



Research article

***Capparis macrantha* sp. nov. (Capparaceae, Brassicales), a new shrub species from a deciduous forest of the Nam Kading National Protected Area (central Lao PDR)**

Keooudone SOUVANNAKHOUUMMANE¹, Silvio FICI^{2,*}, Soulivanh LANORSAVANH³,
 Jeong Ho PARK⁴, Ho Sang KANG⁵ & Chaloun BOUNITHIPHONH⁶

¹The Agro-Biodiversity Initiative, National Agriculture and Forest Research Institute,
 Vientiane, Lao PDR.

²Department of Agricultural, Food and Forest Sciences, University of Palermo, Palermo, Italy.

³Biology Department, Faculty of Natural Science, National University of Laos, Vientiane, Lao PDR.

^{4,5}International Environmental Cooperation Center, National Instrumentation Center
 for Environmental Management, Seoul National University, Seoul, 08826, Republic of Korea.

⁶Forest Ecology and Environmental Research Unit, National Agriculture and Forest Research Institute,
 Vientiane, Lao PDR.

*Corresponding author: silvio.fici@unipa.it

¹ Email: botanytabi@gmail.com

³ Email: biokklano@yahoo.com

⁴ Email: parkjeongho82@gmail.com

⁵ Email: silvi@chol.com

⁶ Email: chalounb@yahoo.com

Abstract. *Capparis macrantha* Souvannakhoummane, Fici & Lanorsavanh sp. nov., a new shrub species characterized by erect or ascending habit, stipular thorns, large lanceolate-elliptic leaves and large flowers in supra-axillary rows, is described and illustrated from the deciduous forest in Nam Kading National Protected Area (central Lao PDR). The new species belongs to *Capparis* sect. *Monostichocalyx* Radlk. and is morphologically similar to *C. radula* Gagnep., a shrub widespread in the Indochinese area, differing in the shorter, straight stipular thorns, larger leaves, larger sepals and petals, higher number of stamens with longer filaments and longer gynophore and ovary. Its affinities with related taxa are discussed and a key is provided for the species of *Capparis* L. known from Lao PDR. The conservation status of the new species is provisionally assessed as Vulnerable (VU D1).

Keywords. Bolikhamxai Province, Capparaceae, *Capparis* sect. *Monostichocalyx*, diversity, ecology.

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Introduction

The flowering plant genus *Capparis* L. (Capparaceae Juss., Brassicales Bromhead) includes about 140 species (POWO 2019) of shrubs, small trees and climbers widespread in the tropical and subtropical areas of the Old World, with outliers in central Asia and the Mediterranean Region, and occurring from sea level up to ca 3600 m a.s.l. over a wide range of habitats, e.g., bushlands, savannahs, dry evergreen, deciduous or rain forests, rocky habitats, coastal vegetations, forest margins, etc. The Indochinese Peninsula is a major centre of speciation of *Capparis*, but its taxonomic treatment is still critical in Lao PDR where a discordant number of species has been recorded by different authors (Gagnepain 1908; Jacobs 1965; Newman *et al.* 2007; Inthakoun & Delang 2008; Lee 2016). Field and herbarium research carried out in the last years in this country have provided new data on the variation and distribution of various poorly known taxa (Fici 2016) and led to the description of three new species from the Hin Nam No and Hin Boun National Protected Areas in central Lao PDR (Fici *et al.* 2018, 2020; Souvannakhoummane *et al.* 2018). Furthermore a number of new species of *Capparis* were recently described from neighbouring countries, i.e., Vietnam (Thuong *et al.* 2013, 2015), Thailand (Srisanga & Chayamarit 2004) and China (Zhang & Tucker 2008).

Nam Kading, located in the Bolikhamxai Province, is a poorly explored national protected area of central Lao PDR showing a highly diverse vascular flora. Floristic surveys carried out in this area during the last few years provided documentation of several taxa new for the flora of Lao PDR and led to the description of various new species (Souladeth *et al.* 2017, 2019; Tagane *et al.* 2017, 2018; Yang *et al.* 2018; Souvannakhoummane *et al.* 2019). During recent field work in the deciduous forest of Nam Kading NPA, a population of *Capparis* characterized by large, serial flowers, a high number of stamens and a large ovary was observed. Based on herbarium investigations, material collected from this population turned out to belong to a new species of sect. *Monostichocalyx* Radlk. The new species is here described and illustrated, and data on its distribution, ecology, conservation status and affinities are furnished.

