

RESEARCH ARTICLE

Cryptogamic Type Specimens of CAL: A Comprehensive Catalogue

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ABSTRACT:

The present study provides detailed documentation and an updated inventory of cryptogamic type specimens (excluding Fungi) available in the Central National Herbarium (CAL), Botanical Survey of India, Howrah, West Bengal, India. As one of the oldest and most significant botanical repositories in South Asia, CAL houses a substantial collection of non-flowering plant specimens that serve as critical nomenclatural references for Paleotropical and Oriental floristics. Our survey identified a total of 453 cryptogamic type specimens, comprising Algae (20), Bryophytes (66), Lichens (9), and Pteridophytes (358). Each entry was cross-referenced with protologues and original labels to verify its current nomenclatural status and typification category (e.g., holotype, paratype, isotype, or syntype). The collection includes historically significant materials from the 19th and 20th centuries, reflecting the intensive botanical explorations across Paleotropical and global regions. This cataloging effort aims to enhance the accessibility of these specimens for global taxonomic research and to provide a database for future revisionary studies and digitization initiatives. The data presented here underscore the pivotal role of the CAL herbarium in preserving the region's botanical heritage.

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INTRODUCTION

The Central National Herbarium (CAL), located in the AJCB Indian Botanic Garden, is one of India's oldest and most significant herbaria. Established in 1795, it is administered by the Botanical Survey of India (BSI) under the Ministry of Environment, Forest and Climate Change. CAL functions as the national repository for preserved plant specimens and plays a crucial role in taxonomic research and the documentation of India's botanical diversity. The herbarium houses more than 3 million specimens, both of phanerogams and cryptogams, including

numerous type specimens collected from across India and from various Paleotropical and global regions.

Type specimens are the fundamental reference points for botanical nomenclature; they are the physical records upon which the description of a new species is based. The authentication of taxa relies heavily on the accessibility of these "nomenclatural types," making their documentation a high priority for the scientific community (Haber 2012; Yang 2012; Mutanen *et al.*, 2015; Prosser *et al.*, 2016; Turland *et al.*, 2018). Given that many original

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descriptions of Indian flora were published centuries ago, the preservation and cataloging of type specimens are essential for resolving taxonomic ambiguities.

While phanerogamic (flowering plant) collections are often well-documented, the cryptogamic wealth—comprising algae, lichens, bryophytes, and pteridophytes—represents a significant yet often understudied portion of India’s biodiversity. The diversity of non-flowering plants preserved at CAL reflects the varied bioclimatic zones of the Indian subcontinent, from the Himalayan peaks to the tropical coasts. All specimens are maintained with special care and maintenance techniques for each

group of cryptogamic specimens present at CAL, and Type specimens are prioritized and kept separately in distinct boxes/Pigeons/rooms for enhanced safety and restricted access (Fig. 1-3).

It provides essential support for research in plant taxonomy, ecology, biodiversity conservation, and ethnobotany. In addition, CAL maintains a reference library and a digital herbarium database, offering an important resource for researchers, students, and environmentalists from India and abroad. The present study was undertaken to comprehensively document the Cryptogamic TYPE specimens (excluding Fungi) preserved in CAL. It is hoped that this work will serve

**Fig. 1: A. Entrance view of Cryptogamy section, Central National Herbarium (CAL)
 B. Arrangement of Pteridophyte Type specimens C. Arrangement of Bryophyte and Lichen Type specimens D. Arrangement of Algal Type specimens**



as a useful tool in the hands of all cryptogam lovers and researchers to promote understanding of plant species.

MATERIALS AND METHODS

The present study involved a comprehensive screening of the cryptogamic collections (excluding Fungi) preserved at the Central National Herbarium (CAL) to identify and document all primary and

secondary type specimens. Each identified specimen was physically verified against its original herbarium label and cross-referenced with protologues and taxonomic literature to confirm its current nomenclatural status and typification category. The specimens were then organized by major group (Algae, Bryophytes, Lichens, and Pteridophytes), with scientific names updated in accordance with the latest botanical literature. Finally, a detailed inventory was compiled,

Fig. 2: A. *Ulva chaugulei* M.G.Kavale & M.A.Kazi (Holotype & Isotype) B. *Avrainvillea visakhapatnamensis* A.S.Kumar & M. Palanisamy (Isotype) C. *Udaria lamellicaulis* D.K. Singh, S. Majumdar & D. Singh (Isotype) D. *Riccardia lachungensis* D. Singh & D.K. Singh (Holotype).



