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A checklist of Indian *Hopea* (Dipterocarpaceae) with one new combination and lectotypifications

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Abstract

A new combination is made for *Neisandra indica* Raf. under the genus *Hopea* Roxb. as *H. indica* (Raf.) R.Kr.Singh, and *H. parviflora* Bedd. is synonymized under *H. indica*. The priority of the name *H. longifolia* Dyer over *H. utilis* (Bedd.) Bole is discussed. Lectotypes are designated for the names *Balanocarpus utilis* Bedd., *Dioticarpus barryi* Dunn, *Hopea longifolia* Dyer, *H. parviflora* Bedd. and *Neisandra indica* Raf. The updated checklist of Indian *Hopea* taxa is provided.

INTRODUCTION

The Asian genus *Hopea* Roxb. consists of about 114 species distributed in south China to tropical Asia (WCSP 2023). So far, 14 species and 1 variety have been documented for the Indian flora, of which 9 species and 1 variety are endemic to the Western Ghats, and 1 species *H. shingkeng* (Dunn) Bor is endemic to Arunachal Pradesh (extinct). While working

on the genus *Hopea*, I realized the necessity of a new combination for *Neisandra indica* Raf. under the genus *Hopea*. WCSP (2023) treated *Neisandra indica* as a synonym of *Hopea odorata* Roxb., but the type specimens of the former (BM014141847 and BM014141850) were correctly identified by P.S. Ashton as *H. parviflora* Bedd., which at present is the accepted name of the species. After studies of type specimens, other herbarium specimens and fresh collections from Western Ghats, it is found that *H. parviflora* (also *Neisandra indica*) differs from *Hopea odorata* in having lateral nerves 7–9 pairs in leaves (9–13 pairs), calyx lobes tomentose outside (vs. pubescent), petals glabrous outside (vs. pubescent), petal lobes straight, fimbriate at apex (vs. falcate, ciliate), stamens 10 and 15 both (vs. only 15), stylopodium glabrous (vs. pubescent). Moreover, in India the species *H. odorata* is recorded only from the Andaman & Nicobar Islands, not from other regions of India. Prior to *H. parviflora*, *Neisandra indica* is validly published by Rafinesque (1838) in accordance to Articles 38.1, 38.2, 38.3, 38.5 and 38.6 of ICN (Turland et al. 2018), with short description or diagnosis “pet.5 liberis, stam. 10” (petals 5, free, stamens 10) and type specimens. As the genus *Neisandra* is synonymous to *Hopea*, therefore, a new combination *H. indica* (Raf.) R.Kr.Singh is proposed here for *Neisandra indica* Raf. Wight (1840) did not describe the name *Hopea decandra* validly, because he did not provide any description and only presumed that his species “*Hopea wightiana* Wall. ex Wight & Arn.” may be the same with Buchanan-Hamilton’s *H. decandra*. Therefore, the name *H. decandra* Buch. -Ham. ex Wight is invalid and nude according to ICN (Turland et al. 2018).

Based on specimens collected by Beddome from Tirunelveli hills, Dyer (January 1874) described the name *Hopea longifolia* and two months later Beddome (March 1874) himself described the name *Balanocarpus utilis*. Later, Bole (1951) made a combination by transferring *B. utilis* under genus *Hopea* as *H. utilis* and cited *H. longifolia* under synonymy, but in doing so, the combination became superfluous according to ICN (Turland et al. 2018). The precise publication dates for the names published by Beddome is given by Turner (2012). *Diotiscarpus barryi* was described by Dunn (1920) based on the specimens collected from south India by different collectors, but this name was not mentioned in any subsequent Indian works, except Bole (1951). WCSP (2023) treated the name *D. barryi* Dunn as unplaced name, but study of protologue and type specimens shows that *D. barryi* is conspecific with *Hopea utilis* (Bedd.) Bole, as treated by Bole (1951). After following the current nomenclature, the updated checklist of Indian *Hopea* taxa is presented here.

