



A new species of *Capparis* (*Capparaceae*) from Bac Kan Province, Vietnam

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Key words

Capparis sect. *Monostichocalyx*
ecology
habit
limestone
taxonomy

Abstract *Capparis rupicola* (*Capparaceae*), a new species from limestone cliffs of the Bac Kan Province, northern Vietnam, is described and illustrated. The new species is a shrub characterized by pendulous branches, glabrous twigs with cataphylls at the base, wanting or vestigial stipular thorns, coriaceous, obovate leaves, serial flowers in supra-axillary rows, glabrous sepals and petals, and an ellipsoid, ribbed ovary with a knob-shaped stigma. The habit, as well as the ecological adaptations to rocky habitats, appear peculiar if compared to other species of *Capparis* known from south eastern Asia. The new species is related to *C. micracantha* subsp. *micracantha*, a taxon widespread from India eastwards to Indonesia and the Philippines, which is a small tree or an erect shrub, rarely a climber, differing in the twigs pubescent or puberulous, stipular thorns well developed, serial flowers in higher number, pedicels pubescent, sepals pubescent at the margins and shorter filaments. The affinities of the new species with related taxa are discussed and a key is provided for all the species of *Capparis* with serial flowers reported from Vietnam. The conservation status is provisionally assessed as Vulnerable (VU D2).

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INTRODUCTION

The genus *Capparis* L. includes about 150 species distributed in the tropical and subtropical regions of Africa, Asia, Australia and Oceania, with outliers in the Mediterranean region and central Asia (Souvannakhoummane et al. 2020, POWO continuously updated). Several Neotropical species formerly placed in *Capparis* were recently transferred to distinct genera (Cornejo & Iltis 2008, Cornejo 2017, 2018), therefore the distribution of the genus is now limited to the Old World. Jacobs (1965), in his remarkable revision of *Capparis* from the Indus to the Pacific, regarded the Indochinese Peninsula as a major centre of speciation of this genus, which comprises in this area several endemic species (Chayamarit 1991, Ho 1999, Ban & Dorofeev 2003, Newman et al. 2007, Cho et al. 2016, Fici 2017). Researches carried out during the last decades allowed the description of several new taxa from Thailand, Laos and Malaysia (Srisanga & Chayamarit 2004, Souvannakhoummane et al. 2018, 2020, Fici & Souvannakhoummane 2020, Fici et al. 2018, 2020, 2022, Julius 2022); with regard to Vietnam, various new species were recently described from different areas of the country (Sy et al. 2013, 2015, 2016, 2018, 2020), for which a large number of species was previously recorded by Ho (1999) and Ban & Dorofeev (2003). Within the whole Asiatic continent, a similar richness in species of *Capparis* is recorded only for China and India (Zhang & Tucker 2008, Maurya et al. 2020).

During a recent field survey carried out in central and northern

Vietnam a population of *Capparis*, showing differential characters from known species, was observed on a limestone cliff of the Bac Kan Province. Based on herbarium investigations, material collected from this population turned out to belong to a new species of sect. *Monostichocalyx*, characterized by the habit, the glabrescence of vegetative and reproductive parts, and by the features of the stipular thorns, leaves and flowers. The new species is here described and illustrated, its affinities are discussed, and a key to the related species from Vietnam is provided.

MATERIALS AND METHODS

In the frame of a revision of *Capparis* in Vietnam, herbarium investigations were carried out on the collections of the genus at HN, coupled with researches on historical and recent collections at P. The new species described here, was observed by one of us (S.F.) during field investigations on populations of *Capparis* undertaken in March 2024. The description and illustration of the new species are based on herbarium material. The species concept adopted follows the one proposed by Jacobs (1965). The terminology, as well as the main diagnostic characters within the genus, are based on the same treatment; in particular, the term 'serial flowers' refers to the serial multiplication of flowers in supra-axillary rows (Jacobs 1965). Digital images of the type specimens of related taxa were examined through JSTOR Global Plants (JSTOR continuously updated), while the morphometric data concerning the same taxa are based on Jacobs (1960, 1965) and Fici (2023). The herbarium acronyms follow Thiers (continuously updated), while plant names and authors are based on IPNI (continuously updated). The conservation status was provisionally assessed according to IUCN Red List Categories and Criteria (IUCN 2012).

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TAXONOMIC TREATMENT

Capparis L.

Capparis L. (1753) 503. — Type: *Capparis spinosa* L.