Fig 3.: A. *Buellia manipurensis* Kr.P. Singh & S.R. Singh (Holotype) B. *Heppsoia indica* D.D. Awasthi & Kr.P. Singh (Isotype) C. *Pteris dixitii* Fraser-Jenk. & Pariyar (Holotype) D. *Salvinia molesta* D.S.Mitch. (Isotype).



including current scientific names, collection data, and original citations to enhance global accessibility for taxonomic research.

RESULT & DISCUSSION

The systematic survey of the cryptogamic collections at the Central National Herbarium (CAL) identified a total of 453 type specimens distributed across four major taxonomic groups. The collection is predominantly Pteridophytes, with 358 types (approx. 79% of the total) distributed across 261 taxa in 19 families. This is followed by Bryophytes, which comprise 66 types (14.6%) distributed across 51 taxa under 7 families. Algae are represented by 20 types (4.4%),

encompassing 13 taxa across 9 families, while Lichens account for 9 types (2%), comprising 9 taxa across 7 families (Fig. 5-9). These specimens encompass a broad range of nomenclatural categories, including holotypes, isotypes, syntypes, and paratypes, primarily originating from 19th and 20th-century botanical explorations across various Palearctic and global regions. The distribution of specimens from various states in India is shown on the map (Fig. 4). While the majority of the collection originates from intensive botanical explorations of the Indian subcontinent (including Nepal, Sri Lanka, and Bhutan), the data

Fig. 4: Geographical representation of Cryptogamy Type specimens in CAL from India

