Blumea 59, 2014: 42–48
www.ingentaconnect.com/content/nhn/blumea

RESEARCH ARTICLE

http://dx.doi.org/10.3767/000651914X683593

Two new species of *Syzygium* (*Myrtaceae*) from Saddle Peak National Park, Andaman and Nicobar Islands, India

M. Venkat Ramana[1], A. Chorghe[2], P. Venu[2]

Key words

new species
North Andaman Islands
Syzygium
taxonomy

Abstract Two new species of *Syzygium, S. hookeri* and *S. sanjappaiana* from the Saddle Peak National Park of North Andaman Islands, are described and illustrated. The novelties are deliberated in the light of reviewed concept on the genus *Syzygium* and discussed with related species of Myanmar and Sri Lanka.

Published on 31 July 2014

INTRODUCTION

The family *Myrtaceae* is an important component of the flora of the southern hemisphere with 132 to 150 genera and somewhere between 3 675 and 3 900 species (Parnell 1999, 2003). *Syzygium* Gaertn., one of the largest genera of the *Myrtaceae*, occurs from Africa eastwards to the Hawaiian Islands and from India and southern China southwards to south-eastern Australia and New Zealand. In terms of species richness, the genus is centred in Malesia but in terms of its basic evolutionary diversity it appears to be centred in the Melanesian-Australian region (Craven & Biffin 2010). They exhibit diverse habits with high ecosystem significance as their (often massed) nectariferous flowers and (usually) fleshy fruit are a food source for a wide range of animals (Craven et al. 2006). The taxonomy of *Syzygium* and its generic allies in the Old World were confusing and complex. The classification problems were extensively reviewed and discussed by many authors based on morphological and molecular evidence (Schmid 1972, Craven 2001, Craven & Biffin 2005, Parnell et al. 2007, Soh & Parnell 2011). *Syzygium* s.l. (*Acmena* DC., *Acmenosperma* Kausel, *Cleistocalyx* Blume, *Piliocalyx* Brongn. & Gris, *Waterhousea* B.Hyland and other satellite genera) probably comprises somewhere between 1 200 and 1 500 species (Biffin et al. 2005, Craven et al. 2006, Craven & Biffin 2010). An infrageneric classification for *Syzygium* s.l., based upon analyses of nuclear and plastid DNA sequence data and morphological evidence, recognized six subgenera and seven sections (Craven & Biffin 2010). This was further supported by leaf anatomical studies (Soh & Parnell 2011).

In India the genus *Syzygium* s.str. comprises 54 species (Govaerts et al. 2008, Shareef et al. 2012). The base list prepared for Andaman and Nicobar Islands comprises 17 species, prepared by Pandey & Diwakar (2008) requires correction in the light of a new concept proposed by Biffin et al. (2005) and Craven et al. (2006). *Syzygium cymosum* (Lam.) DC. and *S. occlusum* Miq. are to be included as they are hitherto ignored species and *S. ruscifolium* (Willd.) Santapau & Wagh (now shifted to *Eugenia* L.) and *S. leptaleum* (Craib) V.S.Kumar (for not being a valid publication) are to be deleted. Furthermore, the genera *Acmena*, *Acmenosperma* and *Cleistocalyx* treated separately in the list, now got merged with *Syzygium* s.l.