Material and methods

Field investigations were carried out in the Nam Kading National Protected Area from 2017 to 2019. The new species was first observed and collected by one of us (S.L.) in May 2019 in the deciduous forest of this area and the specimens are kept at the National University of Laos (FOF) and Herbarium National du Laos (HNL).

The description and illustration are based on herbarium material. The species concept adopted follows the one proposed by Jacobs (1965) in his revision of the genus *Capparis* from the Indus to the Pacific. The terminology of vegetative and reproductive structures, as well as the main diagnostic characters within the genus, are based on the same treatment (Jacobs 1965). The herbarium acronyms follow Thiers (2017), while authors and names of plants are based on the IPNI (2018). The conservation status was provisionally assessed according to *IUCN Red List Categories and Criteria* (IUCN 2012).

Results

Class Magnoliopsida Brongn.
Order Brassicales Bromhead
Family Capparaceae Juss.
Genus *Capparis* L.
Section *Monostichocalyx* Radlk.

Capparis macrantha Souvannakhoummane, Fici & Lanorsavanh sp. nov.

[urn:lsid:ipni.org:names:77209673-1](https://nomenclature.ipni.org/names/77209673-1)

Figs 1–2

Type material

LAO PDR • Bolikhamxai Province, Pakkading district, Nam Kading National Protected Area; 221 m a.s.l.; 16 May 2019; *Lanorsavanh et al. SL1641*; holotype: HNL, isotype: FOF.

Diagnosis

A C. radula Gagnep. *stipulis rectis brevioribus, foliis majoribus, sepalis petalisque majoribus, staminum numero superiore, filamentis longioribus, gynophoro atque ovario longioribus praecipue differt.*

Etymology

The specific epithet is composed of the Greek words ‘makrós’, meaning ‘large’, and ‘ánthos’, ‘flower’.

Description

Erect or ascending shrub 1–3 m tall. Branches greyish, bearing small knobs surmounted by a thorn; twigs when young pubescent with simple hairs, later glabrous, at the base usually surrounded by cataphylls. Stipular thorns straight, directed upwards or slightly recurved, ca 2 mm long. Petioles 10–24 mm long, glabrous. Leaf blades coriaceous, lanceolate-elliptic, ca 3.7–4.1 times as long as wide, 30–36 × 7.5–10.5 cm; base obtuse or rounded; apex acute or acuminate, with tip 0.8–1.4 cm long; upper surface dark green, lower surface light green, both ones glabrous; veins ca 8–12 on each side of the midrib, decurrent along the margin; young leaves pubescent, silver to pale green with purple patch near apex. Flowers white, fragrant, serial, 2–4 in supra-axillary rows; pedicels 3.5–4.2 cm long, glabrous, surrounded at base by conferted bracts; bracts triangular, ca 1.8 mm long. Sepals 2–2.5 × 0.7–1 cm, greenish, acute at apex, glabrous on both sides, outer pair boat-shaped, inner pair thinner. Petals oblong to obovate, 3.5–4.5 × 1.2–2.6 cm, puberulous outside, white with yellow or purple honey-guide. Stamens ca 100–135; filaments ca 3.5–4.5 cm long; anthers 1.8–2 mm long. Gynophore 3.8–4.2 cm long, glabrous; ovary ellipsoid or oblong, 5–6 × 1.7–2 mm, glabrous, shortly beaked with small knob-shaped stigma. Fruit unknown.

Distribution, habitat and phenology

The new species is so far known from a single location in the Nam Kading National Protected Area in Bolikhamxai Province, at 18°11'44.9" N, 104°26'25.1" E (Fig. 3). *Capparis macrantha* sp. nov. has been observed in mixed deciduous forest on limestone, at ca 200–230 m elevation, with *Amorphophallus laoticus* Hett., *Arisaema* Mart. sp., *Wurfbainia glabrifolia* (Lamxay & M.F.Newman) Škorničk. & A.D.Poulsen. The flowering occurs from May to June.

Taxonomic remarks

Capparis macrantha sp. nov. is mainly distinguished from other species of sect. *Monostichocalyx* by its large flowers in supra-axillary rows, as well as by its large leaves, high number of stamens and elongate