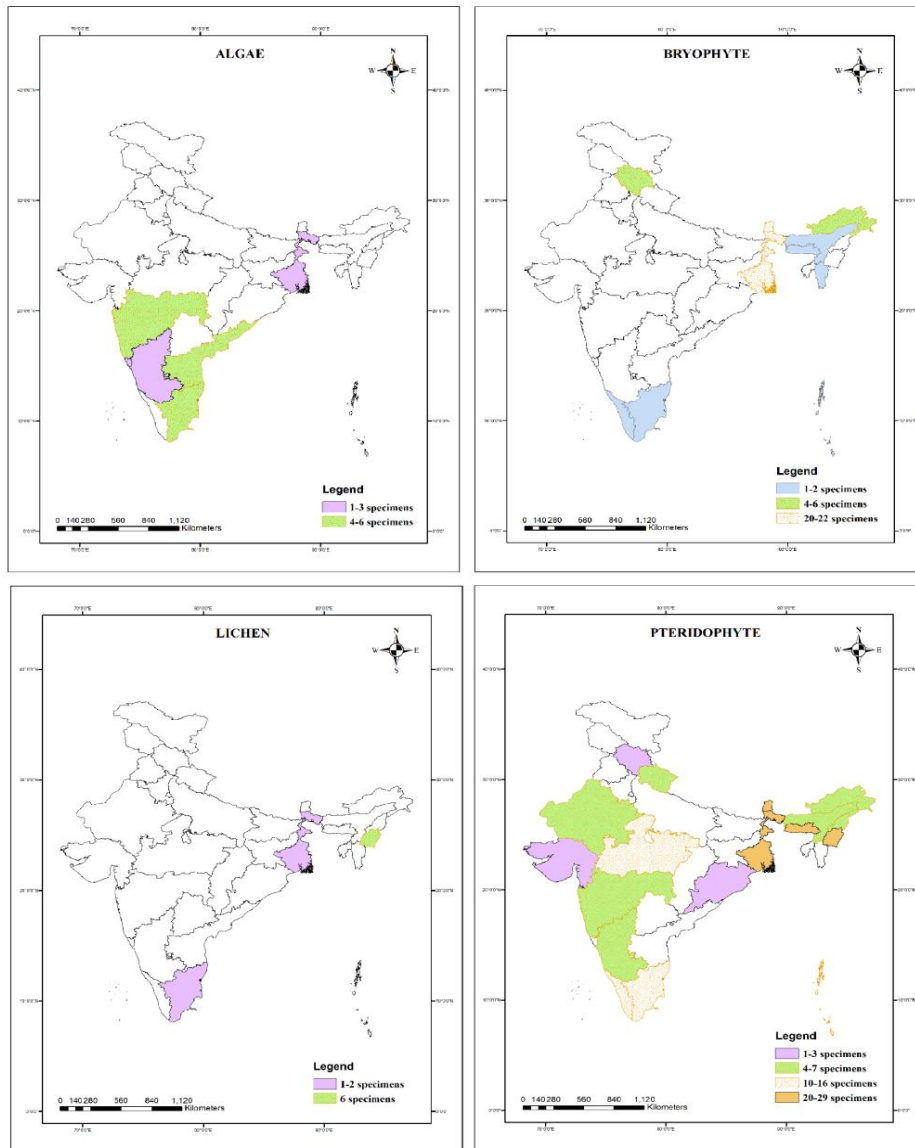
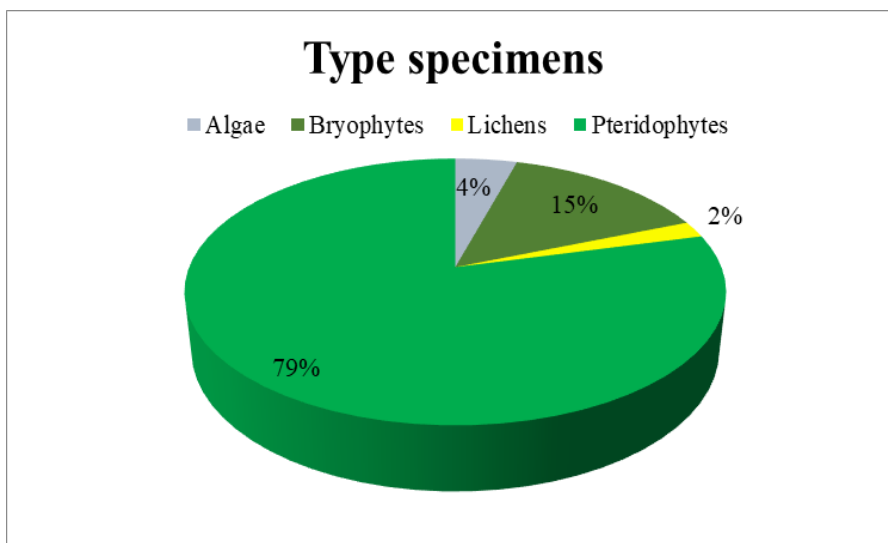


Fig. 5: Distribution of Cryptogamy Type specimens available in CAL



reveal a significant international representation. A substantial number of type specimens, particularly Pteridophytes, hail from China, followed by Southeast Asian nations such as Malaysia and the Philippines. Furthermore, the repository houses historically significant materials from diverse global regions, including Mexico, Hawaii, Fiji, and Zimbabwe (Fig. 10, 11).

The presence of specimens from such varied bioclimatic zones, ranging from the Himalayas to the Pacific Islands and African savannas, underscores the pivotal role of CAL as a premier global repository. This updated inventory provides a verified baseline for international taxonomic research and highlights the herbarium's enduring legacy in preserving the botanical heritage of both the Palearctic and global

