

# *Impatiens cyclosepala* Hook. f. ex W.W. Sm. – a new species record for the flora of India from Arunachal Pradesh

Umeshkumar L. Tiwari\*, Krishna Chowlu & Souravjyoti Borah

Botanical Survey of India, Arunachal Pradesh Regional Centre, Senki View, Itanagar, India

\* corresponding author (e-mail: tigerumesh11@gmail.com)

**Abstract.** The paper reports *Impatiens cyclosepala* Hook. f. ex W.W. Sm. as a new addition for India from Arunachal Pradesh. The species was, till to-date, known only from more than a 100 years old collection from NW Yunnan.

**Key words:** new record, rediscovery, India, *Impatiens cyclosepala*

The Himalayas have been reported with ca. 10000 plant species, among these approximately 31% are endemic to the region. Due to inaccessibility and difficult terrain of north-eastern region of India, floristically, these plants are not well documented. In India, genus *Impatiens* is represented by more than 210 species (Vivekananthan *et al.* 1997; Bhaskar 2012) of which 137 species are endemic (Vivekananthan *et al.* 1997; Swaminathan *et al.* 2001) and have not been well documented from Arunachal Pradesh, a part of the Eastern Himalaya. In recent years, many new species of *Impatiens* were discovered from the region (Gogoi & Borah 2013a, 2014, 2015a, 2015b, 2015c, 2015d, 2015e, 2017a, 2017b, Gogoi *et al.* 2017a, 2017b; Hareesh *et al.* 2016a, 2016b, 2017a, 2017b; Hareesh & Sabu 2017; Lidén & Bharali 2017; Hareesh *et al.* 2017), as well as rediscoveries (Gogoi *et al.* 2013), and distribution extensions (Gogoi & Borah 2013b, Borah *et al.* 2015, Gogoi *et al.* 2015a, 2015b, 2016) were reported.

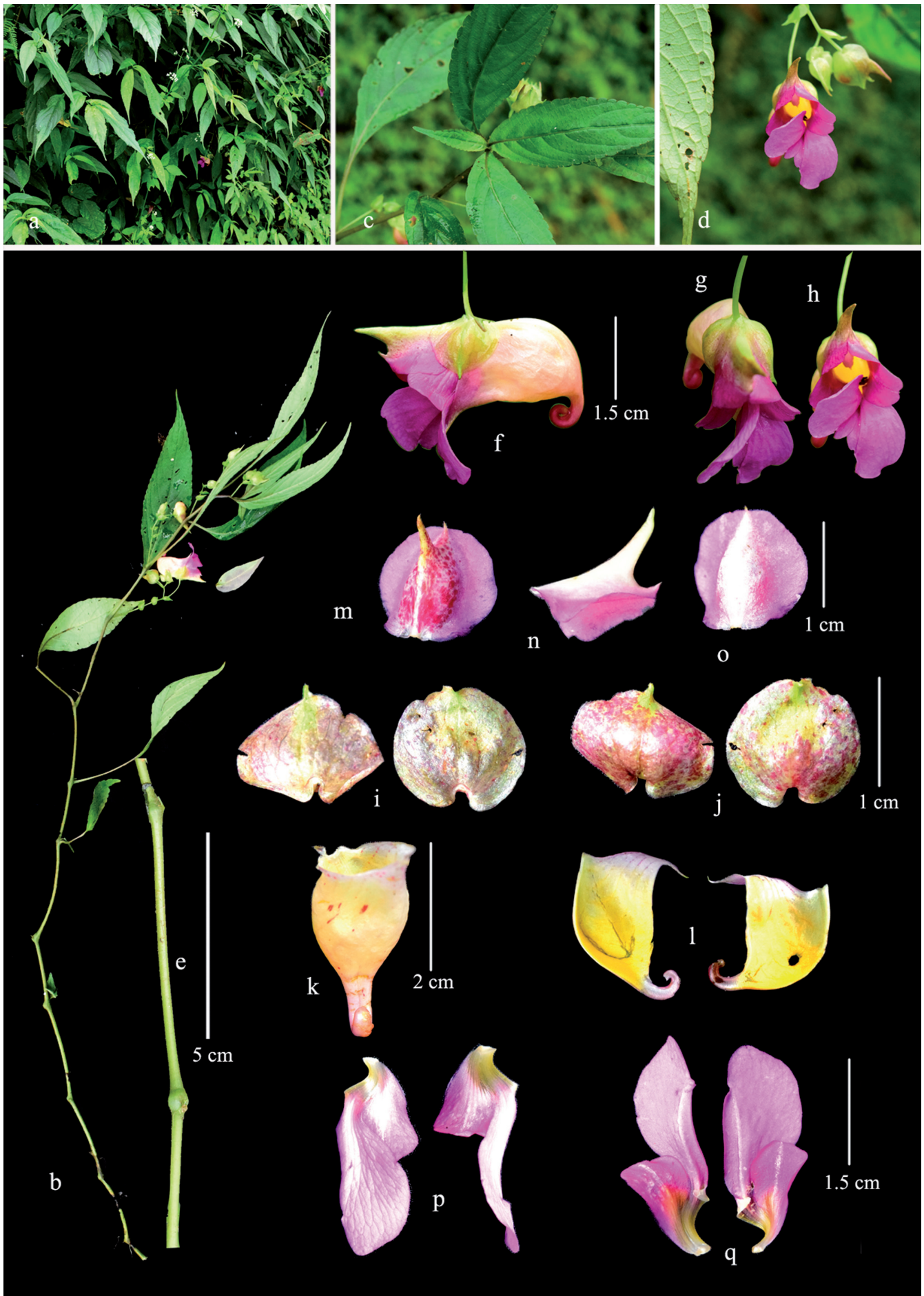
During two floristic expeditions to East and West Kameng districts of Arunachal Pradesh in 2016 and 2017, respectively, one species of *Impatiens* with a yellowish lower sepal, pink to purple petals and the upper petal with two horn-like appendages was collected. After critical examination of specimens and search in literature dealing with *Impatiens* of the Indian subcontinent