Lectotypes are designated here for five names, to fix the identity and misapplication of names, *Balanocarpus utilis* Bedd., *Dioticarpus barryi* Dunn, *Hopea longifolia* Dyer, *H. parviflora* Bedd. and *Neisandra indica* Raf., because no specific herbarium specimen was cited as holotype in protologue of these names and yet not typified (Bole 1951, Janardhanan 1993, 2020, Sanil et al. 2017, 2020). The guidelines and recommendations of the Article 9 of ICN (Turland et al. 2018) have been followed while designating the lectotypes.

NEW COMBINATION, NEW SYNONYM AND LECTOTYPIFICATIONS

Hopea indica (Raf.) R.Kr.Singh, *comb. nov.*

Neisandra indica Raf., Sylva Tellur. 163. 1838. *Hopea decandra* Buch. -Ham. ex Wight in Ill. Ind. Bot. 1: 88. 1840, *nom. inval. et nud.*

Type citation in protologue: “*Hopea decandra* Buch. Roxb.”

Lectotype (designated here): INDIA. Karnataka: Mysore, *s.d.*, *F. Buchanan-Hamilton s.n.* (BM014141847!); isolectotype: BM014141850!.

Hopea parviflora Bedd., Rep. Conservator Forests 1863-1864: 31, unnumbered plate. 1864; Fl. Sylv. S. India t. 7. 1869, *syn. nov.*

Lectotype (designated here): INDIA. Karnataka: South Canara, *s.d.*, *R.H. Beddome 72* (lower bigger specimen of K000700760!); isolectotypes BM014141851!, MH00001815!, MH00001817!.

Remaining syntypes: INDIA. Kerala: Wayanad, *s.d.*, *R.H. Beddome s.n.* (upper right hand side specimen of K000700760!); Tamil Nadu: Tinnivelly Ghats (Tirunelveli), *s.d.*, *R.H. Beddome s.n.* (BM000603278!, BM014141852!); Malabar, *s.d.*, *R.H. Beddome s.n.* (MH00001816!).

Notes: Rafinesque (1838) described the genus *Neisandra* and species *N. indica* based on specimens collected by Buchanan-Hamilton from Mysore in the name *Hopea decandra* Roxb. In keeping with the practice of those times, he did not designate a holotype nor did he mention the name of the herbarium where the specimens were housed. Two specimens collected by Buchanan-Hamilton from Mysore in the name *H. decandra* Roxb. were traced at BM (BM014141847, Figure 1 and BM014141850, Figure 2). The specimen BM014141847 contains the annotation of the name “*Hopea decandra* R” by Buchanan-Hamilton and is

therefore chosen here as the lectotype for the name *Neisandra indica* Raf., as it agrees well with the protologue. This specimen contains mature leaves and well-developed inflorescences. The locality India orientalis and Mysore is mentioned on the back side of the herbarium sheet BM014141847 (Figure 3) and BM014141850 (Figure 4) respectively.

Hopea parviflora was described by Beddome (1864) based on specimens collected by him from Malabar and South Canara regions of southern India, but no type was indicated. Seven original specimens were traced for the name *H. parviflora* Bedd. (BM000603278, BM014141851, BM014141852, K000700760, MH00001815, MH00001816 and MH00001817). Of these, the lower bigger specimen of K000700760 (Figure 5) is better preserved and therefore selected here as the lectotype. This specimen contains mature leaves and well-developed inflorescences. The dates mentioned on the herbarium sheet at K and MH, are the receiving date of the sheet at respective herbarium, not the collection date of that specimen. The specimen number mentioned on BM herbarium sheets is not the collection number given by Beddome, but added later by anonymous herbarium workers.

Hopea longifolia Dyer, Fl. Brit. India [J. D. Hooker] 1: 309. 1874 (January 1874).

Lectotype (designated here): INDIA. Tamil Nadu: Tinnivelly hills (Tirunelveli), 1869, *R.H. Beddome s.n.* (BM014152819!); isolectotypes BM000603359!, BM013787332!, BM013787333!, BM014141869!, BM014152820!, HBG507221!, K000700754!, MH00001812!.

Balanocarpus utilis Bedd., Fl. Sylv. S. India [Forester's Man. Bot.] ccxxxvii, t. 330. 1874 (March 1874). *Hopea utilis* (Bedd.) Bole, Kew Bull. 6: 146. 1951, *nom. superfl.*

Lectotype: As above.