Shrubs or small trees, evergreen or deciduous. *Twigs* glabrous or hairy, sometimes surrounded at base by cataphylls. *Stipules* often thorny, straight or recurved, sometimes wanting. *Leaves* simple, petiolate, spirally arranged, rarely reduced and early caducous; blade herbaceous to coriaceous, entire, the nerves arcuate and connecting near the margin. *Flowers* zygomorphic, pedicellate, in terminal or lateral racemes, corymbs or subumbels, sometimes arranged in panicles, or borne in serial, supra-axillary rows, more rarely solitary in the axil of leaves; bracts usually present but mostly caducous, in some cases 2 basal bracteoles present; receptacle more or less conical, usually with a small adaxial disk; sepals 4, free or more or less connate, the outer pair mostly concave, the inner pair flattish; petals 4, usually white or cream, the lower and upper pairs different, the upper one with connivent bases, the lower petals free and obliquely positioned; stamens 6–c. 200, radiating; gynophore usually elongated, sometimes incrassate in fruit; ovary 1–6-locular, sometimes beaked. *Fruit* baccate or a pepo, globose, ovoid, obovoid, cylindrical or ellipsoid, with a

leathery to corky pericarp, rarely dehiscent. *Seeds* 1 to many, embedded in pulp, reniform.

Distribution — Palaeotropical genus extending to several subtropical areas of Africa, Asia, Australia and Oceania, with extra-tropical representatives in the Mediterranean Region and central Asia. About 150 species, widespread from lowlands up to c. 3600 m in bushland, savannah, dry evergreen or deciduous forests, secondary forests, rocky habitats, wadis, coastal vegetation, hedges, forest margins, often in dry seasonal habitats (Jacobs 1960, 1965, Kers 2002, Fici 2012, POWO continuously updated).

Capparis rupicola Fici & Sy, *sp. nov.* — Fig. 1, 2; Map 1

Related morphologically to *C. micracantha* subsp. *micracantha* by the presence of cataphylls at the base of twigs, serial flowers and length of the sepals and petals, but differing in the pendulous branches (vs erect in *C. micracantha*), twigs glabrous (vs pubescent or puberulous), stipular thorns mostly wanting or vestigial, up to c. 1 mm long (vs well developed, up to 4(–7) mm long), leaf blade obovate (vs oblong, elliptic or ovate), flowers 1–2 in supra-axillary rows (vs up to 7), pedicels glabrous (vs pubescent), sepals glabrous (vs pubescent at the margins), and filaments 3.1–3.3 cm long (vs (1.5–)2–3 cm long). — Type: Fici *et al.* 2411 (holo PAL!), Vietnam, limestone cliff in proximity of the Naang River, between Cao Thuong and Dong Puong, Ba Be District, Bac Kan Province, 18 Mar. 2024.