and adjacent areas and including the paper mentioned above and Hooker (1875, 1908a, 1908b, 1910), Toppin (1920), Grey-Wilson (1989, 1991), Vivekananthan *et al.* (1997), Swaminathan *et al.* (2001), Huang *et al.* (2003), Huang (2006), Chen *et al.* (2008), Pusalkar & Singh (2010), Dessai & Janarthanam (2011), Bhaskar (2012), Yu (2012), Ruchisansakun *et al.* (2014), it turned out that this was *Impatiens cyclosepala* Hook. f. ex W.W. Sm. and that the species has not been reported from India so far. Hence, it is reported here with descriptions and colour illustrations so as to enable field botanists, foresters, environmentalists, herbalists, etc. to identify them in the field.

***Impatiens cyclosepala*** Hook. f. ex W.W. Sm., Notes Roy. Bot. Gard. Edinburgh 8: 338. 1915; Chen *et al.*, Fl. China, 12: 53. 2007. Fig. 1 & 2.

**H o l o t y p e :** China, West Yunnan, 8-9000 ft, 1906, *G. Forrest 4271 E* (E00313641), image!

Plant annual erect, 60-70 cm tall, stem greenish brown, puberulent, white hairs, turgid at nodes, laxly branched. Leaves alternate, petiolate, petiole 1-6 cm long; leaf blade 3-14×3-6 cm, papery, reticulately veined, puberulent with white hairs, strigose on veins on both sides, veins 6-8 pairs, curved, base cuneate, attenuate to petiole, margin crenate or sometimes serrate, teeth glandular. Inflorescence axillary in upper



**Fig. 1.** *Impatiens cyclosepala*

Explanations: a – plant in habitat; b – close up of plant; c – flower bud; d – close up of inflorescence; e – internode; f – side view of the flower; g & h – front view of the flower; i – lateral sepal, ventral side; j – lateral sepals, dorsal side; k – lower sepal; l – longitudinal section of lower sepal; m – dorsal petal, top view; n – dorsal petal, side view with two crista; o – dorsal petal; p – lateral united petals dorsal side; q – lateral united petals ventral side

part of stem and branches, 5-6 flowered, sometimes branched, peduncles ascending, 6-10 cm long, strigose, equal or shorter than leaves, flower pedicellate, pedicel 1.5-2.5 cm long, strigose, bracteate at base, bract persistent, green, 4-8 mm, thick, 3-4 veined, apex cuspidate, ca. 1 mm, cordate; Flower yellowish pink to purple, 3.5-4 cm long; lateral sepals 2, ca. 1 cm in diameter. Lower sepal broadly saccate, yellowish, ca. 2 cm deep, abruptly constricted into thick, incurved orange to red spur, 1.2-1.4 cm long in mature flower, mouth oblique, apex ca. 2×1.5 cm, tip acute. Upper petal purple with dark spot, suborbicular, ca. 2 cm in diameter, abaxial midvein thickened with 2 horn-shaped appendages at middle, outer crista 1 mm long and inner crista 1 cm long. Lateral united petals pink, not clawed, ca. 2-2.5 cm, bilobed, basal lobes suborbicular, ca. 1 cm wide, distal lobes broadly ovate, larger up to 1.5 cm long, apex obtuse. Filaments linear 4-5 mm, anther acute. Ovary linear, capsule 2-2.5 cm long, linear, 8-10 seeded.