Fig. 6: Algal Taxa Family Wise Distribution

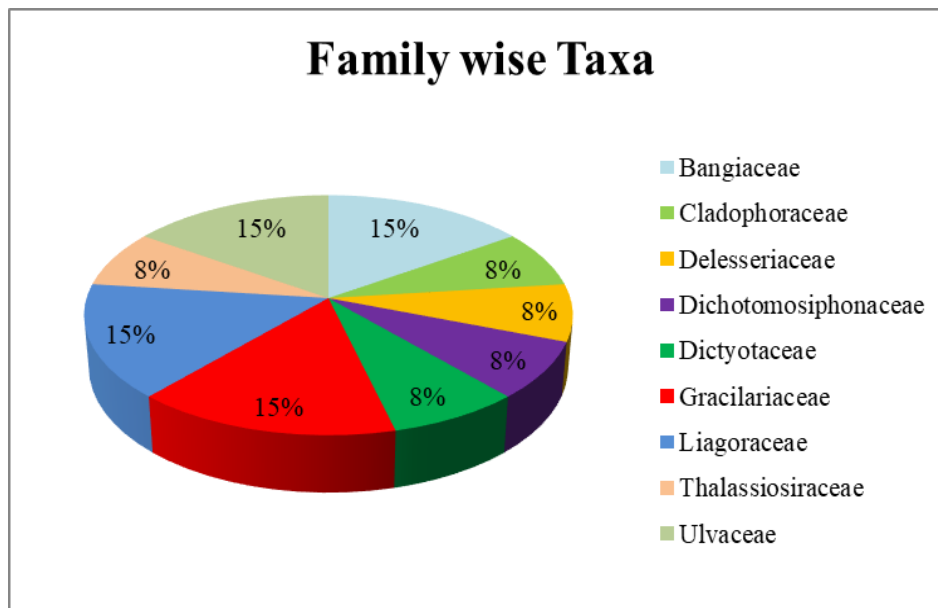


Fig. 7: Bryophyte Taxa Family Wise Distribution

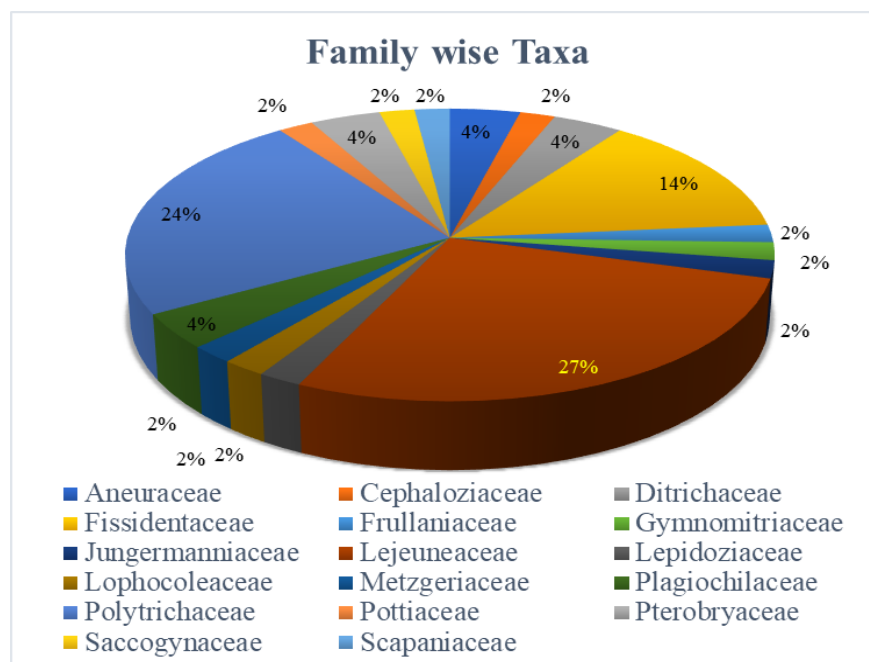


Fig. 8: Lichen Taxa Family Wise Distribution

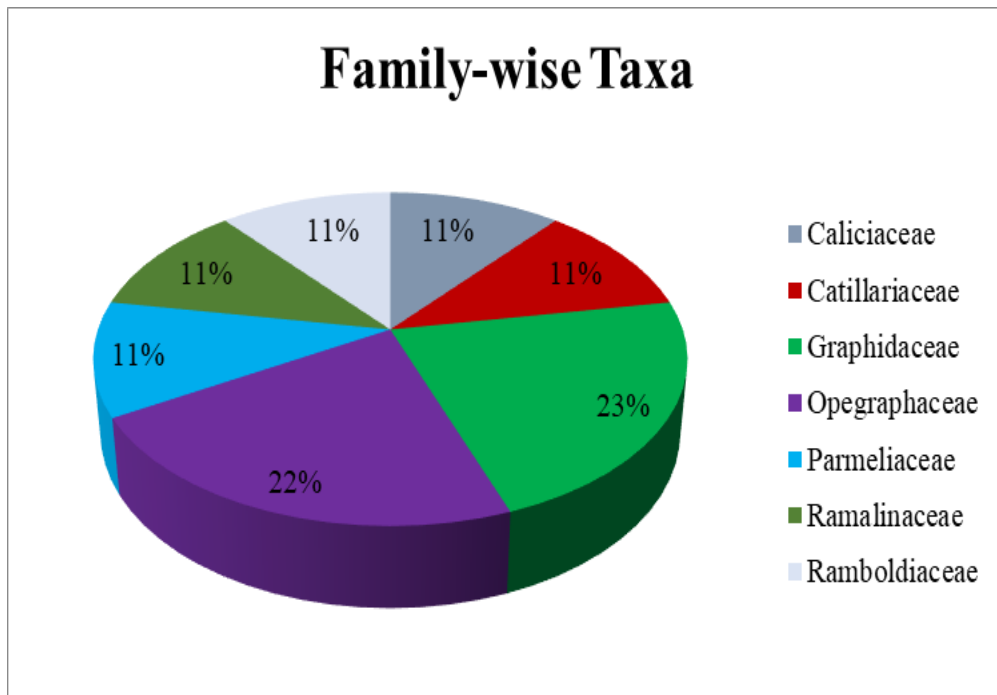


