

# *Heterotis* Benth. (Melastomataceae): a new addition to Indian flora from Andaman Islands

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## ABSTRACT

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The genus *Heterotis* Benth. is reported and described here as new record, with a single species *Heterotis rotundifolia* (Sm.) Jacq.-Fél., for India from the Andaman Islands. Seed germination and conservation aspects are also discussed.

**Key-words:** *Heterotis* Benth., *Heterotis rotundifolia*, new record, Andaman Islands, India.

## INTRODUCTION

*Heterotis* Benth. is a genus of family Melastomataceae with about 120 species, mostly distributed in tropics and South Africa (Mabberley 2008). It is native to tropical Africa and naturalized in Australia, Puerto Rico, Costa Rica and islands in the Pacific Ocean (Renner 1989, Luo et al. 2008, Davidse et al. 2009, Woodgyer 2009, Hogendoorn et al. 2010, Randall 2012). In Australia, Singapore and Nigeria, this species is classified as a weed in natural areas and plantations (Melifonwu & Orkwor 1990, Chong et al. 2009, Csurhes 2011) and has been included in the Global Compendium of Weeds (Randall 2012). It is characterized by herkogamous flowers, dimorphic anthers, self-compatible and agamospermy. It is a fast growing, decumbent herb with potential to grow forming dense mats which are displacing native vegetation and altering the composition of native species in the

understorey of forests as well as in open areas, roadsides and disturbed areas (Space & Flynn 2002, PIER 2013). It spreads mainly by seeds but also by plant fragments and root suckers.

## MATERIAL AND METHODS

During floristic explorations (2011-2014) in Andaman Islands, the senior author came across an interesting plant of Melastomataceae from the understorey of open forest trees of Middle and North Andaman. In October 2012, the senior author collected live plants and planted them at Dhannikhari Experimental Garden cum Arboretum (DEGCA), Andaman and Nicobar Regional Centre, BSI, an active conservation centre of wild plants in the Andaman and Nicobar Islands (Singh 2014a, b). After one year, this species got well established, naturalized and started flowering and fruiting in the first and the last week of November

2013 respectively. After critical study, perusal of relevant literature and consultation of CAL, the authors identified it as *Heterotis rotundifolia* (Sm.) Jacq.-Fél. Thorough literature survey (Linnaeus 1753, Bentham & Hooker 1862-1883, Hooker 1872-1897, Duthie 1903, Parkinson 1923, Bailey 1949, Gamble 1967, Mabberley 2008, Ranjan et al. 2014, Singh & Murugan 2014, Singh et al. 2014) revealed that this genus has so far not been recorded and reported from India. Hence, it is reported here as a new record for India with only one species. Detailed description and photographs of this species are provided here for easy identification.

### TAXONOMIC DESCRIPTION

*Heterotis rotundifolia* (Sm.) Jacq.-Fél. in *Adansonia*, n. s. 20(4): 417. 1981. *Osbeckia rotundifolia* Sm. in Rees, *Cycl.* 25: 4.1813. *Melastoma plumosum* D. Don in Mem. Wern. Nat. Hist. Soc. 4(2): 291.1823. *Dissotis plumosa* (D. Don) Hook. f., *Fl. Trop. Afr.* 2: 452.1871.