The Saddle Peak National Park, c. 84 km² in area, is considered secluded in the remote Andaman and Nicobar group of islands. The park exhibits stunted evergreen vegetation on the peaks and is poorly explored. It did not attract the attention of British explorers, possibly for harbouring the aggressive tribes who were driven away from the south to the north (the Russian geologist and botanist Dr. Helfer was killed on the North Andaman!) and also for apparently possessing uninteresting stunted vegetation rather than economically important timber trees. The area was further neglected in the post independence period for lack of proper access to reach various peaks of the park. As part of the DBT (Department of Biotechnology, New Delhi) sponsored project 'Quantitative Assessment and Mapping of Plant Resources of Andaman and Nicobar Islands', the senior author, who was assigned the North Andamans for exploration, has collected two different materials of *Syzygium*, one is with pink, non-calyptrate flowers and the other is off white with calyptrate flowers. The first one is a shrubby species growing in rocky bed slopes while the second one is a small tree growing near shores of the Kalpong. In both species the petals cohering into a pseudocalyptra and deciduous, anther sacs parallel, placentation axile-median or axile-basal and ovules 6–12, arranged irregularly or in 2 longitudinal rows, spreading to ascending. These characters take them to subgenus *Syzygium* (Craven & Biffin 2010). The mountain *Syzygiums* are usually stunted with small and coriaceous leaves. After a critical study, both of fresh and preserved material, the authors found them as novelties. The type images from K and E coupled with literature (Kurz 1877, Hooker 1879, Ridley 1922, Parkinson 1923, Dassanayake & Fosberg 1981, Sinha 1999) further strengthened our conviction about the identity of the material collected. Much of the terminology followed by Craven (2003) is applied while describing the new species proposed.

TAXONOMIC TREATMENT

1. *Syzygium hookeri* M.V.Ramana, Chorghe & Venu, *sp. nov.* — Fig. 1, 2

Type. *M.V. Ramana 686* (holo CAL; iso BSID, PBL), India, Andaman Islands, Saddle Peak National Park, Kalipur, N13°9'14.5" E93°00'54.8", alt. 586 m, 12 Feb. 2012.

[1] Department of Botany, Nizam College, Osmania University, Hyderabad 500 001, India; corresponding author e-mail: venkat.botany@gmail.com.
[2] Botanical Survey of India, Deccan Regional Center, 500 048 Hyderabad, India.

Fig. 1 *Syzygium hookeri* M.V.Ramana, Chorghe, Venu. a. Habitat; b. twig; c. lower side of leaf; d–f. inflorescence on leafless/leafy lateral twigs. — Photos by M.V. Ramana.