Dioticarpus barryi Dunn, Bull. Misc. Inform. Kew 1920: 337. 1920.

Lectotype (designated here): INDIA. Tamil Nadu: Tinevelly (Tirunelveli), Kuduvarai river, 300 m, September 1920, *Barry s.n.* (K000700753!).

Remaining syntypes: INDIA. Tamil Nadu: Tinevelly (Tirunelveli), 1883, *W.C. Hayne 213B* (MH00001813!); Tinevelly (Tirunelveli), Kannikatti to Karyar, 12 June 1901, *C.A. Barber 3163* (MH00001813!).

Notes: Dyer (January 1874) described *Hopea longifolia* based on specimens collected by Beddome from Tirunelveli hills. Seven specimens collected by Beddome from Tirunelveli hills were traced (BM000603359, BM013787332, BM013787333, BM014141869, BM014152819, BM014152820, HBG507221, K000700754 and MH00001812). Among these, the specimen BM014152819 (Figure 6) is well preserved, contains mature leaves and well-developed inflorescences and also depicts the taxon as recognized today, and is therefore chosen here as the lectotype.

Two months later, Beddome (March 1874) described *Balanocarpus utilis* based on the same specimens from Tirunelveli hills, on which Dyer (January 1874) described *Hopea longifolia*. Here, I select the specimen BM014152819, as the lectotype for the name *Balanocarpus utilis* Bedd., which is also the lectotype of the name *Hopea longifolia* Dyer.

In the protologue of *Dioticarpus barryi*, Dunn (1920) cited type information as “SOUTH INDIA. Madras Presidency: in evergreen forest near the Kuduvarai river, 300 m., a solitary tree, Barry; abundant on the Tinnevely Hills, Beddome 27; Kannikatti to Karyar, Tinnevely, Barber 3163; Tinnevely, Hayne 213B”. Pertaining to this specification, three specimens were traced, one at K (K000700753) and two at MH (MH00001813 and MH00001814). The best one K000700753 (Figure 7), is designated here as the lectotype.

CHECKLIST OF INDIAN HOPEA

1. *Hopea canarensis* Hole, Indian Forester 44: 575. 1918.

Distribution: India, Western Ghats (Karnataka), endemic.

2. *Hopea erosa* (Bedd.) Slooten, Reinwardtia 3: 318. 1956.

Balanocarpus erosus Bedd., Fl. Sylv. S. India [Forester's Man. Bot.] ccxxxvi, t. 329. 1874 (March 1874).

Distribution: India, Western Ghats (Kerala and Tamil Nadu), endemic.

3. *Hopea glabra* Wight & Arn., Prodr. Fl. Ind. Orient. 1: 85. 1834.

Hopea wightiana Wall. ex Wight & Arn. var. *glabra* (Wight & Arn.) Bedd., Fl. Sylv. S. India [Forester's Man. Bot.] xcvi. 1872 (March 1872).

Distribution: India, Western Ghats (Karnataka, Kerala and Tamil Nadu), endemic.

4. *Hopea helferi* (Dyer) Brandis, J. Linn. Soc., Bot. 31: 62. 1895.

Vatica helferi Dyer, Fl. Brit. India [J. D. Hooker] 1: 302. 1874.

Shorea helferi (Dyer) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 43: 100. 1874.

Distribution: Cambodia, India (Andaman & Nicobar Islands, Assam, Manipur, Meghalaya, Mizoram, and Nagaland), Laos, Malaysia, Myanmar, and Thailand.

5. *Hopea indica* (Raf.) R.Kr.Singh

Neisandra indica Raf., Sylva Tellur. 163. 1838.

Hopea decandra Buch.-Ham. ex Wight in Ill. Ind. Bot. 1: 88. 1840, *nom. inval. et nud.*

Hopea parviflora Bedd., Rep. Conservator Forests 1863-1864: 31, unnumbered plate. 1864; Fl. Sylv. S. India t. 7. 1869 (April 1869).