Fig. 9: Pteridophyte Taxa Family Wise Distribution

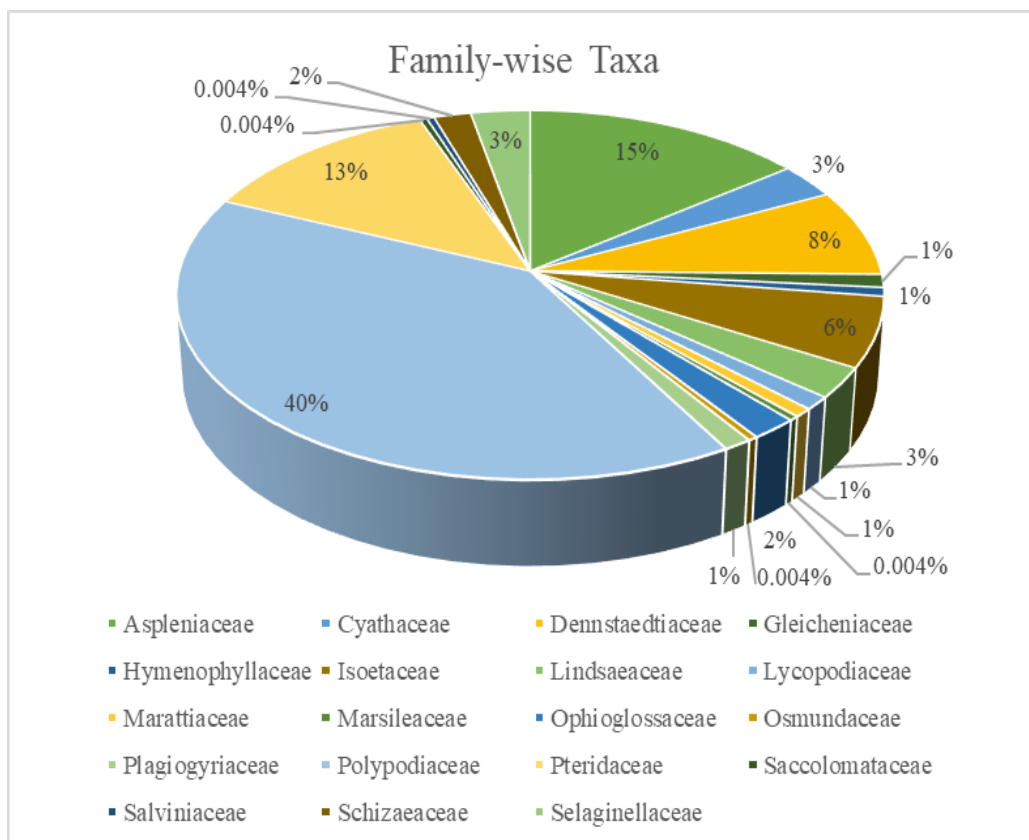


Fig. 10: Cryptogamy Type specimen representation from various states of India

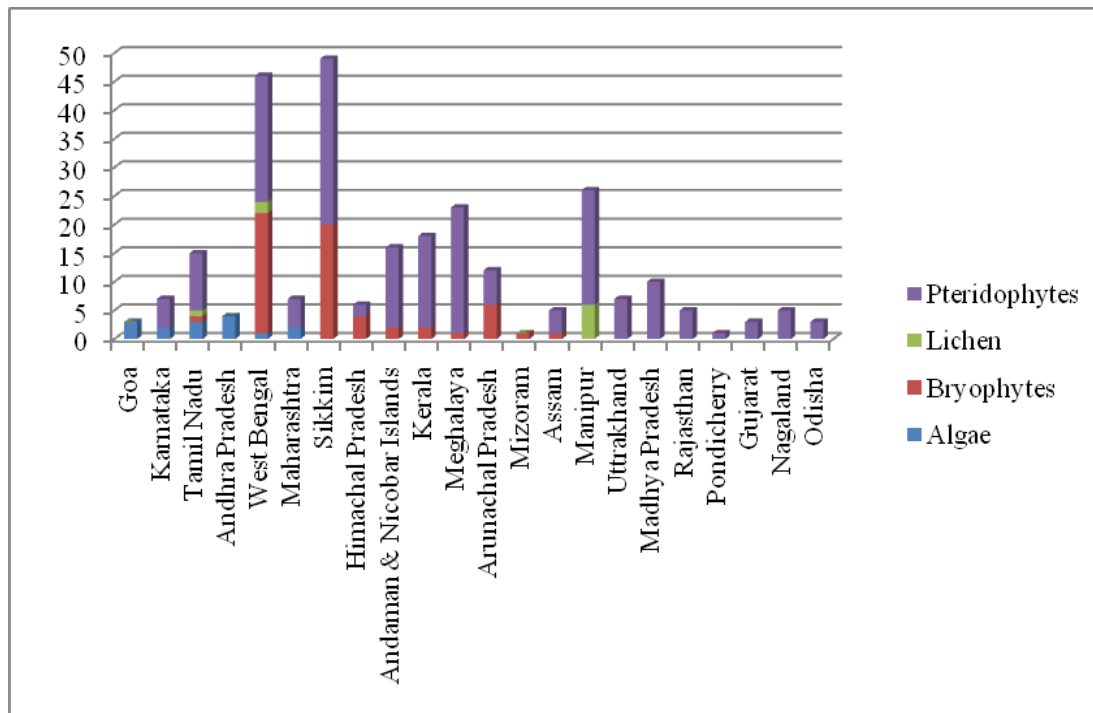
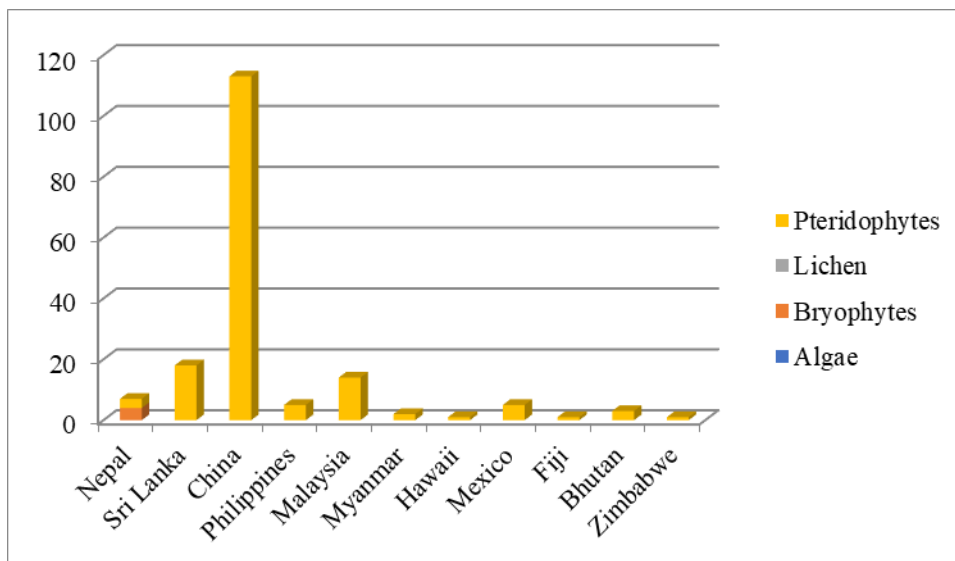


Fig. 11: Cryptogamy Type specimen representation from various Countries



floristics. Such documentation is essential for resolving taxonomic ambiguities and ensuring that these critical nomenclatural references remain accessible for modern revisionary studies and digitization initiatives.