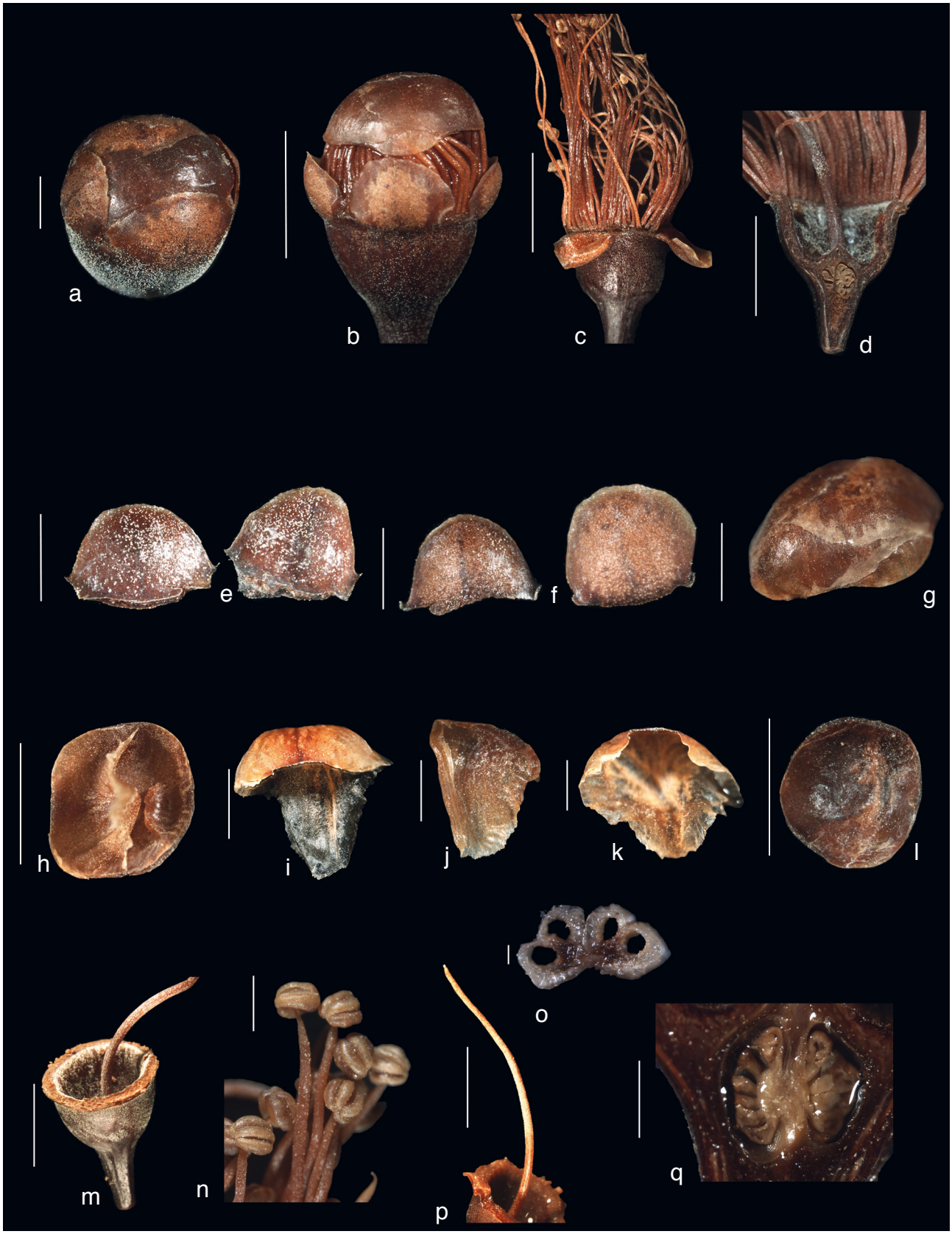

Fig. 2 *Syzygium hookeri* M.V.Ramana, Chorghe, Venu. a, b. Flower buds with free sepals and cohering petals (pseudocalyptra); c. open flower; d. flower longitudinal section; e, f. sepals ventral and dorsal sides; g, h. pseudocalyptra dorsal and ventral; i–k. petals (hooded); l. petals (hemispherical); m. hypanthium with style; n. anthers; o. anther sacs; p. style; q. ovary longitudinal section. — Scale bars: a, e–g, i–k = 2 mm; b–d, h, l, m, p = 5 mm; n, q = 1 mm, o = 0.1 mm. — Photos by Alok Chorghe.

Etymology. This new species is named in honour of Sir J.D. Hooker for his great contribution to the Flora of British India.

Shrub, 2–3 m high, 15–20 cm dbh. *Branches* subcylindrical, greyish when young, turning blackish when old, often laden with crustose lichens. *Leaves* simple, coriaceous, opposite subdecussate, elliptic-lanceolate, 3.5–5.5 by 1.5–3 cm, acutely-narrowed at base, entire to slightly revolute at margins, acute to acuminate at apex, lamina dark green above, pale beneath, blackish above, brownish beneath when dried, midrib impressed, sulcate above, raised beneath, secondary nerves 15–20 pairs, sunken, faintly visible beneath, ascending, joining close to margin forming a loop. *Petioles* 5–10 mm long. *Reproductive seasonal growth unit* usually completely leafless or with a pair of leaves at the base. *Inflorescences* on leafless twigs or terminal on short leafy lateral twigs, few-flowered and then simple or compound cymes, main axis 3–6 cm long; bracts and bracteoles minute, triangular, deciduous. *Flowers* not calyptrate, 1.5 by 2 cm long, showy, bright pinkish. *Hypanthium* cup-shaped, 5.6 by 6 mm, pinkish to pale yellow, not gland dotted, stipitate, the stipe 3.2 mm long. *Sepals* 4, nearly equal, very distant, semi circular, lacerate to entire, auriculate at base, 2.9 by 4.2 mm long, deciduous during anthesis. *Petals* 4, cohering into a pseudocalyptra, 4.4 by 3.5 mm, deciduous, inner 3 hooded, upper one hemispherical. *Staminal disc* unmodified. *Stamens* all fertile, numerous, bright pinkish, spreading, arising in three whorls, in 5–6 loosely aggregated bundles; *filaments* broad at base, narrowed towards tip, thick, 10–16 mm long, unequal, glabrous; *anther sacs* parallel; *anthers* oblong dorsifixed, 0.8 by 0.7 mm, dehiscing by longitudinal slits, connective not glandular. *Style* 20 mm long at anthesis, persistent; *stigma* subulate. *Placentation* axile-median, the placenta uneven, one side peg like protruding into locule, the other side protruding. *Ovules* 6 per locule, spreading to ascending. *Fruits* not seen.