Distribution: India, Western Ghats (Karnataka, Kerala and Tamil Nadu), endemic.

6. *Hopea jacobi* C.E.C.Fisch., Bull. Misc. Inform. Kew 1932: 245. 1932.

Distribution: India, Western Ghats (Karnataka and Kerala), endemic.

7. *Hopea longifolia* Dyer, Fl. Brit. India [J. D. Hooker] 1: 309. 1874 (January 1874).

Balanocarpus utilis Bedd., Fl. Sylv. S. India [Forester's Man. Bot.] ccxxxvii, t. 330. 1874 (March 1874).

Hopea utilis (Bedd.) Bole, Kew Bull. 6: 146. 1951, *nom. superfl.*

Dioticarpus barryi Dunn, Bull. Misc. Inform. Kew 1920: 337. 1920.

Distribution: India Western Ghats (Kerala and Tamil Nadu), endemic.

8. *Hopea modesta* (A.DC.) Kosterm., Ceylon J. Sci., Biol. Sci. 15: 47. 1982.

Hopea jucunda Thwaites var. *modesta* A.DC., Prodr. [A. P. de Candolle] 16: 633. 1868.

Distribution: India (Tamil Nadu) and Sri Lanka.

9. *Hopea oblongifolia* Dyer, Fl. Brit. India [J. D. Hooker] 1: 309. 1874.

Distribution: India (Assam, Manipur, Meghalaya, Mizoram and Nagaland), Myanmar and Thailand.

10. *Hopea odorata* Roxb., Pl. Coromandel 3: 7, t. 210. 1811.

Hopea odorata Roxb. var. *vasta* Wall. ex A.DC., Prodr. [A. P. de Candolle] 16: 633. 1868.

Distribution: Bangladesh, Cambodia, India (Andaman & Nicobar Islands), Laos, Malaysia, Myanmar, Thailand and Vietnam.

11. *Hopea ponga* (Dennst.) Mabb., Taxon 28: 587. 1979. var. *ponga*.

Artocarpus ponga Dennst., Schlüssel Hortus Malab. 30. 1818.

Hopea wightiana Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 1: 85. 1834.

Artocarpus canaranus Miq., Nieuwe Verh. Eerste Kl. Kon. Ned. Inst. Wetensch. Amsterdam, ser. 3, 5: 20. 1852.



Figure 1: Lectotype of *Neisandra indica* Raf. (BM014141847, © The Natural History Museum, London)



Figure 2: Isolectotype of *Neisandra indica* Raf. (BM014141850, © The Natural History Museum, London)



Figure 3: Back side of the lectotype herbarium sheet of *Neisandra indica* Raf. (BM014141847, © The Natural History Museum, London)