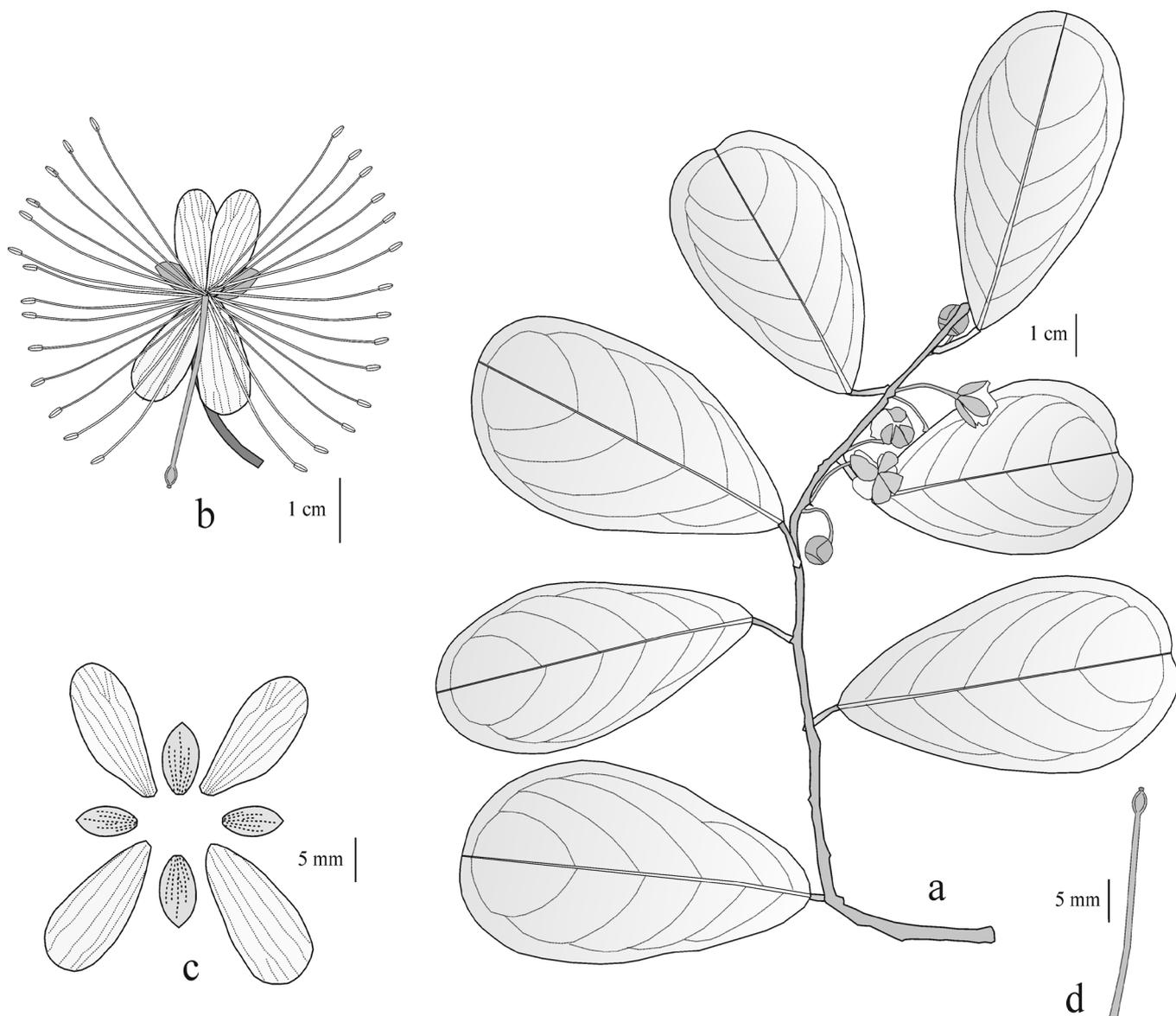


Fig. 1 *Capparis rupicola* Fici & Sy. a. Flowering branch; b. flower; c. dissected flower showing sepals and petals; d. gynophore and ovary (all from Fici *et al.* 2411, PAL). — Drawing by Silvio Fici.



Fig. 2 *Capparis rupicola* Fici & Sy. a. Habitat; b. individual; c. branches; d. flower; e. flowering branch bearing flower buds; f. abaxial view of sepals. Photos by Silvio Fici.

Shrub with pendulous branches up to 5 m long. *Twigs* glabrous, with few cataphylls at the base. *Stipular thorns* mostly wanting, when present vestigial, straight, up to c. 1 mm long. *Petiole* 7–16 mm long, glabrous. *Leaf blade* obovate, coriaceous, (6.6–) 7.1–10.5(–11) by (3.5–)4–5.2(–5.5) cm, base acute, apex rounded, retuse or rarely acute, often with a cartilaginous mucro c. 1 mm long; surfaces glabrous, pale green; young leaves reddish, mucronulate; nerves 5–7 pairs. *Flowers* serial, 1–2 in supra-axillary rows, fragrant; bundles of cataphyll-like scales present between the petiole and the flowers; pedicels 1.3–2.6 cm long, glabrous; sepals acute, 8–9 by 3–5 mm, glabrous; petals white, c. 15–16 by 6–7 mm, glabrous, the upper pair with yellow honey-guide at the base; stamens 25–35, with filaments 3.1–3.3 cm long and anthers 1.5–2 mm long; gynophore 2.5–2.8 cm long, glabrous; ovary ellipsoid, 2.5–2.8 by 1.2–1.5 mm, ribbed, glabrous, with knob-shaped stigma. *Fruit* unknown.

Distribution — The new species has been observed in a single location of the Ba Be District, Bac Kan Province (northern Vietnam), in proximity of the Ba Be National Park.

Habitat & Ecology — On limestone cliffs. Elevation: 160–180 m. Flowering in March.