Enumeration

ALGAE

Bangiaceae

Pyropia acanthophora var. *robusta* M.G.Kavale, M.A.Kazi & N.Sreenadhan, Indian Journal of Geo-Marine Sciences 44(6): 1-8. 2014; India, Goa, Cola,

18.08.2012, M.G. Kavale et M.A. Kazi ARC-P-126, CAL0000062761 (Holotype).

Pyropia sukshma (M.G.Kavale & M.A.Kazi) Santiañez & M.J.Wynne, Notulae Algarum 258: 1-2. 2022; India: Karnataka, Karwar, 14.08.2014, M.G. Kavale et. M.A. Kazi ARC-P-207, CAL0000062760 (Holotype).

Pyropia sukshma (M.G.Kavale & M.A.Kazi) Santiañez & M.J.Wynne, Notulae Algarum 258: 1-2. 2022; India: Karnataka, Karwar,

14.08.2014, M.G. Kavale et. M.A. Kazi ARC-P-208, CAL0000062769 (Isotype).

Cladophoraceae

Cladophora goaensis F.Bast, Indian Journal of Geo-Marine Sciences 44(12): 1874–1879. 2015, India: Goa, Vasco-Da-Gama, 15°23'32"N, 73°49'13"E, 13.09.2012, Felix Bast CUPVOUCHER-CG-2013-1, CAL0000062759 (Holotype).

Delesseriaceae

Acrosorium krishnamurthyi M.Umamaheswara Rao, Phycos 40(1/2): 1–13. 2002; India: Tamil Nadu, Kanyakumari, 18.12.1969, M. Umamaheswara Rao 336, CAL0000062756 (Holotype)

Dichotomosiphonaceae

Avrainvillea visakhapatnamensis A.S.Kumar & M. Palanisamy; Regional Studies in Marine Science 60 (2023) 102868 (Figs. 3 and 4); Doi. org/10.1016/j.rsma.2023.102868; India: Andhra Pradesh, Mangamaripeta, 17°53'34.85"N, 83°27'18.45"E, 21.03.2019, M. Palanisamy & Aron Santosh Kumar Y 140303, CAL0000230269 (Isotype)

Dictyotaceae

Lobophora variegata var. *indica* Umamaheswara Rao; In: *Taxonomy of Algae*. (Desikachary, T.V. & Raja Rao, V.N. Eds), pp. 765-773. University of Madras.1980: 772, figs. 2 H-M, pl. I [1]; India: Tamil Nadu, Mandapam, 01.02.1965, M. Umamaheswara Rao MUR 531, CAL0000062748 (Holotype).

Lobophora variegata var. *indica* Umamaheswara Rao; In: *Taxonomy of Algae*. (Desikachary, T.V. & Raja Rao, V.N. Eds), pp. 765-773. University of Madras.1980: 772, figs. 2 H-M, pl. I [1]; India: Tamil Nadu, Nallatanni Island (near Kilakarai), 12.11.1973, M. Umamaheswara Rao MUR535, CAL0000062749 (Paratype).

Gracilariaceae

Gracilariaria idinthakaraiensis Umamaheswara Rao; Seaweed Res. Utiln. 25(1&2):1-11. 2003; India: Tamil Nadu, Tirunelveli Dist., Idinthakari, 19.12.1969, M. Umamaheswara Rao 332, CAL0000062757 (Holotype)

Gracilariaria rostrata Umamaheswara Rao; Seaweed Res. Utiln. 25(1&2):1-11. 2003; India: Tamil Nadu, Gulf of Mannar, Shingle Island, 28.12.1968, M. Umamaheswara Rao 334, CAL0000062750 (Holotype)

Gracilariaria rostrata Umamaheswara Rao; Seaweed Res. Utiln. 25(1&2):1-11. 2003; India: Tamil Nadu, Shingle Island, Gulf of Mannar, 28.12.1968, M. Umamaheswara Rao 334, CAL0000062754 (Paratype)

Liagoraceae

Helminthocladia sreeramului Umamaheswara Rao; 1991: 169-173, figs. 1-18; Seaweeds of the British Isles. Volume 1. Rhodophyta. Part 1. Introduction, Nemaliales, Gigartinales. pp. [i]-xi, [1]-252, 90 figs. London: British Museum (Natural History) In Dixon, P.S. & Irvine, L.M.; India: Andhra Pradesh, Visakhapattanam, Station IV., 09.01.1975, M. Umamaheswara Rao s.n., CAL0000062758 (Holotype).

