International Journal of Advanced Research in Botany
Volume 3, Issue 3 2017, PP 34-39
ISSN No. (Online) 2455-4316
DOI: http://dx.doi.org/10.20431/2455-4316.0303005
www.arcjournals.org

Missing Holotypes of Names in Plants, Fungi and Algae Published From India

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Abstract: *A list of names of 54 taxa has been provided whose holotypes could not be located in the herbaria of Botanical Survey of India.*

Keywords: *Botanical Survey of India, Herbaria, Holotype deposition, Verification*

1. INTRODUCTION

Protologues and type materials provide crucial data in establishing the identity of a given species. In protologues, everything associated with a name including the citing of holotype is given by the author and the name (as a correct name or as a synonym) gets permanently attached with the designated type. The holotype has a central role in fixing the application of the name concerned. The authors examined names of new taxa published from India in four Indian journals, 'Bulletin of the Botanical Survey of India', 'Indian Journal of Forestry', 'Indian Forestor' and 'Journal of Economic and Taxonomic Botany) for the period between 1990 and 2004. The analysis revealed that names of 54 taxa in actuality with no holotypes traceable in the herbaria cited in the protologues. The examined names along with the cited location of the type (which could not be traced) are presented here alphabetically.

1. *Adinandra collettiana* T.K.Paul, Bull. Bot. Surv. India 35(1–4): 126. 1997 (1993 publ. 1997). (Theaceae)

Type: Myanmar, Tenasserim, Jaepo, 5000′ (1520 m), 17.4.1877, *George Gallatly* 829A (holotype CAL).

2. *Amomum deorianum* D.P.Dam & N.Dam, Bull. Bot. Surv. India 34(1–4): 212. 1997 (1992 publ. 1997). (Zingiberaceae)

Type: India, Meghalaya, Jaintia hills, East of Dawki, 22.4.1972, *N.C. Deori* 51696 (holotype CAL).

3. *Antidesma jayasuriyae* Chakrab. & M.Gangop., J. Econ. Taxon. Bot. 24(1): 21. 2000. (Euphorbiaceae)

Type: Sri Lanka, Ratnapura district, Suriyakanda (Kabaragala no. 1), 16 March 1985, *Jayasuriya & Balasubramaniyam* 3256 (holotype CAL).

4. *Antidesma keralense* Chakrab. & M.Gangop., J. Econ. Taxon. Bot. 24(1): 23. 2000. (Euphorbiaceae)

Type: India, Kerala, Thiruvananthapuram district, way to Chemungi, 19 May 1979, *M. Mohanan* 61834 (holotype CAL).

5. *Armatella balakrishnanii* Hosag., J. Econ. Taxon. Bot. 15(1): 196. 1991. (Meliolaceae)

Type: India, Kerala, Idukki, along the road from Painavu to Kulamavu, in the forest, on the leaves of *Cinnamomum malabatrum* (Burm.f.) Blume, 18 April 1982, *V.B. Hosagoudar* 72696 (holotype MH).

6. *Armatella cryptocaryae* Hosag., J. Econ. Taxon. Bot. 15(1): 198. 1991. (Meliolaceae)

Type: India, Kerala, Pamba, on the leaves of *Cryptocarya bourdillonii* Gamble, 10 Oct. 1983, *V.B. Hosagoudar* 78917 (holotype MH).

7. *Armatella indica* Hosag., J. Econ. Taxon. Bot. 15(1): 199. 1991. (Meliolaceae)

Type: India, Kerala, Idukki, Calvary mount, on the leaves of *Cinnamomum malabatrum* (Burm.f.) Blume, 5 Oct. 1983, *V.B. Hosagoudar* 78160 (holotype MH).

8. *Armatella phoebecola* Hosag., J. Econ. Taxon. Bot. 15(1): 201. 1991. (Meliolaceae)

Type: India, Kerala, Idukki, Meenumkutty, on the leaves of *Phoebe lanceolata* Nees, 12 Dec. 1982, *V.B. Hosagoudar* 73698 (holotype MH).