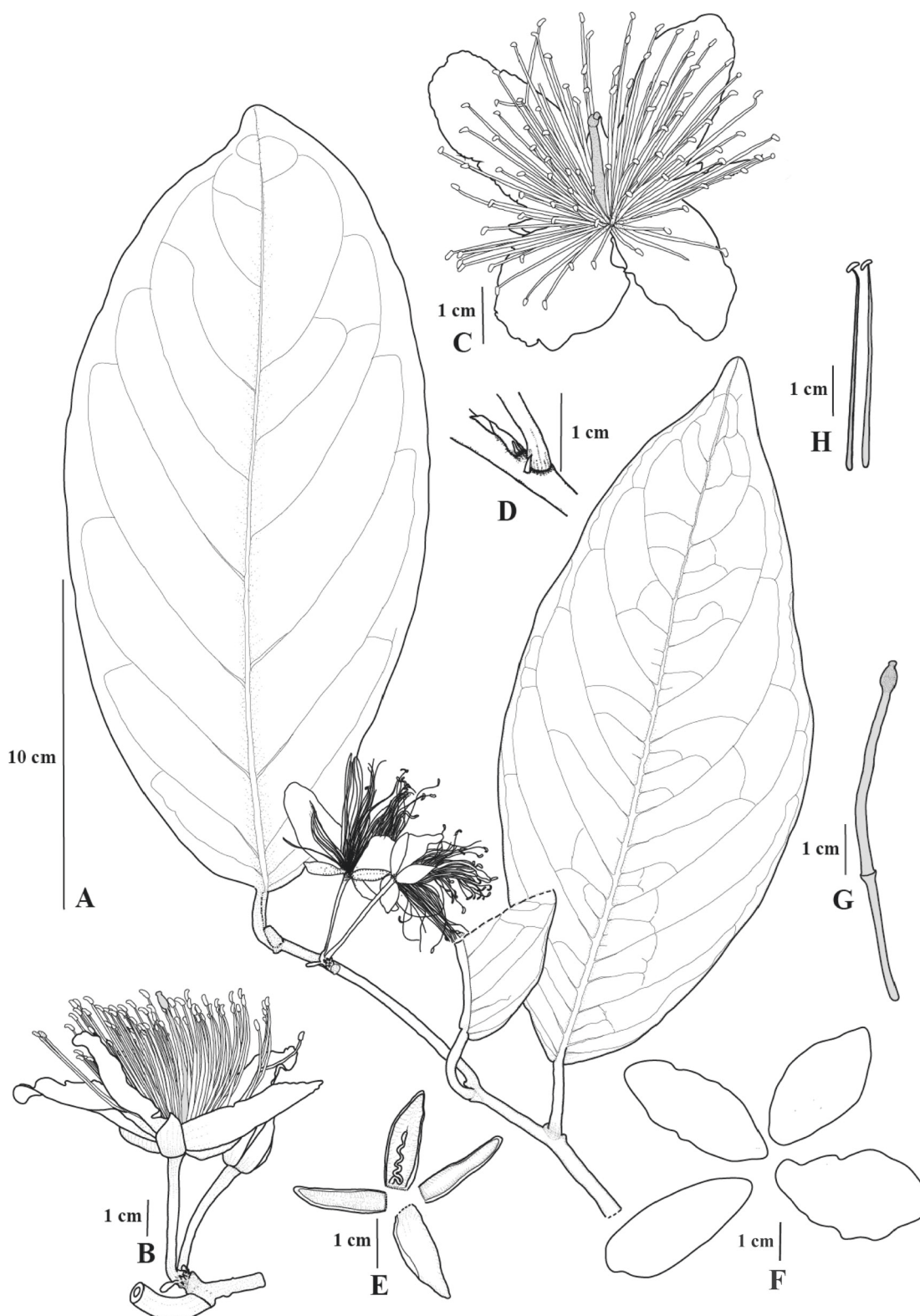


Fig. 1. *Capparis macrantha* Souvannakhoummane, Fici & Lanorsavanh sp. nov. **A.** Flowering branch. **B.** Flower (lateral view). **C.** Flower (front view). **D.** Stipular thorn and petiole. **E.** Sepals. **F.** Petals. **G.** Gynophore and ovary. **H.** Stamens. Drawn from holotype (*Lanorsavanh et al. SL1641*) by K. Souvannakhoummane.