Plate 1, figures A-I, Plate 2, figures A-H

**Description:** Trailing or creeping herbs; stems slender, up to 24 cm or more long, moderately hirtellous to pilose, rectangular in cross section, rooting at the nodes. Leaves ovate to ovate-lanceolate or suborbicular, 1.5-7 x 0.8-4 cm, both surfaces sparsely to densely pilose, margins ciliate and somewhat crenulate, apex acute, base truncate to short-attenuate, 3-nerved; petioles slender, 0.5-2.5 cm long. Flowers solitary, terminal, pedicellate, tetra to hexamerous; pedicels ca. 2 mm long in fruit; bracts 2, membranous, ciliate; hypanthium 5-7 mm long in flower, densely covered with green, spreading, hair-like, linear-oblong, appendages 2-4 mm long, apex stellate and sparsely to moderately bristly along their length. Calyx-tube ovoid, covered with long stalked, stellate purplish bristles; lobes 4-6, linear, subulate, tip with stellate bristles. Petals purple; lobes 4-6, broadly obovate. Stamens dimorphic, 4-6, anthers of larger stamens pink or lavender, 7-8 mm long, connective prolonged 3-4 mm and modified basally into a deeply 2-lobed spur 1.5-2 mm long, anthers of smaller stamens yellow, 5.5-7 mm long, connective prolonged 0.5 mm or less with

a 2-lobed spur usually 0.5 mm long. Ovary 4-6 celled, pubescent. Fruits capsule, hypanthium cylindrical-campanulate, 1 x 0.9 cm. Seeds extremely small, ca. 1 mm long, prominently ribbed dorsally with a deep pit on each side.

**Flowering and fruiting:** November-December.

**Habitat and ecology:** In Andaman Islands, understory of open forest trees and grows as a weed along side roads.

**Distribution:** Tropical Africa, Sierra Leone to Angola, including Congo, Zimbabwe and Mozambique, Australia, Puerto Rico, Costa Rica and islands in the Pacific Ocean, Singapore and Nigeria, India (Andaman and Nicobar Islands).

**Specimens examined:** India: Andaman and Nicobar Islands, Middle Andaman, Kalsi Forest, Rangat 31.12.2012, Lat. 12°32'28.0"N, Long. 92°52'25.4"E, Lal Ji Singh 29502 (PBL); and North Andaman, Forest of Lamiya Bay, Diglipur 05.02.2013, Lat. 13°11'52.4"N, Long. 93°02'06.5"E, Lal Ji Singh, 29519 (PBL).

### SEED GERMINATION

*Heterotis rotundifolia* is propagated either by seed or well rooted cuttings of stolen. Seed germination was done under edaphic and climatic conditions of DEGCA, Botanical Survey of India, Andaman and Nicobar Regional Centre (Lat. 11°34.296'N, Long. 092°40.259'E, ca. 20 m elevation) as a part of ex-situ conservation. DEGCA is situated at Nayashahar about 16 km from Port Blair in the equatorial and exposed to have warm and humid tropical climate, with the temperature ranging between 18°C and 35°C. It receives heavy rain fall from both south-west and north-east monsoons with the average annual rain fall ranging from 3000 to 3500 mm. Cyclonic winds accompanied by thunder and lightning are very frequent here. January to March have fairly dry weather with scanty rain fall. The mean relative humidity is rather high and usually remains between 66% and 85% throughout the year. Thus the climate is suitable for rapid germination. Seeds are extremely small and take one to two months to attain maturity for germination. Seed is germinated by sowing directly on the surface of moist soil under dense canopy