9. *Astragalus drasianus* H.J.Chowdhery, Uniyal & Balodi, Bull. Bot. Surv. India 34(1–4): 209. 1997 (1992 publ. 1997). (Leguminosae)

Type: India, Jammu and Kashmir, Ladakh district, ad locum Dras, August 1988, *H.J. Chowdhery & B.P. Uniyal* 85804A (holotype CAL).

10. *Baccaurea airyshawii* Chakrab. & M.Gangop., J. Econ. Taxon. Bot. 18(2): 419. 1994. (Euphorbiaceae)

Type: Malay Peninsula, Perak, Larut, Sept. 1882, *Kunstler* 1408 (holotype CAL).

11. *Baccaurea bhaswatii* Chakrab. & M.Gangop., J. Econ. Taxon. Bot. 18(2): 420. 1994. (Euphorbiaceae)

Type: Sumatra, Lampongs, 30 Aug. 1880, *Forbes* 1653, acc. no. 407625 (holotype CAL).

12. *Bambusa assamica* Barooah & Borthakur, Indian J. Forest. 24(4): 503. 2002 (2001 publ. 2002). (Poaceae)

Type: India, Assam, Morigaon, Amsoi, 8th February 1997, *C. Barooah* 2520 (holotype ASSAM).

13. *Bambusa barpatharica* Borthakur & Barooah, Indian J. Forest. 24(4): 505. 2002 (2001 publ. 2002). (Poaceae)

Type: India, Assam, Lakhimpur, Barpathar No. 1, 18th August 1996, *C. Barooah* 2508A (holotype ASSAM).

14. *Bambusa garuchokua* Barooah & Borthakur, Indian J. Forest. 24(4): 506. 2002 (2001 publ. 2002). (Poaceae)

Type: India, Assam, Lakhimpur, Barpathar No. 1, 7th July 1996, *C. Barooah* 2505 (holotype ASSAM).

15. *Bambusa rangaensis* Borthakur & Barooah, Indian J. Forest. 24(4): 508. 2002 (2001 publ. 2002) (Poaceae)

Type: India, Assam, Lakimpur, Ranga R.F., 18th August 1996, *C. Barooah* 2512A (holotype ASSAM).

16. *Biophytum congestiflorum* Govind., J. Econ. Taxon. Bot. 20(2): 311. 1996. (Oxalidaceae)

Type: India, South India, W. Ghats, Kerala, Peermede, Azhudha, *E. Govindarajalu* 5597 (holotype CAL).

17. *Biophytum longipedunculatum* Govind., J. Econ. Taxon. Bot. 20(2): 312. 1996. (Oxalidaceae)

Type: India, Kerala, Chalakudi Division, Anakayam, *E. Govindarajalu* 2955 (holotype CAL).

18. *Calamus lacciferus* Lakshmana & Renuka, J. Econ. Taxon. Bot. 14(3): 707. 1990. (Arecaceae)

Type: India, Karnataka, evergreen forests, 950 m, 18 May 1988, *C. Renuka* 4078 (holotype CAL).

19. *Calamus lakshmanae* Renuka, J. Econ. Taxon. Bot. 14(3): 703. 1990. (Arecaceae)

Type: India, Karnataka, evergreen forests, 85 m, 14 March 1989, *C. Renuka* 4086 (holotype CAL).

20. *Calamus prasinus* Lakshmana & Renuka, J. Econ. Taxon. Bot. 14(3): 705. 1990. (Arecaceae)

Type: India, Karnataka, cane plantation, 35 m, 20 May 1988, *C. Renuka* 4082 (holotype CAL).

21. *Calamus stoloniferus* Renuka, J. Econ. Taxon. Bot. 14(3): 701. 1990. (Arecaceae)

Type: India, Karnataka, cane plantation, 85 m, 14 March 1989, *C. Renuka* 485 (holotype CAL).

22. *Calanthe anjanae* Lucksom, Indian J. Forest. 16(4): 386. 1994 (1993 publ. 1994) *'anjanii'*. (Orchidaceae)

Type: India, Sikkim, Fimphu, 8th April 1990 and 20th April 1992, *Lucksom* 206a (holotype CAL).