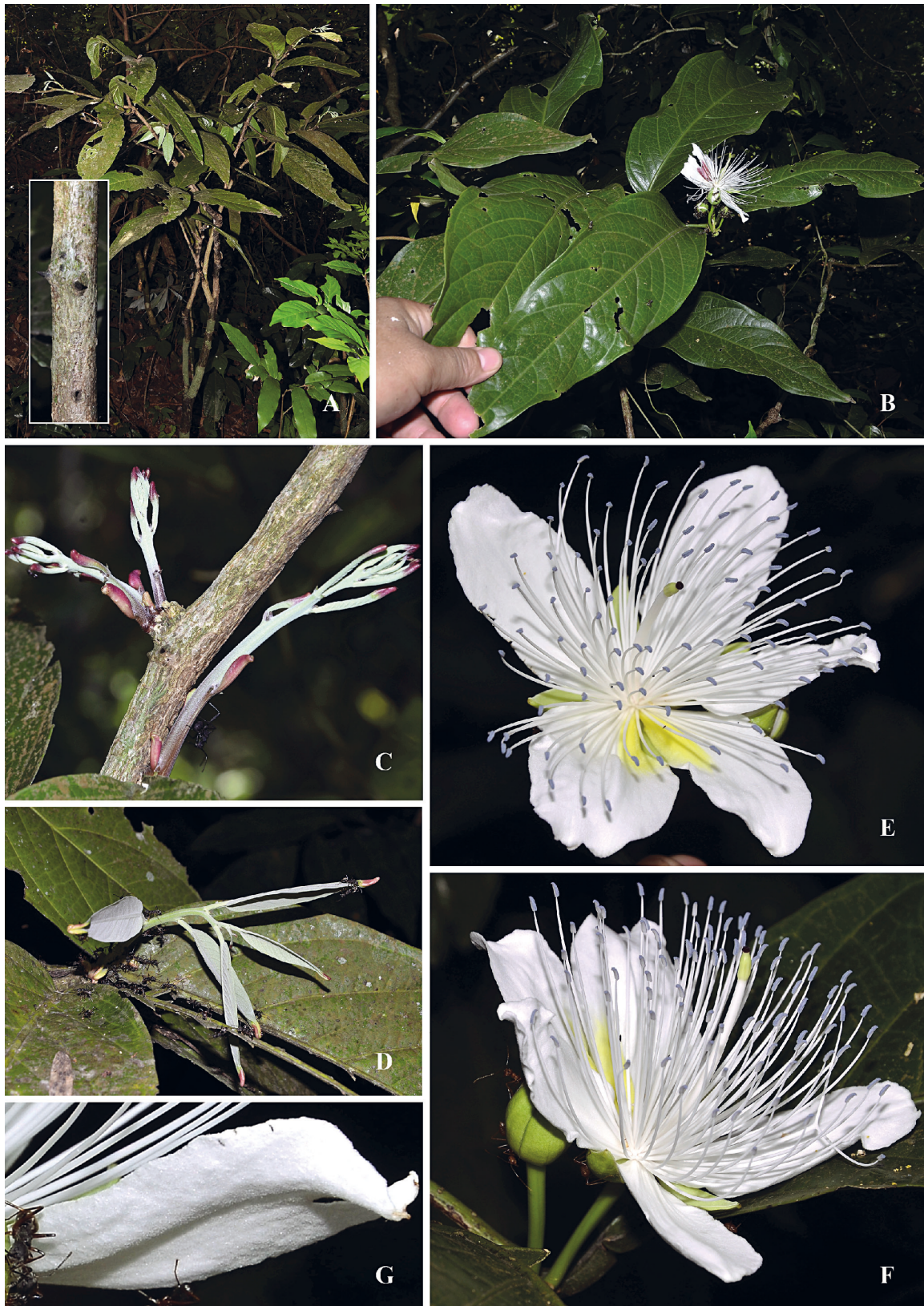


Fig. 2. *Capparis macrantha* Souvannakhoummane, Fici & Lanorsavanh sp. nov. **A.** Habit and detail of a branch bearing thorns. **B.** Flowering branch. **C.** Young twigs. **D.** Young leaves. **E.** Flower (top view). **F.** Flower (lateral view). **G.** Petal (outside view). Photos by S. Lanorsavanh.

Table 1 (continued on the next page). Diagnostic characters among *Capparis macrantha* Souvannakhoummane, Fici & Lanorsavanh sp. nov. and related taxa.