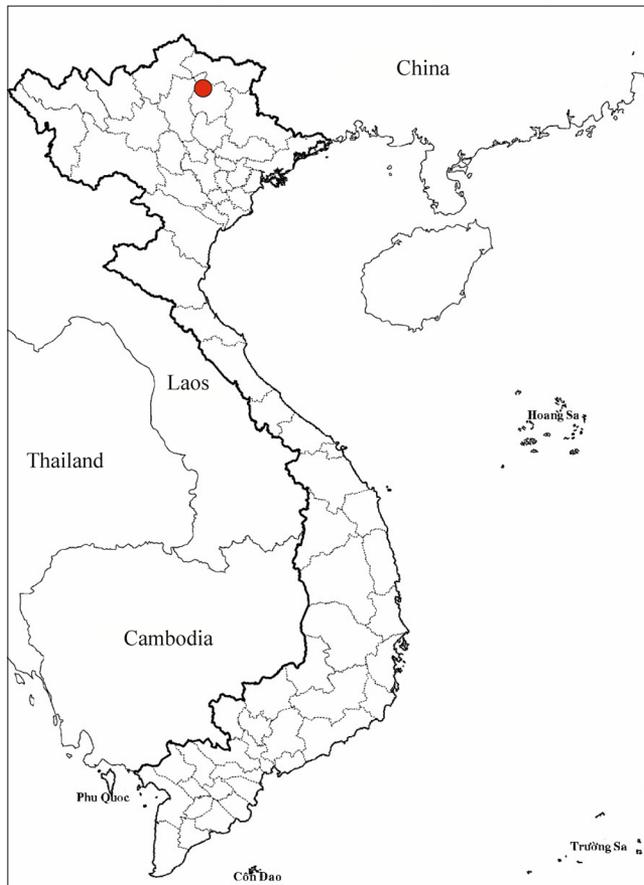
Provisional conservation status — The new species is known so far from only one location, where a few individuals were observed in rocky outcrops. Following the IUCN Red List Categories and Criteria (IUCN 2012), we suggest that the new species should be assessed as Vulnerable (VU D2).

Affinities — The new species is characterized by pendulous branches, glabrous twigs with cataphylls at the base, wanting or vestigial stipular thorns, obovate, coriaceous leaves, low number of serial flowers in supra-axillary rows, glabrous sepals and petals, and ellipsoid, ribbed ovary with knob-shaped stigma. The young leaves, reddish and mucronulate, are also

peculiar if compared with the ones found in related taxa. Within sect. *Monostichocalyx*, *Capparis rupicola* is to be referred to the Jacobs' (1965) Seriales-Group, including several species with serial flowers arranged in supra-axillary rows. It is to be underlined that the new species shows a marked reduction in the number of flowers (1 or 2) in a supra-axillary row, as reported for some other species of the group (Jacobs 1965, Chayamarit 1991, Zhang & Tucker 2008, Fici 2023).

Capparis rupicola is related with *C. micracantha* DC. subsp. *micracantha*, a taxon widespread from India eastwards to Indonesia and the Philippines. In both taxa the flowers may be replaced by small bunches of cataphyll-like scales, a feature recorded for a few other species of the Seriales-Group (Jacobs 1965). The latter subspecies, however, differs from *C. rupicola* in several features, as reported above in the Diagnosis and in Table 1.

The new species shows also affinities with *C. radula* Gagnep., a taxon distributed from Thailand to Vietnam, in particular in the presence of cataphylls and in the low number of serial flowers in the supra-axillary rows, as well as in the coriaceous leaves, size of sepals, number of stamens and small bundles of cataphyll-like scales between the petiole and the flowers. The latter species, however, differs in several characters (Jacobs 1965, Fici 2023), as reported in Table 1. Also *C. rigida* M. Jacobs, a poorly known species endemic to central Vietnam, shows cataphylls at the base of the twigs and serial flowers, but it is easily recognizable from the new species in the habit, being an erect shrub or climber, and in the smaller, elliptic or narrowly ovate leaves, c. 5.5–7.5 by 2.2–3.8 cm, with subacuminate apex (Jacobs 1965). A key to all the species of *Capparis* with serial flowers known in Vietnam (Jacobs 1965, Ho 1999, Ban & Dorofeev 2003) is here reported.



Map 1 Distribution of *Capparis rupicola* (red circle).