23. *Carex thanikaimoniana* Govind., J. Econ. Taxon. Bot. 20(2): 305. 1996. (Cyperaceae)

Type: India, Tamil Nadu, Madurai district, Kodaikanal, *Thanikaimoni* 7082 (holotype CAL).

24. *Cinnamomum assamicum* S.C.Nath & Baruah, J. Econ. Taxon. Bot. 25(1): 29. 2001. (Lauraceae)

Type: India, Assaam, Jorhat district, Puranimati, 86 m, *S.C. Nath & A. Baruah* RRLJ 1861 (holotype CAL).

25. *Croton bhasanthiae* T.K.Paul, J. Econ. Taxon. Bot. 25(3): 594. 2002 (2001 publ. 2002). (Euphorbiaceae)

Type: India, West Bengal, Kalijhora, near Teesta river bank, *ca.* 304 m, 7.9.1999, *T.K. Paul* 26840A (holotype CAL).

26. *Ecbolium ligustrinum* (Vahl) Vollesen var. *aryankavensis* Remadevi & Binojk., J. Econ. Taxon. Bot. 27(Suppl.): 1189. 2003. (Acanthaceae)

Type: India, Kerala, Quilon district, Aryankavu, 22.9.2001, *S. Remadevi* 325 (holotype MH).

27. *Euphorbia katrajensis* Gage var. *kasaragodensis* V.J.Nair, Binojk. & R.Ansari, J. Econ. Taxon. Bot. 14(2): 471. 1990 (Euphorbiaceae)

Type: India, Kerala, Cannanore district, Bela, 1.10.1982, *R. Ansari* 74431 (holotype CAL).

28. *Fimbristylis cuneata* Govind. & S.K.Varma, J. Econ. Taxon. Bot. 21(2): 377. 1997. (Cyperaceae)

Type: India, Bihar, Sahibganj, Rajmahal Hills, Mirzachowki Rly. Station, *Singh* 5764 (holotype MH).

29. *Fimbristylis diglumoides* Govind. & S.K.Varma, J. Econ. Taxon. Bot. 21(2): 377. 1997. (Cyperaceae)

Type: India, Bihar, Dumka, 25 km northeast of Antall village, *Das* 3542 (holotype CAL).

30. *Fimbristylis hyalina* Govind. & Sasidh., J. Econ. Taxon. Bot. 21(2): 373. 1997. (Cyperaceae)

Type: India, Kerala, Thrissur, Charpa range, Athirapalli, *Sasidharan* 676 Hb. FRLHT, Bangalore (holotype MH).

31. *Fimbristylis perspicua* Govind. & Sasidh., J. Econ. Taxon. Bot. 21(2): 376. 1997. (Cyperaceae)

Type: India, Kerala, Thrissur, Peechi, *N. Sasidharan* 719 (holotype MH).

32. *Gymnostachyum sahyadricum* C.N.Mohanan, Remadevi & Binojk., J. Econ. Taxon. Bot. 26(1): 38. 2002. (Acanthaceae)

Type: India, Kerala, Quilon district, Chokkampatty Hills, 23.3.1990, *C.N. Mohanan* 73469 (holotype MH).

33. *Hedychium satyanarayanum* Sush.C.Srivast., Indian J. Forest. 22(1): 85. 1999. (Zingiberaceae)

Type: India, Meghalaya, Shillong, Old Barapani road, September 11th 1970, *A.S. Rao* 38640 (holotype ASSAM).

34. *Helminthostachys zeylanica* (L.) Hook. var. *brachyspicae* S.Nampy & Madhus., J. Econ. Taxon. Bot. 18(1): 189. 1994. (Ophioglossaceae)

Type: India, Kerala, Malappuram district, Prakadavu, in open-waste lands, sea level, *Santhosh Nampy & A.K. Pradeep* CU 44832 (holotype CAL).

35. *Hybanthus vatsavayae* C.S.Reddy, J. Econ. Taxon. Bot. 25(1): 219. 2001. (Violaceae)

Type: India, Andhra Pradesh, Nalgonda district, Yadagirigutta, 18.10.1998, *C.S. Reddy* 1268 (holotype MH).

