi by leaf oblanceolate, oval to obovate (*vs.* elliptic to narrowly lanceolate), abaxial veins glabrous (*vs.* pubescent), 5–8 lateral veins on each side of midrib (*vs.* 6–10), corolla yellow (*vs.* white), anthers ca. 1.5–2.0 mm (*vs.* 3 mm), pistil 2.5–3.0 cm long (*vs.* 1.5–2 cm), disc ring-like 2–2.5 mm high (*vs.* 1 mm)^[2], and from the *H. rubibracteata* Z. Y. Li & Yan Liu^[26] by leaf margin entire or with shallowly glandular teeth (*vs.* serrate to crenate), 5–8 lateral veins on each side of midrib (*vs.* 6–15), involucre green (*vs.* red), calyx white (*vs.* purple), corolla yellow (*vs.* white), glabrous inside (*vs.* glandular puberulent), filaments 16–18 mm long (*vs.* 10–15 mm), anthers completely coherent (*vs.* apically coherent), capsule 19–28 mm long (*vs.* 14–18 mm).

3 Identification key to *Hemiboea* species known from Vietnam

- 1a. Stem covered densely white villous hairs..... *H. ovalifolia*
- 1b. Stem glabrous2
 - 2a. Involucre outside purplish white to red.....3
 - 3a. Involucre purplish white, lateral veins 4–6 on each side of midrib, cymes 1–3 flowered.....*H. gracilis*
 - 3b. Involucre red, lateral veins 6–15 on each side of midrib, cymes 6–9 flowered.....*H. rubibracteata*
 - 2b. Involucre green.....4
 - 4a. Corolla outside glabrous5
 - 5a. Lateral veins 5–8 on each side of midrib, corolla yellow *H. malipoensis*
 - 5b. Lateral veins 10–12 on each side of midrib, corolla white *H. longisepala*
 - 4b. Corolla outside not glabrous (glandular puberulent or pubescent).....6
 - 6a. Corolla outside pubescent, inside glabrous *H. crystallina*
 - 6b. Corolla outside glandular puberulent, inside with a ring hair adnate to corolla tube base.....7

7a. Leave base decurrent, calyx segments $6-12 \times 3-4.5$ mm, pistil 3-4 cm long..... *H. subcapitata*

7b. Leave base not decurrent, calyx segments $5-7 \times 0.2-0.4$ mm, pistil 1.7-2.5 cm long... *H. cavaleriei*

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摘要:麻栗坡半蒴苣苔 *Hemiboea malipoensis* Y.H. Tan 是最近才得以被描述的、原产自中国云南麻栗坡县的苦苣苔科新种, 最近在越南北部河江省(Ha Giang Province)的全坝区(Quan Ba District)也发现了该种。该新记录种的凭证标本保存在越南生态与生物资源研究所标本馆(HN)和俄罗斯科马罗夫植物研究所(LE)。本文亦同时提供了本种的详细形态描述、彩色图片、物候、生态学、保育现状等信息和目前越南已知的半蒴苣苔属植物的检索表。

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