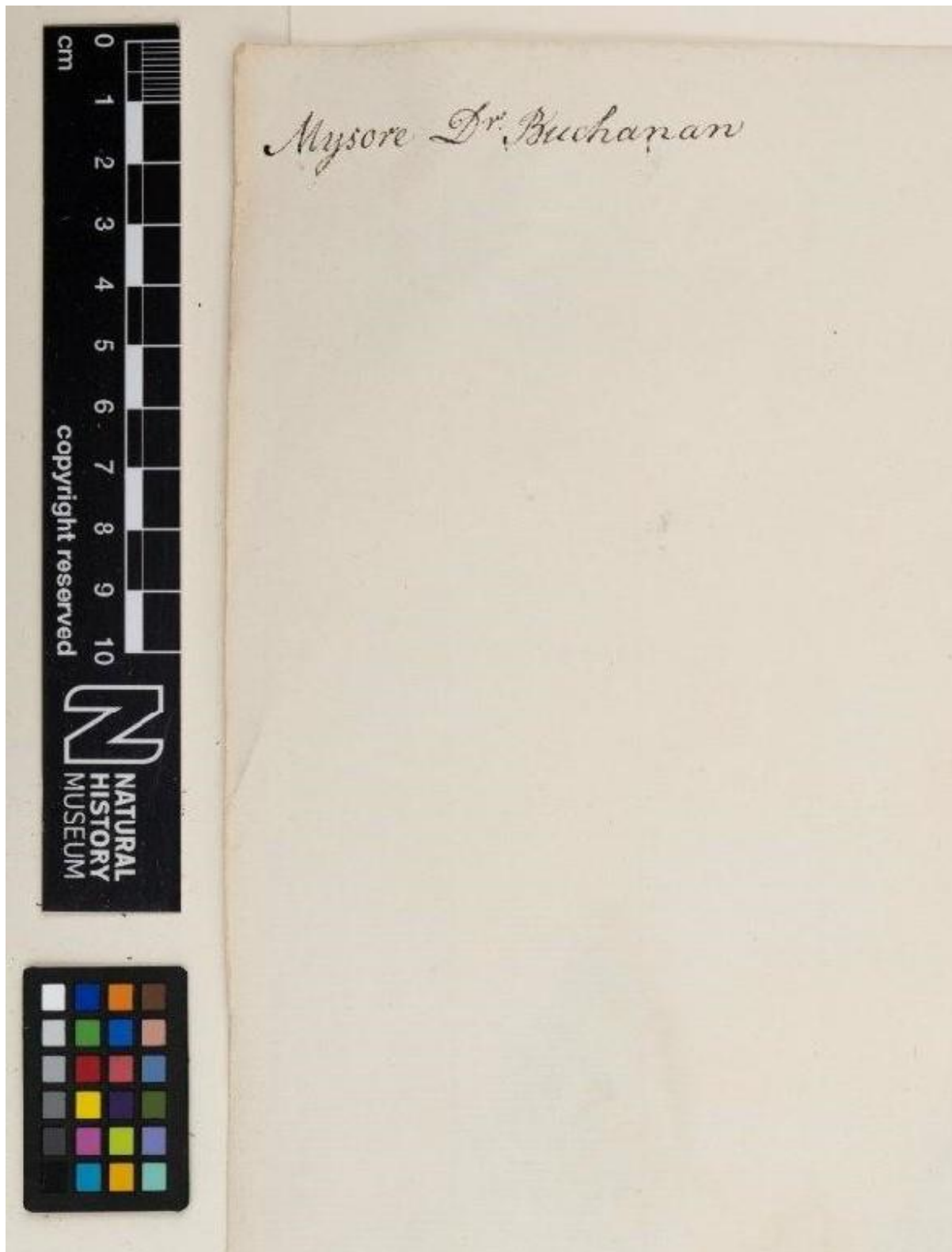


Figure 4: Back side of the isoelectotype herbarium sheet of *Neisandra indica* Raf. (BM014141850, © The Natural History Museum, London)



Figure 5: Lectotype of *Hopea parviflora* Bedd. (K000700760, © The Trustees of the Royal Botanic Gardens, Kew)



Figure 6: Lectotype of *Hopea longifolia* Dyer (BM014152819, © The Natural History Museum, London)



Figure 7: Lectotype of *Dioticarpus barryi* Dunn (K000700753, © The Trustees of the Royal Botanic Gardens, Kew)

Distribution: India, Western Ghats (Goa, Karnataka, Kerala, Maharashtra, and Tamil Nadu), endemic.

12. *Hopea ponga* (Dennst.) Mabb. var. *cauveriana* Kesh.Murthy & Yogan., Curr. Sci. 56: 544. 1987.

Distribution: India, Western Ghats (Karnataka), endemic.

13. *Hopea racophloea* Dyer, Fl. Brit. India [J. D. Hooker] 1: 310. 1874 (January 1874).

Hopea malabarica Bedd., Icon. Pl. Ind. Or. 42, t. 185. 1874 (March 1874).

Distribution: India, Western Ghats (Karnataka, Kerala and Tamil Nadu), endemic.

14. *Hopea sasidharanii* Robi & Sujanalpal, Phytotaxa 429: 167. 2020.

Distribution: India, Western Ghats (Kerala), endemic.

15. *Hopea shingkeng* (Dunn) Bor, Indian Forest Rec., Bot. 2: 227. 1941.

Vatica shingkeng Dunn, Bull. Misc. Inform. Kew 1920(3): 108. 1920.

Distribution: India (Arunachal Pradesh), endemic and extinct.

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