Distribution — India (Andaman and Nicobar Islands, North Andaman Islands, Saddle Peak National Park).

Habitat & Ecology — Rocky bed slopes of mountain peaks.

Phenology — Flowering: February – March.

Additional specimen examined. India, North Andaman Islands, Saddle Peak National Park, Kalipur, *M.V. Ramana 1289* (CAL), N13°09'21.6" E93°00'24.4", 698 m alt., 8 Apr. 2013.

Conservation status — The present novelty is reported only from one locality with a small population of 5–6 individuals. There are no perceived threats, since it is reported from a protected area, either to the population or its habitat. This may be regarded under Data Deficient category as no information is available on its rarity or abundance (IUCN 2013).

Notes — The shrubby habit, subcylindrical branches, smaller leaves, bright pinkish flowers in simple or compound cymes from leafless twigs or terminal on short leafy lateral twigs, cup-shaped hypanthium, hooded or hemispherical petals and loosely aggregated 5–6 stamen bundles in three rows on hypanthium make it very distinctive from all the known species described in Indian floras (Hooker 1879, Parkinson 1923).

The authors also examined mountain shrubby species from British Burma (Kurz 1877) and Malaya Peninsula (Ridley 1922) for comparison. It resembles *S. contractum* Wall. from Myanmar (erstwhile Burma) in possessing pinkish non-calyptrate flowers, deciduous sepals, petals cohering into a pseudocalyptra, but differs from it in having subopposite decussate leaves (vs opposite decussate), lamina elliptic, ovate (vs linear-oblong), inflorescences simple or compound cymes on lateral leafy or leafless branchlets (vs terminal corymbs), hypanthium cup-shaped (vs funnel-shaped) and hooded or hemispherical petals (vs orbicular).

2. *Syzygium sanjappaiana* M.V.Ramana, *sp. nov.* — Fig. 3, 4

Type. *M.V. Ramana 779* (holo CAL; iso BSID, PBL), India, North Andaman Islands, Saddle Peak National Park, Kalpong River, N13°09'37.1" E92°58'05.8", 228 m alt., 20 Feb. 2012.

Etymology. This new species is named after Dr. M. Sanjappa, for his contributions to the Legumes of India.