**Flowering & Fruiting:** August-October.

**Habitat:** It was found growing in moist habitat near a stream in Venia village, Sawa block in East Kameng district and later it was collected from Dirang to Mandala, West Kameng district. Associated species were *Impatiens racemosa*, *Impatiens drapanophora*, *Strobilanthes attenuata*, *Quercus* sp., *Litsea* sp., *Magnolia* sp. etc.

**Distribution:** India: Arunachal Pradesh, East & West Kameng district; China.

**Conservation Status:** Chen *et al.* (2008) did not give its distribution in Yunnan and also did not mention about the population of species. Based on the herbarium collections, this species was represented by ca. 110 year-old collections and, with this, it has an extended distribution and new species record for India. Based on the distribution records, the authors would like to assess it as an Indeterminate (I) species due to insufficient information on its distribution. However, this species is evaluated here as Endangered [EN, B1ab(i, iv)] according to the recent IUCN Red List Criteria and Categories version 3.1 (IUCN, 2012). Further intensive explorations are required in similar habitats in adjacent areas for the possible location of this species. During the present survey, only twelve mature individuals were located, growing as undergrowth in a semi-evergreen forest along a stream. It is possible that *I. cyclosepala* occurs also in N Myanmar, and other adjoining areas, between original localities in Yunnan and localities described in this paper.

**Specimens examined:** East Kameng, near Venia village on way to Yakali, Sawa, 1555 m, 28.09.2016, U.K. Tiwari 47777 (ARUN); West Kameng, Dirang, 2402 m, 09.09.2017, K. Chawlu 40908 (ARUN).

**Acknowledgements.** The authors are grateful to Dr. Paramjit Singh, Director, Botanical Survey of India (BSI), Dr. R. Gogoi, Central National Herbarium (CNH), BSI, Howrah and Head of Office, BSI APRC, Itanagar for facilities and encouragement.

## References

- BHASKAR V. 2012. Taxonomic monograph on *Impatiens* L. (Balsaminaceae) of Western Ghats, South India: the key genus for endemism. 283 pp. Bangalore: Centre for Plant Taxonomic Study.
- BORAH S., GOGOI R., SATYANARAYANA P. & YU S-X. 2015. Lectotypification of the name *Impatiens toppinii* Dunn, a new addition of the species for flora of India. *Telopea* 18: 33-37. <https://doi.org/10.7751/telopea8324>.
- CHEN Y. L., AKIYAMA C. S. & OHBA H. 2008. *Impatiens*. In: Z.-Y. WU, P. H. RAVEN & D. Y. HONG (eds.). *Flora of China*, vol. 12, pp. 43-113. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis, USA.
- DESSAI J. R. N. & JANARTHANAM M. K. 2011. The genus *Impatiens* (Balsaminaceae) in the northern and parts of central Western Ghats. *Rheedea* 21: 23-80.
- GOGOI R. & BORAH S. 2013a. *Impatiens lohitisensis*, a New Species of *Impatiens* (Balsaminaceae) from Arunachal Pradesh, India. *Taiwania* 58: 15-19. DOI: 10.6165/tai.2013.58.15
- GOGOI R. & BORAH S. 2013b. *Impatiens siculifer* Hook. f. (Balsaminaceae) and *Tricarpelema chinense* D. Y. Hong (Commelinaceae) Two Additions to the Flora of India from Lohit Valley of Arunachal Pradesh, India. *Taiwania* 58: 146-150. DOI: 10.6165/tai.2013.58.146
- GOGOI R. & BORAH S. 2014. *Impatiens paramjitiana*, a new species of Balsaminaceae from Arunachal Pradesh, India. *Phytotaxa* 175: 171-175. <https://doi.org/10.11646/phytotaxa.175.3.8>
- GOGOI R. & BORAH S. 2015a. *Impatiens ashihoi*, a new species of Balsaminaceae from Dibang Valley of Arunachal





Fig. 2. *Impatiens cyclosepala*, Holotype: China, West Yunnan, 8-9000 ft, 1906, G. Forrest 4271 E (E00313641), image!