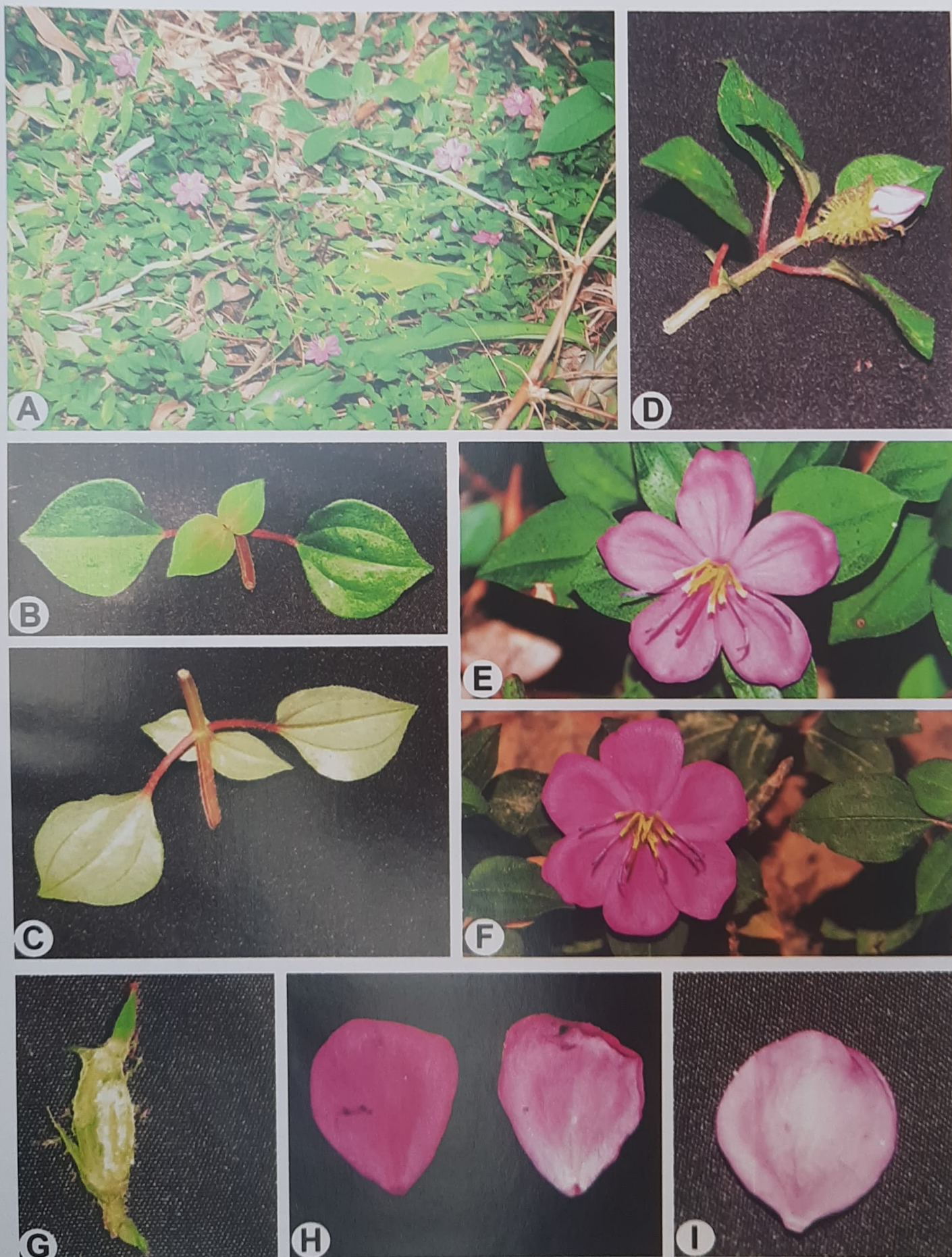