Small tree, 3–5 m tall, 25–30 cm dbh. *Bark* smooth, greyish with pink tinge. *Branchlets* previous year cylindrical, greyish white, young ones flattened; *nodes* thickened. *Leaves* simple, opposite, crowded near the apices of the branchlets, coriaceous, broadly elliptic to orbicular, obovate, 3.5–5 by 3–4 cm, acute at base, entire, slightly revolute at margins, acute, rounded, rarely obtuse at apex, turning black above, coppery below when dried, midrib sulcate above, raised beneath, secondary nerves 10–12 pairs, sunken on both the surfaces, looping near the margins, pellucid punctuate beneath. *Petioles* 3–6 mm long. *Reproductive seasonal growth unit* with vegetative and reproductive zones. *Inflorescence* usually in leaf axils, rarely terminal, 6–10-flowered, main axis 3–5 cm long, angular; bracteate, *bracts* minute, oblong, caducous; *bracteoles* absent. *Flowers* white, calyptrate (the calyptra formed from fused sepals only, the petals cohere to the calyptra and fall with it) sessile or stalked; the calyptra 4.6 by 4.6 mm. *Hypanthium* visibly pellucid punctuate, stipitate, obconic, 5.7 by 7.2 mm, the stipe 4.4 mm long. *Petals* 4, cohering into a pseudocalyptra, orbicular with a short claw, 4.9 by 4.1 mm, visibly pellucid punctuate, falling with calyptra. *Staminal disc* unmodified. *Stamens* all fertile, white, aggregated in bundles; *filaments* slender, 6–10 mm long; *anther sacs* parallel, oblong; *anthers* dorsifixed, 0.7 by 0.6 mm long, dehiscing by longitudinal slits, connective not glandular. *Style* 12.5 mm long at anthesis; *stigma* slightly bent. *Placentation* axile-basal, the placenta protruding into locule. *Ovules* 3–6 per locule, arranged spreading to ascending. *Mature fruits* spherical, sometimes partially flattened and grooved, sessile or stalked, pale pink to dark purple when ripe, 1.5 by 1.5 cm, crowned with a distinct c. 3 mm long calyx limb, pericarp dry, distinctly free from the seed. *Seed* one, without intrusive tissue interlocking the cotyledons.

Distribution — India (Andaman and Nicobar Islands, North Andaman Islands, Saddle Peak National Park).

Habitat & Ecology — Banks of Kalpong River.

Phenology — Flowering and fruiting: January–May.

Additional specimen examined. India, North Andaman Islands, Saddle Peak National Park, Kalpong River, *M.V. Ramana 1188* (CAL), N13°10'08.3" E92°58'05.9", 225 m alt., 18 Jan. 2012.

Conservation status — The authors came across 4 small populations, each with not more than 3 individuals, on the Kalpong River bank in the National Park. The area is well protected with no perceived threats to the populations/habitats. The species may be treated under Data Deficient (DD) category IUCN (2013).

Note — The authors examined the new species for comparison with species that have commonality in showing suborbicular-rotund leaves with terminal and axillary inflorescences (Hooker 1879). The new species exhibits similarity with *S. rotundifolium* Arn. and *S. sclerophyllum* Thwaites (endemics to Sri Lanka) in broadly elliptic orbicular lamina, calyptrate flowers and globose berries with persistent enlarged calyx limb. But it is distinctive with smaller plants up to 5 m high (vs up to 10 m high), flattened young twigs (vs sharply quadrangular), longer petioles, 3–6 mm long (vs 1–3 mm long), few-flowered cymes mostly in leaf axils (vs many-flowered in terminal and axillary), visibly pellucid punctuate on under surface of leaf and floral parts (vs without pellucid punctuate), orbicular petals with short claw (vs elliptic-concave petals) and stamens up to 10 mm long (vs up to 4 mm long).

Fig. 3 *Syzygium sanjappaiana* M.V.Ramana. a. Habitat; b. habit; c. portion of the stem showing bark; d. leaves; e, f. inflorescence; g–i. berries unripened/ripened. — Photos by M.V. Ramana.