| Traits | <i>C. macrantha</i> | <i>C. radula</i> | <i>C. olacifolia</i> | <i>C. acutifolia</i> | <i>C. echinocarpa</i> | <i>C. florida</i> | <i>C. micranantha</i> | <i>C. pyrifolia</i> | <i>C. tenera</i> | <i>C. urophylla</i> | <i>C. zeylanica</i> |
|--|--------------------------------------|---|--|--|-------------------------------|--|--|--|--|---|---|
| Habit | shrub | shrub | shrub or small tree | shrub, small tree or climber | shrub | shrub | shrub, small tree or climber | shrub, sometimes climber | shrub or climber | shrub or small tree | shrub, small tree or climber |
| Height (m) | 1–3 | ca 2.5–3 | 1–5 | 1–2(–7) | ca 1 | up to 2.5 | 2–6(–10) | 1.5–3.5 | up to ca 3 | 2–6(–7) | 2–5(–10) |
| Indumentum of twigs | pubescent when young, later glabrous | glabrous, densely set with minute warts | densely tomentose with stellate hairs | tomentose with stellate hairs, glabrescent or glabrous | pubescent or glabrescent | glabrous | sparsely pubescent when young, later glabrous | pubescent with stellate hairs or glabrescent | tomentose and early glabrescent, or glabrous | mostly glabrous or with minute stellate hairs | tomentose with stellate hairs, later glabrescent |
| Cataphylls at base of innovations | present | present | present | wanting | wanting | wanting | present | wanting | wanting | wanting | wanting |
| Stipular thorns: | | | | | | | | | | | |
| Length (mm) | ca 2 | 3–4 | 3–5(–8) | up to 4 | 2–4 | up to ca 3 | (1.5)2–4(–7) | 1–3(–4) | 3–4 | up to 1 | 2.5–6 |
| Shape | straight or slightly recurved | recurved | straight | straight or wanting | recurved | straight or wanting | straight or slightly recurved | straight, slightly recurved or wanting | recurved | slightly recurved or wanting | recurved |
| Length of petiole (mm) | 10–24 | 5–6 | 5–6 | 4–7(–11) | 4–7 | (6–)7–10(–11) | 6–10(–15) | 4–6 | (2.5–)4–6 | 3–5 | 0.5–1(–2) |
| Leaf blade: | | | | | | | | | | | |
| Size (cm) | 30–36 × 7.5–10.5 | ca 4.5–9.5 × 2.5–6.5 | 8–13(–16) × (3.5)–4–6 | (4.5–)8–13(–22.5) × (1.5–)2.5–4(–5) | 3.5–6(–7.5) × (1.5–)2.5–3.5 | (10–)10.5–14(–15) × (5–)5.5–8(–8.7) | 8–24(–32.5) × (3.7–)4–9(–12.5) | (4–)5–9.5(–15) × (2–)2.5–4.5(–6.5) | (3.7–)4.5–8(–11.5) × (1.5–)2–4(–6) | (3–)4–8.5 × 1.3–2(–2.3) | 4–10(–18) × (2.1–)3–5.5(–9) |
| Length/width ratio | ca 3.7–4.1 | ca 1.5–2.1 | (2–)2.2–2.6(–3.5) | (1.5–)2–4(–7) | 1.5–2(–2.4) | (1.4–)1.5–2.1(–2.4) | 1.6–2.9(–4.1) | (1.2–)1.7–2.5(–3) | (1.4–)1.8–2(–2.7) | (2.2–)3–4(–5.4) | (1.2–)1.5–2.7(–2.9) |
| Leaf base | obtuse or rounded | rounded | rounded | acute or cuneate | rounded to acutish | rounded, sometimes blunt | mostly rounded, in some cases blunt, subcordate or acute | rounded, acute or blunt | rounded, subcordate or acutish | rounded, cuneate or acutish | rounded, sometimes subcordate or acute |
| Leaf apex | acute or acuminate | rounded with recurved mucro | tapering, gradually acuminate, mucronulate | acuminate | tapering, gradually acuminate | acute or slightly acuminate, mucronulate | mostly rounded, or emarginate, acute or mucronate | acuminate | acuminate | caudate | acute or rounded, rarely acuminate, with recurved mucro |
| N° of veins on each side of the midrib | ca 8–12 | 4–6 | (5–)6–7(–8) | 8–10 | 5–6 | ca 6–8 | 5–7(–10) | ca 5 | (3–)4–5 | 4–6 | 3–8 |
| Pedicle length (mm) | 3.5–4.2 | 0.7–2 | 0.7–1.5 | 0.8–1.5(–4) | 1–1.5 | (0.6–)0.8–1.5(–1.6) | (0.4–)0.7–1(–2) | (0.9–)1.5–2(–2.5) | (0.5–)1–3(–3.5) | 0.6–1.3(–1.5) | 0.4–2(–3) |

Table 1 (continued). Diagnostic characters among *Capparis macrantha* Souvannakhoummane, Fici & Lanorsavanh sp. nov. and related taxa.