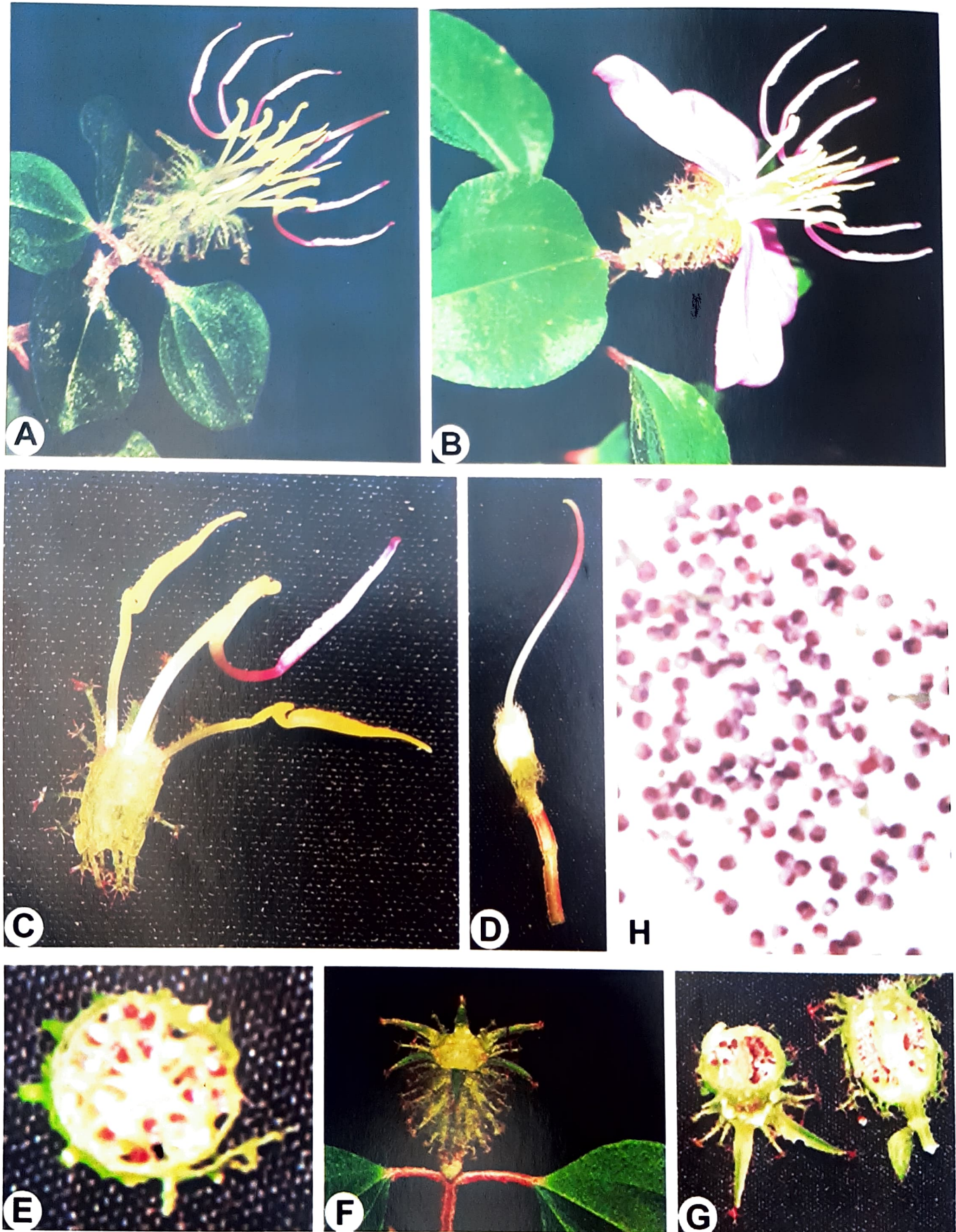