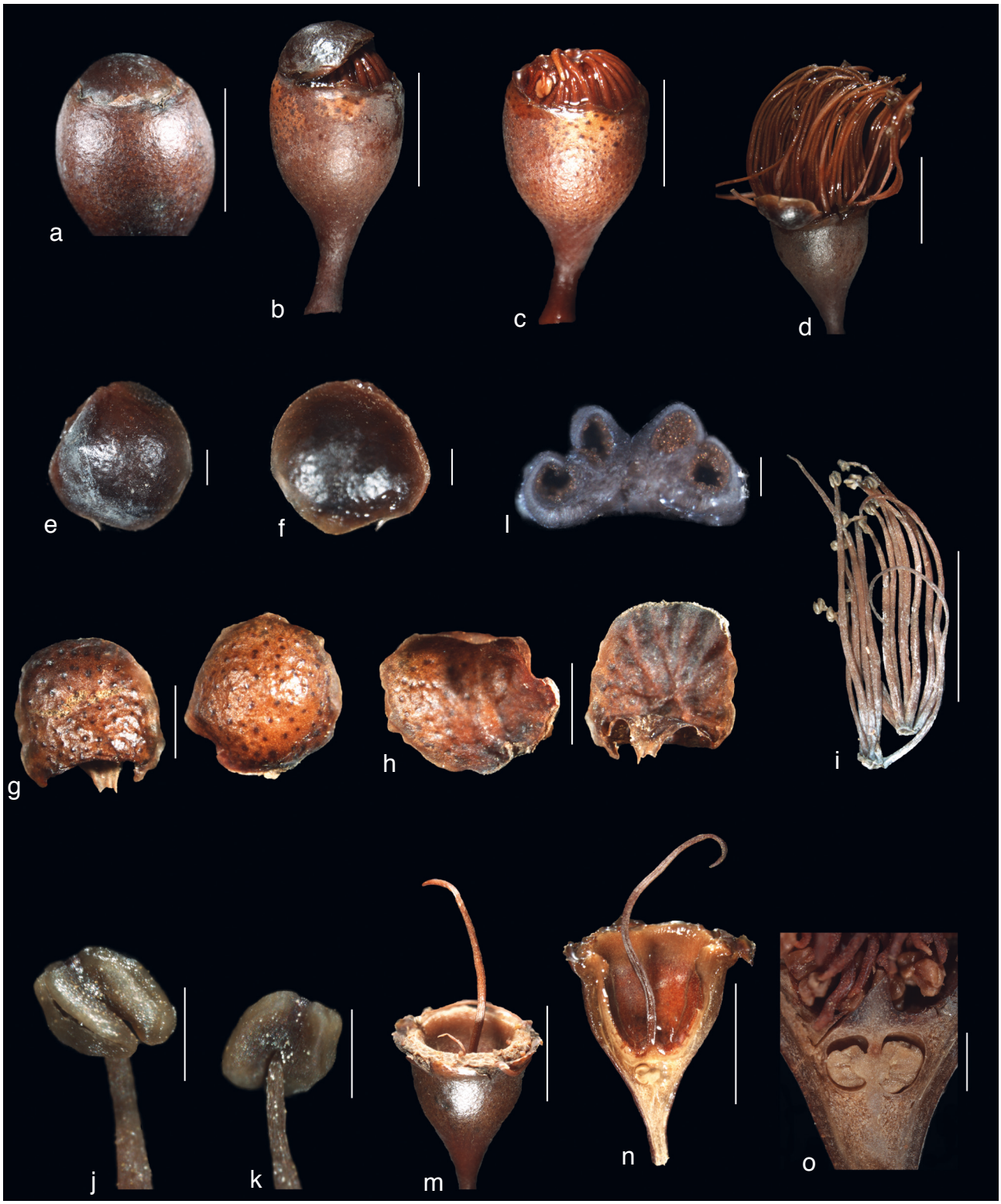

Fig. 4 *Syzygium sanjappaiana* M.V.Ramana. a, b. Flower bud with calyptra and pseudocalyptra; c. flower bud after separation of calyptra and pseudocalyptra; d. open flower; e, f. calyptra dorsal and ventral sides; g, h. petals dorsal and ventral sides; i. stamen bundles; j, k. anther lobes ventral and dorsal sides; l. anther sacs; m. hypanthium with style; n. hypanthium longitudinal section; o. ovary longitudinal section. — Photos by Alok Chorghe.

Acknowledgements The present work was carried out under a DBT sponsored program 'Quantitative Assessment and Mapping of Plant Resources of Andaman and Nicobar Islands'. Authors are thankful to Dr. P. Singh, Director, Botanical Survey of India, Kolkata and Dr. M. Sanjappa and Prof. K.N. Ganeshaiah, GKVK, Bangalore, the principle investigator and coordinator of this program, respectively, for facilities. The senior author (MVR) gratefully acknowledges the fellowship received under the program. The opinion and literature from Dr. Lyn A. Craven (Australia) and opinion of Prof. Pranom Chantaranothai (Thailand) on the materials are acknowledged. Thanks are due to the curators of E and K and the Indian Botanical Laison Officer at Kew, for digital images; forest officials of the Andaman and Nicobar administration assisted during field work.