| Traits | <i>C. macrantha</i> | <i>C. radula</i> | <i>C. olacifolia</i> | <i>C. acutifolia</i> | <i>C. echinocarpa</i> | <i>C. florida</i> | <i>C. micranantha</i> | <i>C. pyrifolia</i> | <i>C. tenera</i> | <i>C. urophylla</i> | <i>C. zeylanica</i> |
|--------------------------|---------------------|--|---|---|---------------------------------------|---------------------------------|-----------------------------------|------------------------------|---|------------------------------------|--------------------------------------|
| Sepals: | | | | | | | | | | | |
| Size (mm) | 20–25 × 7–10 | ca 9–11 × 3–5 | 8–10 × (3–4)–5(–6) | (4–)5–8(–9) × 2.5–4 | ca 5 × 2.5 | (6–)7–10 × 3–3.5 | (3–)5.5–13 × (1.5–)2.5–5.5 | 4–5 × 2.5–4 | (2.5–)3–4.5(–5.5) × (1.5–)2–2.5 | ca 3–5 × 2–3 | (5–)6–11(–15) × (3–)4–7(–9) |
| Pubescence | glabrous | puberulous outside and inside at margins | tomtose at margins | tomtose at margins | pubescent or glabrescent outside | pubescent inside and at margins | hairy at margins | minutely hairy or glabrous | sometimes hairy inside and at the margins | glabrous outside, tomentose inside | tomtose outside and at the margins |
| Petals: | | | | | | | | | | | |
| Size (mm) | 35–45 × 12–26 | ca 11–14 × 6 | ca (15–)17–22 × 5 | (6–)7–12(–14) × 3–5 | ca 6 × 2 | (11–)12–18(–22) × (3–)4–5(–6) | (9–)10–25 × (2–)3–7 | (5–)6–8 × (1.5–)2–4 | (3.5–)4–5(–7) × 1.7–2.3 | 6–7 × 2.5–3.5 | (7–)7.5–12(–19) × (3–)3.5–5(–8) |
| Pubescence | puberulous outside | glabrous or hairy at the base | tomtose at margins and outside at the top | tomtose at margins and in some cases at the top | pubescent especially outside | woolly | puberulous outside and at margins | hairy-floccose on both sides | tomtose | tomtose inside | mostly glabrous or outside pubescent |
| Number of stamens | ca 100–135 | ca 30–40 | ca 34–38 | 20–35 | 8–10 | ca 47–61 | (10–)20–35(–100) | ca 20–25 | (7–)8–18 | ca 14–20 | 30–45(–70) |
| Length of filaments (cm) | 3.5–4.5 | 1.7–2 | 2.7–3.5 | ca (1.8–)2–2.3(–3) | ca 1.4–2 | (2–)2.5–3.5 | 1.8–3 | 1.4–2.3 | ca 1.5 | 1.5–1.9 | 2–3.5(–5) |
| Gynophore: | | | | | | | | | | | |
| Length (cm) | 3.8–4.2 | 1.6–2.3 | 2.7–3.5 | (1.3–)1.7–2.7(–3.2) | 1.5–2 | (2–)2.5–3.4 | 1.5–3 (–3.5) | (1.4–)1.6–2(–2.5) | (1.2–)1.5–2(–2.5) | 1–2(–2.5) | (2–)4–5(–6.5) |
| Pubescence | glabrous | glabrous | glabrous | glabrous | glabrescent or puberulous at the base | glabrous | glabrous | glabrous | glabrous | glabrous | pubescent or puberulous at the base |
| Ovary: | | | | | | | | | | | |
| Size (mm) | 5–6 × 1.7–2 | ca 2.5–3 × 2 | ca 2–3 × 1–1.5 | ca 2 × 1 | 2 × 1–1.2 | 1.5–2 × 1 | (1.5–)2–3 × 1.5–2 | 1 × 0.5–0.7 | ca 1.5 × 0.5–1 | 1 × 0.5 | 1.5–2.5 × 1–1.5 |
| Shape | ellipsoid or oblong | ovoid | ellipsoid with elongate style | pear-shaped or elongate | pear-shaped | pear-shaped or ovoid | ovoid or ellipsoid | ovoid or ellipsoid | pear-shaped or subglobose | ellipsoid | ellipsoid or ovoid |
| Pubescence | glabrous | glabrous | densely tomentose | glabrous | pubescent or glabrescent | with slender style glabrous | glabrous, rarely hairy | glabrous | glabrous | glabrous | glabrous |