Note — The pendulous habit and the ecological adaptations of the new species to vertical cliffs appear peculiar, if compared to the other representatives of the genus *Capparis* known from south eastern Asia (Jacobs 1960, 1965, Chayamarit 1991, Zhang & Tucker 2008, Fici 2023). Similar features are reported for the Mediterranean *C. spinosa* var. *rupestris* (Sm.) Viv., belonging to sect. *Capparis* (Fici 2014), a section not represented in south eastern Asia. The latter variety – mostly linked with calcareous, volcanic and gypseous cliffs at low elevations – shows other similarities, i.e., stipular thorns lacking or vestigial and coriaceous leaves, but differs from the new species in the solitary, axillary flowers and in the adaxial sepal of the outer pair saccate, a character regarded as differential of sect. *Capparis* (Jacobs 1965). With regard to the conservation status, it has been underlined above that few individuals of the new species were observed on a limestone cliff, in proximity of the Ba Be National Park. So far, limestone quarries are not yet present in this area, but widespread in other districts of northern Vietnam; furthermore we consider that the hardly accessible rocky habitat should help preserve the integrity of the population from other risks due to anthropic activities.

KEY TO THE SPECIES OF CAPPARIS WITH SERIAL FLOWERS IN VIETNAM

1. Leaf blade up to 3.5 cm long *C. beneolens*
1. Leaf blade more than 3.5 cm long 2
2. Shoots without cataphylls at the base 3
2. Shoots with cataphylls at the base 6
3. Innovations glabrous. Petiole up to 2 mm long
- *C. subsessilis*
3. Innovations tomentose, often with stellate, reddish or brownish hairs. Petiole more than 3 mm long 4
4. Leaf blade not acuminate, with rigid, dark mucro

Table 1 Diagnostic characters among *Capparis rupicola* and morphologically related taxa.

Characters	<i>C. rupicola</i>	<i>C. micracantha</i> subsp. <i>micracantha</i>	<i>C. radula</i>
Habit	pendulous shrub	erect shrub, small tree or climber	erect shrub
Indumentum of twigs	glabrous	pubescent or puberulous when young	glabrous, warty
Stipular thorns	mostly wanting or vestigial	present	present
Length (mm)	up to c. 1	(1.5–)2–4(–7)	2–4.5
Shape	straight	straight or slightly recurved	recurved
Length of petiole (mm)	7–16	6–10(–15)	4–6
Leaf blade			
Size (cm)	(6.6–)7.1–10.5(–11) by (3.5–)4–5.2(–5.5)	(8–)10–24(–32.5) by 4–10(–12.5)	(3.5–)4.5–8.7(–9.5) by (1.5–)2.2–4.8(–6.5)
Shape	obovate	oblong, elliptic or ovate rounded	elliptic or ovate
Base	acute	obtuse, subcordate or acute	rounded or cordate
Number of flowers in supra-axillary rows	1–2	up to 7	1–3
Pediceal			
Length (mm)	13–26	4–10(–20)	(7–)8–13(–20)
Pubescence	glabrous	pubescent	glabrous
Sepals			
Size (mm)	8–9 by 3–5	3–10(–13) by 1.5–4(–5.5)	(6–)7–11(–12) by 3–5
Pubescence	glabrous	glabrous or pubescent outside, hairy at margins	puberulous
Petals			
Size (mm)	c. 15–16 by 6–7	9–20(–25) by 2–6(–7)	(9–)10–14 by (3–)3.5–5(–6)
Pubescence	glabrous	glabrous or puberulous outside and at margins	the upper pair pubescent inside at base
Length of filaments (cm)	3.1–3.3	(1.5–)2–3	1.5–2
Length of gynophore (cm)	2.5–2.8	(1.5–)1.8–3(–3.5)	(1–)1.6–2.3
Ovary			
Size (mm)	2.5–2.8 by 1.2–1.5	1.5–3 by 1.5–2	(2.5–)3–4 by 1.5–2
Shape	ellipsoid	ovoid or ellipsoid	ovoid
Pubescence	glabrous	glabrous or puberulous	glabrous

- *C. zeylanica*
4. Leaf blade acuminate with tip up to 1.7 cm long, without mucro 5
5. Pedicels glabrous. Petals glabrous or tomentose. Ovary up to 2.2(–3) mm long *C. acutifolia*
5. Pedicels hairy, especially in the distal part. Petals hairy-floccose. Ovary 1–1.2 mm long *C. pyrifolia*
6. Twigs firstly pubescent or puberulous, later glabrous. Top of leaf often with rigid mucro *C. micracantha*
6. Twigs glabrous. Top of the leaf without rigid mucro 7
7. Twigs densely warty. Petiole 4–6 mm long *C. radula*
7. Twigs not warty. Petiole more than 7 mm long 8
8. Leaf blade elliptic or narrowly ovate, with apex subacuminate *C. rigida*
8. Leaf blade obovate, with apex rounded, retuse or rarely acute *C. rupicola*

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