Plate 1

A-I. *Heterotis rotundifolia* (Sm.) Jacq.-Fél. A. Habit. B-C. Leaves (dorsal and ventral views). D. Flower bud. E-F. Flower. G. Sepal. H-I. Petals.



### Plate 2

A-H. *Heterotis rotundifolia* (Sm.) Jacq.-Fél. A-B. Stamen and pistil. C. Dimorphic anther. D. Pistil. E. Ovary (C.S.). F. Fruit (immature). G. Fruit (C.S. and L.S.). H. Seeds.

of trees. Mature seeds remain viable for 4–5 months and take 4 to 6 weeks for germination after sowing. The average percentage of seed germination ranges from 50 to 60%.

### CONSERVATION STATUS

It has been observed that habitat loss and degradation are major threats in Andaman Islands. *Heterotis rotundifolia* has been conserved under ex-situ conservation practice and now has become naturalised in Dhannikhari Experimental Garden cum Arboretum (DEGCA), Andaman and Nicobar Regional Centre, Botanical Survey of India.

### DISCUSSION

*Heterotis rotundifolia*, commonly called ‘Spanish Shawl’ or ‘Pink Lady’, is not well known as an ornamental plant outside tropical and subtropical regions. However, it has potential to be more widely used in the landscape. It is a short lived perennial plant of trailing or creeping growth habit. Species is resistant to drought and easily propagates by cutting. It is well known for ornamental and medicinal potential in its native range in Africa (Kokwaro 1993, Burkill 1997, Neuwinger 2000, Mann et al. 2009, Abere et al. 2009, 2010). It has been internationally planted as an ornamental principally in tropical regions because of its attractive flowers. It has escaped from gardens and spreads rapidly into natural forest forming dense mats (Space & Flynn 2002). Plants produce large amounts of seeds, but plant can also grow by stems fragments/cuttings (PIER 2013). Hence, authors conclude that species should bring into cultivation as ornamental plant in the mainland of India as a potential soil binder with beautiful flowers.

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### REFERENCES

- Abere T. A., Okoto P. E. & Agoreyo F. O. 2010. Antidiarrhoea and toxicological evaluation of the leaf extract of *Dissotis rotundifolia* Triana (Melastomataceae). BMC Compl. and Alt. Med. 10: (17 November 2010)-(2017 November 2010).
- Abere T. A., Onwukaeme D. N. & Eboka C. J. 2009. Pharmacognostic evaluation of the leaves of *Dissotis rotundifolia* Triana (Melastomataceae). African J. Biotech. 8: 113-115.
- Bailey L. H. 1949. Manual of Cultivated Plants. Macmillan, New York.
- Bentham G. & Hooker J. D. 1862-1883. Genera Plantarum. Vol. 1-3, London.
- Burkill H. M. 1997. The useful plants of west tropical Africa. 2nd Edition. Volume 4, Families M–R. Royal Botanic Gardens, Kew, Richmond, United Kingdom.
- Chong K. Y., Tan H. T. W & Corlett R. T. 2009. A checklist of the total vascular plant flora of Singapore: native, naturalised and cultivated species. Singapore: Raffles Museum of Biodiversity Research, National University of Singapore, [http://lkcnmh.nus.edu.sg/nus/pdf/PUBLICATION/LKCNH%20Museum%20Books/LKCNHM%20Books/flora\\_of\\_singapore\\_tc.pdf](http://lkcnmh.nus.edu.sg/nus/pdf/PUBLICATION/LKCNH%20Museum%20Books/LKCNHM%20Books/flora_of_singapore_tc.pdf)
- Csurhes S. M. 2011. Risk assessment of 214 emerging weed threats detected in Queensland, Australia: Invasive Plants and Animals, Biosecurity, Queensland.
- Davidse G, Sousa M. S., Knapp S. & Chiang F. C. 2009. Cucurbitaceae a Polemoniaceae. Flora Mesoamericana, 4(1):1-855.
- Duthie J. F. 1903. Flora of Upper Gangetic Plains, adjacent Shivalik and Sub-Himalayan tract, Superintendent Government Printing, India Calcutta 2: 1-470.
- Gamble J. 1967. Flora of the Presidency of Madras. Botanical Survey of India, Calcutta.
- Hogendoorn K., Keller M. A. & Bartholomaeus F. 2010. Chemical and sensory comparison of tomatoes pollinated by bees and by a pollination wand [electronic resource]. J. Econ. Entomol. 103: 1286-1292. doi:<http://dx.doi.org/10.1603/EC09393>.
- Hooker J. D. 1872-1897. The flora of British India, Vol. 1-7. L. Reeve, London.
- Kokwaro J. O. 1993. Medicinal plants of East Africa. 2<sup>nd</sup> Edition. Kenya Literature Bureau, Nairobi, Kenya.
- Linnaeus C. 1753. Species Plantarum. ed. 2. Stockholm: Impensis Laurentii Salvii.
- Luo Z., Zhang D. & Renner S. S. 2008. Why two kinds of stamens in buzz-pollinated flowers? Experimental support for Darwin's division-of-labour hypothesis. Func. Ecol. 22: 794-800.
- Mabberley D. J. 2008. Mabberley's Plant Book-A Portable Dictionary of Plants, their classification and uses. Cambridge University Press, UK.