- Pradesh, India. *Phytotaxa* 238: 278-282. <https://doi.org/10.11646/phytotaxa.238.3.7>
- GOGOI R. & BORAH S. 2015b. *Impatiens siangensis* (Balsaminaceae), a new species from Arunachal Pradesh, India. *Phytotaxa* 192: 117-120. <https://doi.org/10.11646/phytotaxa.192.2.5>
- GOGOI R. & BORAH S. 2015c. *Impatiens adamowskiana* sp. nov. (Balsaminaceae) from Arunachal Pradesh, Northeast India. *Nord J Bot* 33: 586-590. <https://doi.org/10.1111/njb.00798>
- GOGOI R. & BORAH S. 2015d. *Impatiens dalaiensis* (Balsaminaceae) a new species from Arunachal Pradesh, India. *Phytotaxa* 207: 286-290. <https://doi.org/10.11646/phytotaxa.207.3.7>
- GOGOI R. & BORAH S. 2015e. *Impatiens pathakiana* (Balsaminaceae), a new species from Arunachal Pradesh, north-eastern India. *Telopea* 18: 121-125. <https://doi.org/10.7751/telopea8484>
- GOGOI R. & BORAH S. 2017a. *Impatiens rugosipetala* sp. nov. (Balsaminaceae) from Arunachal Pradesh, Northeast India. *Phytotaxa* 35: 365-367. <https://doi.org/10.1111/phytotaxa.35>
- GOGOI R. & BORAH S. 2017b. Two new species of *Impatiens* L. (Balsaminaceae) from Arunachal Pradesh, Northeast India. *Webbia: Journal of Plant Taxonomy and Geography* 72(1): 87-92. <http://dx.doi.org/10.1080/0837792.2016.1253913>
- GOGOI R., ADAMOWSKI W., SHERPA N. & CHHETRI G. 2016. On the taxonomic identity and lectotypification of *Impatiens uncipectala* C.B. Clarke ex Hook. f. *Phytotaxa* 273(3): 207-211. <http://dx.doi.org/10.11646/phytotaxa.273.3.8>
- GOGOI R., BARBHUIYA H. A. & BORAH S. 2013. Rediscovery of *Impatiens laevigata* var. *grandifolia* (Balsaminaceae) from NE India. *Taiwania* 58: 311-315.
- GOGOI R., S. BORAH & SATYANARAYANA P. 2015a. *Impatiens fugongensis*, *I. yui* and *I. xanthina* (Balsaminaceae), Three New Additions to Flora of India. *Journal of Japanese Botany* 90: 270-275.
- GOGOI R., HAREESH V. S. & ADAMOWSKI W. 2017a. *Impatiens zironiana* (Balsaminaceae), a new species from Arunachal Pradesh, northeastern India. *Webbia: Journal of Plant Taxonomy and Geography* 72(1): 83-86. <http://dx.doi.org/10.1080/0837792.2017.1286773>
- GOGOI R., ODYUO N. & DAIMARY R. 2015b. *Impatiens parkinsonii* C.E.C. Fisch. (Balsaminaceae), a new addition to flora of India and notes on its typification. *Telopea* 18: 383-387. <http://dx.doi.org/10.7751/telopea9100>
- GOGOI R., THAM B. B. T., LIDÉN M. & BORAH S. 2017b. *Impatiens pseudolaevigata* sp. nov. (Balsaminaceae): a new species from Western Arunachal Pradesh, India. *Phytotaxa* 313 (2): 227-230. <http://dx.doi.org/10.11646/phytotaxa.313.2.10>
- GREY-WILSON C. 1989. *Impatiens bicornuta* and its allies: studies in Balsaminaceae: VII. *Kew Bull.* 44: 61. <http://dx.doi.org/10.2307/4114645>
- GREY-WILSON C. 1991. *Impatiens* L. In: A. J. C. GRIERSON & D. G. LONG (eds.). *Flora of Bhutan* 2. Royal Botanic Garden, Edinburgh, UK.
- HAREESH V. S. & SABU M. 2017. *Impatiens nilalohitae* (Balsaminaceae): a new species from northeastern India. *Phytotaxa* 323(2): 189-193. <http://dx.doi.org/10.11646/phytotaxa.323.2.7>