REFERENCES

Biffin E, Craven LA, Tuiwawa M, Crisp MD, Gadek PA. 2005. South Pacific Cleistocalyx transferred to Syzygium (Myrtaceae). Blumea 50: 383–388.

Craven LA. 2001. Unraveling knots or plaiting rope: What are the major taxonomic strands in Syzygium sens. lat. (Myrtaceae) and what should be done with them? In: Saw LG, Chua LSL, Khoo KC, Taxonomy: the cornerstone of biodiversity. Proceedings of the Fourth International Flora Malesiana Symposium: 75–85. Institut Penyelidikan Perhutanan Malaysia, Kuala Lumpur

Craven LA. 2003. Four new species of Syzygium (Myrtaceae) from Australia. Blumea 48: 479–488.

Craven LA, Biffin E. 2005. Anetholea anisata transferred to and two new Australian taxa of Syzygium (Myrtaceae). Blumea 50: 157–162.

Craven LA, Biffin E. 2010. An infrageneric classification of Syzygium (Myrtaceae). Blumea 55: 94–99.

Craven LA, Biffin E, Ashton PS. 2006. Acmena, Acmenosperma, Cleistocalyx, Piliocalyx and Waterhousea formally transferred to Syzygium (Myrtaceae). Blumea 51: 131–142.

Dassanayake MD, Fosberg FR. 1981. A revised handbook to the Flora of Ceylon 2. Amerind Publishing, Co. Pvt. Ltd., New Delhi.

Govaerts R, Sobral M, Ashton P, Barrie F, Holst BK, et al. 2008. World checklist of Myrtaceae. Royal Botanic Gardens, Kew, United Kingdom.

Hooker JD. 1879. The Flora of British India 2. Reeve & Co., London.

IUCN Species Survival Commission. 2013. IUCN Red List Categories and Criteria, version 10. IUCN, Switzerland and Cambridge, United Kingdom.

Kurz S. 1877. Forest Flora of British Burma 1. Government Press, Calcutta.

Pandey RP, Diwakar PG. 2008. An integrated checklist of Andaman and Nicobar Islands, India. Journal of Economic and Taxonomic Botany 32: 403–500.

Parkinson CE. 1923. A forest Flora of the Andaman Islands. Government Central Press, Simla.

Parnell J. 1999. Numerical analysis of Thai members of the Eugenia-Syzygium group (Myrtaceae). Blumea 44: 351–379.

Parnell J. 2003. Pollen of Syzygium (Myrtaceae) from SE Asia, especially Thailand. Blumea 48: 303–317.

Parnell JAN, Craven L, Biffin E. 2007. Matters of scale: dealing with one of the largest genera of angiosperms. In: Hodkinson TR, Parnell JAN, Reconstructing the tree of life: taxonomy and systematics of species rich taxa: 251–273, and 2 col. plates. CRC Press, Boca Raton, London, New York (Systematics Association Special Volume Series 72).

Ridley HN. 1922. The Flora of Malaya Peninsula 1. Reeve & Co. Ltd., London.

Schmid R. 1972. A resolution of the Eugenia-Syzygium controversy (Myrtaceae). American Journal of Botany 59: 423–436.

Shareef SM, Santhosh Kumar ES, Shaju T. 2012. A new species of Syzygium (Myrtaceae) from the southern Western Ghats of Kerala, India. Phytotaxa 71: 28–33.

Sinha BK. 1999. Flora of Great Nicobar Islands. Botanical Survey of India, Calcutta.

Soh WK, Parnell J. 2011. Comparative leaf anatomy and phylogeny of Syzygium Gaertn. Plant Systematics and Evolution 297: 1–32.