- Mann A., Egwim E. C., Banji B., Abdulkadir N. U., Gbate M. & Ekanem J. T. 2009. Efficacy of *Dissotis rotundifolia* on *Trypanosoma brucei brucei* infection in rats. African J. Biochem. Res. 3: 5-8.
- Melifonwu A. A. & Orkwor G. C. 1990. Chemical weed control in ginger (*Zingiber officinale*) production from minisets. Nigerian J. Weed Sci. 3: 43-50.
- Neuwinger H. D. 2000. African traditional medicine: a dictionary of plant use and applications. Medpharm Scientific, Stuttgart, Germany.
- Parkinson C. E. 1923. A Forest Flora of the Andaman Islands, Rep. 1983, Bishen Singh Mahendra Pal Singh, Dehradun.
- PIER 2013. Pacific Islands Ecosystems at Risk. Honolulu, Hawaii, USA: HEAR, University of Hawaii. <http://www.hear.org/pier/index.html>
- Randall R. P. 2012. A Global Compendium of Weeds. Perth, Australia: Department of Agriculture and Food Western Australia, 1124 pp. [http://www.agric.wa.gov.au/objtwr/imported\\_assets/content/pw/weed/global-compendium-weeds.pdf](http://www.agric.wa.gov.au/objtwr/imported_assets/content/pw/weed/global-compendium-weeds.pdf)
- Ranjan V., Singh L. J., Kumar B. & Singh S. C. 2014. Medicinal trees of Andaman and Nicobar Islands. In National Conference on Islands Biodiversity. U.P. Satate Biodiversity Board, Lucknow, pp. 99-104.
- Renner S. S. 1989. A survey of reproductive biology in neotropical Melastomataceae and Memecylaceae. Ann. Missouri Bot. Gard. 76: 496-518.
- Singh L. J. 2014a. *Musa indandamanensis* L. J. Singh: a new species of wild Banana Genus *Musa* (Musaceae) from Bay Islands, India. Taiwania 59(1): 26-36.
- Singh L. J. 2014b. Influence of canopy opening on tree seed germination endemic to Andaman and Nicobar Islands in Dhannikhari Experimental Garden-cum-Arboretum (DEGCA) In: National Workshop on Forest Seed Science: Recent Advances & Challenges in Seed Research, Dehradun. Abs. 67-68.
- Singh L. J. & Murugan C. 2014. Seed plant species diversity and conservation in Dhannikhari Experimental Garden cum Arboretum in Andaman and Nicobar Islands, India. In Nehra S. et al. (Editors)- Biodiversity in India: Assessment, Scope and Conservation Lambert Academic Publishing Heinrick-Booking-Str. Saarbruken, Germany.
- Singh L. J., Murugan C. & Singh P. 2014. Plant genetic diversity of endemic species in the Andaman and Nicobar Islands. In National Conference on Islands Biodiversity. U.P. Satate Biodiversity Board, Lucknow, pp. 49-57.
- Space J. C. & Flynn T. 2002. Report to the Government of Samoa on invasive plant species of environmental concern. Honolulu, USA: USDA Forest Service.
- Woodgyer E. M. 2009. Neotropical Melastomataceae. Neotropikey- Interactive key and information resources for flowering plants of the Neotropics [ed. by Milliken, W., Klitgard, B., Barakat, A.]. Richmond, UK: Kew Botanic Garden. <http://www.kew.org/science/tropamerica/neotropikey/families/Melastomataceae.htm>