- HAREESH V. S., JOE A., GOGOI R. & SABU M. 2017a. *Impatiens arunachalensis* (Balsaminaceae), a new species from northeastern India. *Phytotaxa* 305(1): 047-051. <http://dx.doi.org/10.11646/phytotaxa.305.1.7>
- HAREESH V. S., BORAH S. & SABU M. 2017b. *Impatiens walongensis* (Balsaminaceae) – a new species from North-East India. *Nord J Bot* 317(3): 226-230. <http://dx.doi.org/10.11646/phytotaxa.317.3.7>
- HAREESH V. S., GOGOI R. & SABU M. 2016a. *Impatiens pseudocitrina* (Balsaminaceae), a new species from Arunachal Pradesh, Northeast India. *Phytotaxa* 282: 231-234. <http://dx.doi.org/10.11646/phytotaxa.282.3.8>
- HAREESH V. S., JOE A., PRASHOB P. & SABU M. 2016b. *Impatiens roingensis* (Balsaminaceae): a new species from northeast India. *Webbia: Journal of Plant Taxonomy and Geography* 71(2): 187-190. <https://doi.org/10.1080/0837792.2016.1190503>
- HOOKE J. D. 1875. *Impatiens* L. In: J. D. HOOKE (ed.). *Flora of British India*, vol. 1. L. Reeve & Co., London, UK.
- HOOKE J. D. 1908a. *Impatiens*. In: *Hooker's Icones Plantarum*, 4th series 9, pp. 1851-1857, Dulau & co., London.
- HOOKE J. D. 1908b. Les espèces du genre "*Impatiens*" dans l'herbier du Muséum de Paris. *Nouv. Arch. Mus. Hist. Nat. Paris*, Ser. 4, 10: 232-272, pls. 2-6.
- HOOKE J. D. 1910. Indian species of *Impatiens*. *Genesis Impatiens species Indicae novae et minus rite cognitae a Cl. A. Meebold detectae*. *Bull. Misc. Inform. Kew* 1910: 291-300.
- HUANG S. H., SHUI Y. M. & CHEN W. H. 2003. New taxa of *Impatiens* from Yunnan. *Acta Bot. Yunnanica* 25: 261-280.
- HUANG S. H. 2006. Balsaminaceae. In: C. Y. YU (ed.). *Flora Yunnanica*, vol. 16, pp. 66-156. Science Press, Beijing.
- LIDÉN M. & BHARALI P. 2017. *Impatiens pyrorrhiza* sp. nov. (Balsaminaceae), a new species from East Himalaya. *Nord J Bot* 35(4): 411-416. <https://doi.org/10.1111/njb.01547>
- PUSALKAR P. K. & SINGH D.K. 2010. Three new species of *Impatiens* (Balsaminaceae) from Western Himalaya, India. *Taiwania* 55: 13-23.
- RUCHISANSAKUN S., TRIBOUN P. & JENJITIKUL T. 2014. A new species of *Impatiens* (Balsaminaceae) from South-western Thailand. *Phytotaxa* 174: 237-240. <http://dx.doi.org/10.11646/phytotaxa.174.4.5>
- SWAMINATHAN M. S., VIVEKANANTHAN K. & NAIR V. J. 2001. *Impatiens*. In: N. P. SINGH & D. K. SINGH (eds.). *Floristic diversity and conservation strategy of India*, vol. IV, pp. 2139-2157. Botanical Survey of India, Kolkata.
- TOPPIN S. M. 1920. Notes on the Balsams of Chitral and the Kachin Hills. *Bulletin of Miscellaneous Information, Kew* 10: 345-367. <https://doi.org/10.2307/4118598>

VADAKKOOT S. H., JOE A., GOGOI R. & SABU M. 2017. *Impatiens arunachalensis* (Balsaminaceae), a new species from northeastern India. *Phytotaxa* 305(1): 047-051. <https://doi.org/10.11646/phytotaxa.305.1.7>

VIVEKANANTHAN K., RATHAKRISHNAN N. C., SWAMINATHAN M. S. & GHARA L. K. 1997. Balsaminaceae. In: P. K. HAJRA,

R. K. CHAKRAVERTY, R. D. DIXIT, M. S. MONDAL & U. CHATTERJEE (eds.). *Flora of India*, vol. IV, pp. 95-229, Botanical Survey of India, Kolkata.

YU S. X. 2012. *Balsaminaceae of China*. Peking University Press, Beijing.