ovary. Among the species of the genus with serial flowers, *C. macrantha* sp. nov. shows some affinities with *C. radula*, recorded in Thailand, Lao PDR, Cambodia and Vietnam, which however differs in the longer, recurved stipular thorns 3–4 mm long, smaller leaves ca 4.5–9.5×2.5–6.5 cm, smaller flowers with sepals ca 9–11×3–5 mm and petals ca 11–14×6 mm, lower number of stamens (ca 30–40) with filaments 1.75–2 cm long, shorter gynophore 1.6–2.3 cm long and shorter, ovoid ovary ca 2.5–3 mm long (Jacobs 1965) (Table 1). The new species is also related to *C. olacifolia* Hook.f. & Thomson, widespread from India and Nepal eastwards to Myanmar, which is distinguished by the smaller leaves 8–13(–16)×(3.5–)4–6 cm, smaller flowers with sepals 8–10×(3–)4–5(–6) mm and petals (15–)17–22×ca 5 mm, lower number of stamens (34–38) and densely tomentose ovary 1–1.5 mm wide (Table 1). Various other species recorded from Lao PDR and included by Jacobs (1965) in the Seriales-Group, as *C. acutifolia* Sweet, *C. echinocarpa* Pierre ex Gagnep., *C. micracantha* DC., *C. pyriformis* Lam., *C. tenera* Dalzell, *C. urophylla* F.Chun and *C. zeylanica* L., are readily distinguished by their small to medium sized flowers, with sepals 3–15 mm long, and by the ovary up to ca 3 mm long (Table 1).

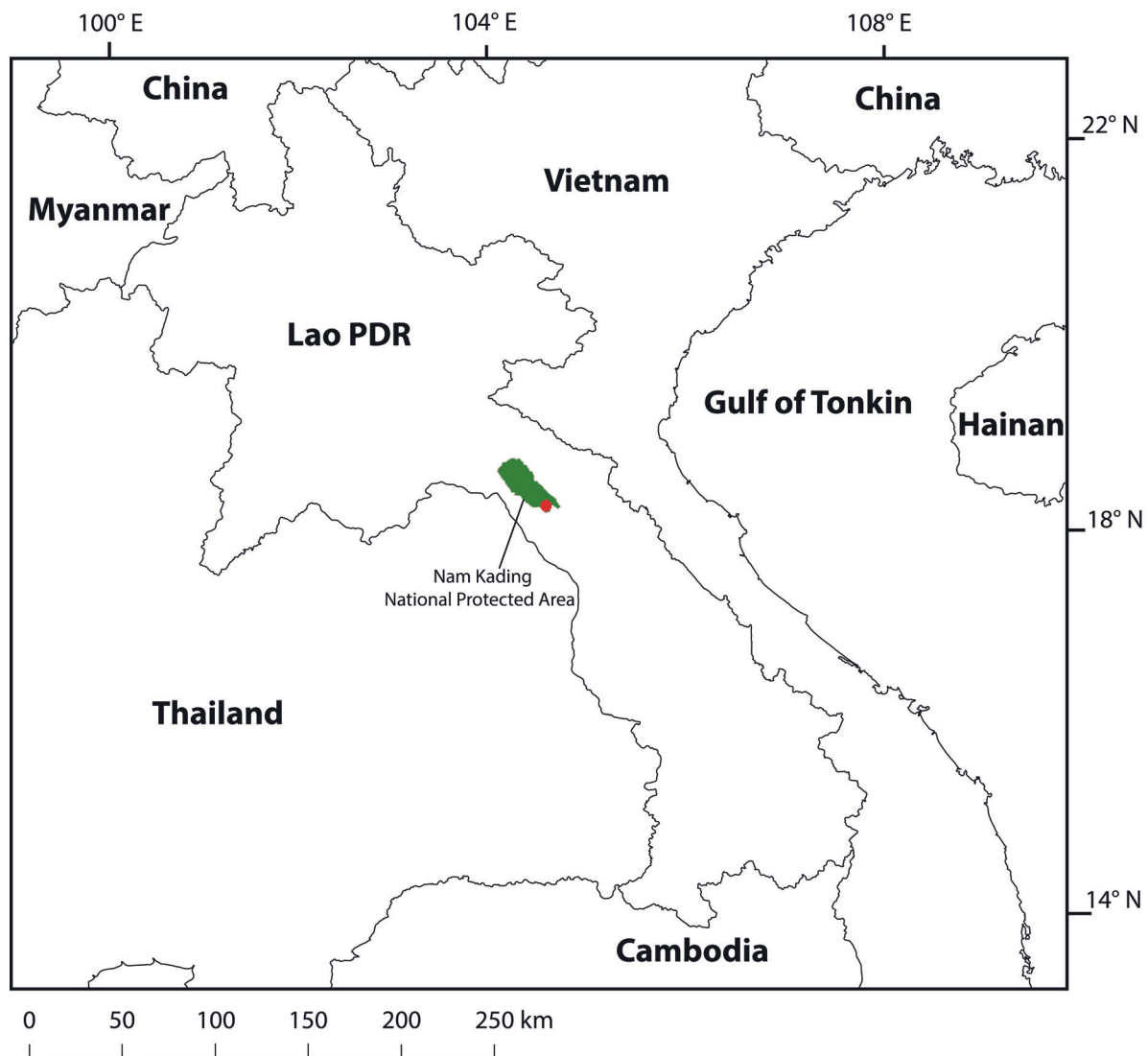


Fig. 3. Known distribution of *Capparis macrantha* Souvannakhoummane, Fici & Lanorsavanh sp. nov. (red circle).