36. *Hygrophila salicifolia* (Vahl) Nees var. *cochinensis* Remadevi & Binojk., J. Econ. Taxon. Bot. 25(1): 233. 2001. (Acanthaceae)

Type: India, Kerala, Alleppey district, Arror, *S. Remadevi* 65 (holotype MH).

37. *Kopsia majumdarii* M.Gangop. & Chakrab., J. Econ. Taxon. Bot. 16(1): 59. 1992. (Apocynaceae)

Type: Malaya, Perak, open jungle, 300–600 ft, Aug. 1885, *King's Collector* 7937 (holotype CAL).

38. *Kyllinga eglandulosa* Govind. & K.Ramani, J. Econ. Taxon. Bot. 18(2): 335. 1994. (Cyperaceae)

Type: India, Karnataka, Bababudan hills, *E. Govindarajalu* 8726 (holotype CAL).

39. *Kyllinga pluristaminea* Govind. & K.Ramani, J. Econ. Taxon. Bot. 18(2): 336. 1994. (Cyperaceae)

Type: India, Tamil Nadu, Madurai district, High Wavy Mts., Thuvanam, *E. Govindarajalu* C 239 (holotype CAL).

40. *Liparis breviscapa* A.P.Das & Lama, J. Econ. Taxon. Bot. 16(1): 226. 1992. (Orchidaceae)

Type: India, West Bengal, Birch hill, Darjeeling, 2000 m, 4 August 1981, *A.P. Das* 603 (holotype CAL).

41. *Millettia pseudoracemosa* Thoth. & S.Ravik., J. Econ. Taxon. Bot. 21(1): 239. 1997, *'pseudo-racemosa'*. (Leguminosae)

Type: India, Tamil Nadu, Anamalai Hills, Valparai, 350 m, 21.4.1995, *S. Ravikumar* 334A (holotype MH).

42. *Petalonema striato-theca* R.K.Gupta, Indian J. Forest. 24(4): 500. 2001. (Scytonemataceae)

Type: India, Uttaranchal, Dehra Dun, 2298 m, 2.12.2000, *R.K. Gupta* 97904 (BSD: Cryptogamic Section, preserved in formalin solution).

43. *Protasparagus biradarii* Kamble, J. Econ. Taxon. Bot. 17(1): 197. 1993, *'biradari'*. (Asparagaceae)

Type: India, Orissa, Mayurbhanj district, Dharamchampa, May 1941, *Dr. Biswas's collector R.K. Kazi* 88 (holotype CAL).

44. *Protasparagus karthikeyanii* Kamble, J. Econ. Taxon. Bot. 19(3): 735. 1996 (1995 publ. 1996). (Asparagaceae)

Type: India, Maharashtra, Pune district, Madh in Junnar Taluka, June 1956, *J.A. Vasavada* 17049 (F. No. 2736) (holotype BSI).

45. *Pycreus fasciculatus* Govind., J. Econ. Taxon. Bot. 20(2): 301. 1996. (Cyperaceae)

Type: India, Kerala, Munar, Idimottai, *E. Govindarajalu* 15427 (holotype CAL).

46. *Pycreus mahadevanii* Govind., J. Econ. Taxon. Bot. 20(2): 299. 1996. (Cyperaceae)

Type: India, Karnataka, Shimoga, Barkana, *E. Govindarajalu* 5118 (holotype CAL).

47. *Pycreus pyramidalis* Govind., J. Econ. Taxon. Bot. 20(2): 301. 1996. (Cyperaceae)

Type: India, Tamil Nadu, Tirunelveli district, Courtallam, Shembagadevi-Honey Falls, *E. Govindarajalu* 10404 (holotype CAL).

48. *Rhynchostylis albiflora* I.Barua & Bora, J. Econ. Taxon. Bot. 26(1): 251. 2002. (Orchidaceae)

Type: India, Assam, Jorhat (26°47' N and 94°12' E), Karanga, 86.8 m above MSL, 28.4.1994, *Barua* 3286 (holotype CAL).

49. *Ruellia sivarajanii* Sreedevi, Remadevi & Binojk., J. Econ. Taxon. Bot. 27(Suppl.): 1186. 2003. (Acanthaceae)

Type: India, Kerala, Alappuzha, 15.12.2000, *B. Sreedevi* 168 (holotype CAL).

50. *Sansevieria maduraiensis* Binojk., J. Econ. Taxon. Bot. 26(2): 458. 2002. (Dracaenaceae)

Type: India, Tamil Nadu, Madurai, 25.6.1993, *Binojkumar s.n.* (holotype CAL).

51. *Sonerila inaequalis* Murugan & Manickam, J. Econ. Taxon. Bot. 25(3): 510. 2002 (2001 publ. 2002). (Melastomataceae)

Type: India, Tamil Nadu, Tirunelveli district, Courtallum hills, 1500–1700 m, 15.2.2000, *C. Murugan* XCH 18228 (holotype MH).

52. *Trichodesma indicum* (L.) Sm. var. *betulense* K.K.Khanna & An.Kumar, Indian J. Forest. 24(2): 226. 2001. (Boraginaceae)

Type: India, Madhya Pradesh, Betul district, Ranipur, 21.4.1997, *Anand Kumar* 50178A (holotype CAL).

53. *Trigonella emodi* Benth. var. *oblongifolia* Balodi & R.R.Rao, J. Econ. Taxon. Bot. 15(1): 188. 1991. (Fabaceae)

Type: India, Uttar Pradesh, Garhwal, near Ghorpatta, 2800 m, 23.8.1963, *U.C. Bhattacharyya* 29675A (holotype CAL).

54. *Zeuxine dhanikariana* Maina, Lalitha & Sreek., J. Econ. Taxon. Bot. 25(1): 21. 2001. (Orchidaceae)

Type: India, Andaman and Nicobar Islnds, South Andaman, near Dhanikari, Goal Tikkiri, 10.4.1997, *Maina & Sreekumar* 18433A (holotype CAL).

2. Conclusion

Essentially application of names of taxonomic groups is determined by means of nomenclatural types (Principle II of ICN, McNeill *et al.*, 2012). The requirements for publication of names of new taxa are detailed in Articles 38–40 (McNeill *et al.*, 2012). During the present analysis 34 holotypes at CAL, 13 at MH, five at ASSAM, one each at BSI and BSD could not be traced in the respective herbarium. In two of our earlier publications (Bandyopadhyay *et al*., 2016, 2017) as well we have clearly indicated the missing of different types of many names that were published in two different journals, Rheedea (1991–2004) and Nordic Journal of Botany (1990–2004). Many fail to appreciate the importance of maintenance of types which help in resolving nomenclatural confusions that crop up in revisionary studies. The onus of depositing types goes with the author(s) while the maintenance responsibility goes with the herbarium concerned. Lapse either in deposition or maintenance leads to non-availability of these specimens to bonafide researchers. Looking at the number of misplaced holotypes, it is necessary that we ensure the holotype deposition in a herbarium and its easy access to bonafide researchers prior to publication of new species. Herbaria which accept such depositions should ensure their scrupulous conservation.

During the 19th International Botanical Congress held at Shenzhen, China in July, 2017, the concept of registration of names of algae, bryophytes and vascular plants has been accepted, but it would come into effect after the 20th International Botanical Congress to be held at Rio de Janeiro, Brazil in 2023. It is beleieved that the problem of non-deposition of type specimens can be fully overcome when only the registration of names becomes mandatory.

Acknowledgements

We thank Dr. Paramjit Singh, Director, Botanical Survey of India (BSI), for approving this study as project work. We also thank Dr. S.K. Srivastava (Rtd.) (NRC, Dehra Dun); Dr. G.V.S. Murthy (Rtd.) and Dr. J.V. Sudhakar (SRC, Coimbatore); Dr. B.K. Sinha (ERC, Shillong); Dr. C. Murugan (ANRC, Port Blair) and Dr. J. Jayanthi (WRC, Pune), for facilitating the information on the type specimens in their respective herbarium. Dr. W. Arisdason (BSI) helped to improve the manuscript.

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Citation: *S. Bandyopadhyay et al. , "Missing Holotypes of Names in Plants, Fungi and Algae Published From India", International Journal of Advanced Research in Botany, vol. 3, no. 3, p. 34-39, 2017. http://dx.doi.org/10.20431/2455-4316.0303005*