Conservation status

Capparis macrantha sp. nov. is known from the type locality only, occurring in a National Protected Area, where about 10 individuals were observed. Based on our observations, the population is not under immediate threat; however, given the very small area of occupancy known, the new species is assessed here as Vulnerable (VU D1) according to *IUCN Red List Categories and Criteria* (IUCN 2012).

Discussion

The genus *Capparis* is represented in Lao PDR by about twenty species (Jacobs 1965; Newman *et al.* 2007; Fici *et al.* 2018, 2020; Souvannakhoummane *et al.* 2018), all belonging to sect. *Monostichocalyx*, characterized by leaves well developed and persistent, and sepals all free in bud, with both sepals of a pair equal (Jacobs 1965) (for a key to the species of *Capparis* L. in Lao PDR see [Supplementary file 1](#)). Other sections of the genus recorded in southern Asia and the Pacific, i.e., sect. *Capparis* L., sect. *Sodada* (Forssk.) Endl. and sect. *Busbeckea* (Endl.) Benth. & Hook.f. (Jacobs 1965; Fici 2017), are not represented in the Indochinese area. Jacobs (1965) recognized within sect. *Monostichocalyx* some tentative morphological groups, among which the Seriales-Group includes several species with small to medium-sized flowers arranged in supra-axillary rows. However, the same author underlined that, within the whole genus, the species with serial flowers “are the most difficult to interpret. Most of them have advanced characters, some are taxonomically isolated”; based on his statement that “a serial arrangement of flowers does not imply a common origin”, Jacobs (1965) treated a few species showing this reproductive feature in other groups, i.e., *C. multiflora* Hook.f. & Thomson in the Cataphyllosa-Group (including species with flowers small to large, usually arranged on a bracteate, leafless axis or subumbellate, rarely serial), and *C. olacifolia* and *C. radula* in the Brevispina-Group (including species with flowers mostly large and solitary, rarely serial, with elongate ovary). Due to its flower characters, *C. macrantha* sp. nov. could be better placed in the latter group than in the Seriales one; it is to be underlined that the large size of the flowers and the high number of stamens found in the new species are unusual for sect. *Monostichocalyx*. With regard to southern Asia, flowers of similar size are recorded in a few species, i.e., *C. baducca* L. from southern India, differing in the smaller leaves, (7–)9–14×(3.5–)4–5.5(–6.5) cm, and in the solitary, axillary flowers, and *C. trisonthiae* Srisanga & Chayam., a species described from Doi Phu Kha National Park in northern Thailand (Srisanga & Chayamarit 2004), which differs in the lianous habit and flowers arranged in terminal leafy panicles.

The discovery of this new species confirms the role of the limestone habitats of Lao PDR in the differentiation in south-eastern Asia of the genus *Capparis*, which includes several taxa endemic to this country, among which are *C. lanceolatifolia* Fici, Bouaman. & Souvann., *C. hinnamnoensis* Souvann. & Fici and *C. florida* Fici & Souvann., three species recently described from the Khammouan Karst. With regard to the floristic relevance of Nam Kading NPA, during the last years various new species were described from this area, e.g., *Strobilanthes namkadingensis* Soulad. & Tagane (Acanthaceae Juss.), *Begonia namkadingensis* C.J.Yang, Soulad. & Tagane (Begoniaceae C.Agardh), *Monoon namkadingense* Soulad. & Tagane and *Neo-uvaria laosensis* Tagane & Soulad. (Annonaceae Juss.), *Didymocarpus middletonii* Souvann., Soulad. & Tagane (Gesneriaceae Dumort.), *Camellia namkadingensis* Soulad. & Tagane and *C. rosacea* Tagane, Soulad. & Yahara (Theaceae Mirb. ex Ker Gawl.) (Souladeth *et al.* 2017, 2019; Tagane *et al.* 2018; Yang *et al.* 2018; Souvannakhoummane *et al.* 201). Further floristic research in this less investigated area most likely will add new data to the vascular flora of central Lao PDR.

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Supplementary material

[Supplementary file 1](#)

Key to the species of *Capparis* L. in Lao PDR.

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