Liagora visakhapatnamensis Umamaheswara Rao; Hydrobiologia 33: 201-208. 1969; India: Andhra Pradesh, Visakhapatnam Dt., Station II, 17.01.1960, M. Umamaheswara Rao MUR 203, CAL0000062751 (Holotype).

Liagora visakhapatnamensis Umamaheswara Rao; Hydrobiologia 33: 201-208. 1969; India: Andhra Pradesh, Visakhapatnam Dt., Station II, 16.12.1960, M. Umamaheswara Rao MUR 204, CAL0000062752 (Paratype).

Thalassiosiraceae

Thalassiosira sundarbana Samanta & Bhadury, Phycological Research 63(2): 102-109. 2015; India: West Bengal, Chemaguri Creek of Sagar Island, 25.08.2014, Brajogopal Samanta s.n., CAL0000305013 (Holotype).

Ulviceae

Ulva chaugulei M.G.Kavale & M.A.Kazi, Phycologia 55(1): 45-54. 2016; India: Maharashtra, Vayangani, 06.09.2014, M.G. Kavale et M.A. Kazi ARC-U-303, CAL0000062762 (Holotype).

Ulva chaugulei M.G.Kavale & M.A.Kazi, Phycologia 55(1): 45-54. 2016; India: Maharashtra, Vayangani, 06.09.2014, M.G. Kavale et M.A. Kazi ARC-U-303, CAL0000310341 (Isotype).

Ulva chaugulei M.G.Kavale & M.A.Kazi, Phycologia 55(1): 45-54. 2016; India: Maharashtra, Vayangani, 06.09.2014, M.G. Kavale et M.A. Kazi ARC-U-303, CAL0000062767 (Isotype).

Ulva chaugulei M.G.Kavale & M.A.Kazi, Phycologia 55(1): 45-54. 2016; India:



Maharashtra, Vayangani, 06.09.2014, M.G. Kavale et M.A. Kazi ARC-U-303, CAL0000062768 (Isotype).

Ulva paschima F.Bast, PLoS ONE 9(10): e109295. 2014: 6, fig. 1 a-x; India: Goa, Anjuna, 15° 35' 00" N, 73° 44' 00" E, 13.09.2012, Felix Bast CUPVOUCHER-UP-2013-3, CAL0000029100 (Holotype).

BRYOPHYTES

Aneuraceae

Riccardia lachungensis D. Singh & D.K. Singh, Taiwania 62(1): 36, 3. 2017; India: North Sikkim, 12 km from Lachung towards Katau (ca 3118m), 14.05.2011, D. Singh 52130A, CAL0000063858 (Holotype).

Riccardia udarii D. Singh & D.K. Singh, Taiwania 62(1): 39, 4, 5. 2017; India: South Sikkim, Shimkharkha (ca 1421 m), 14.12.2013, D. Singh 60674A, CAL0000063859 (Holotype).

Cephaloziaceae

Cephalozia schusteri Sushil K. Singh & D.K. Singh, Lindbergia 32: 1. 2007; India: Himachal Pradesh, Kullu, GHNP, Sainj valley, Shanger (ca 2100 m), 19.09.2003, S.K. Singh 104343, CAL0000063852 (Holotype).

Ditrichaceae

Ditrichum apophysatum Hampe ex Gangulee, Bull. Bot. Soc. Bengal 13: 4. f. 25. 1959.; India: Sikkim Himalaya, Tongloo to Phalut, 8-9000 ft., 15.10.1868, S. Kurz 2305, CAL0000063923 (Holotype).

Ditrichum darjeelingense Ranauld & Cardot, Bull. Soc. Roy. Bot. Belgique 41(1): 51. 1905.; India: West Bengal, Darjeeling, 00.00.1901, G.A. Miller s.n., CAL0000063922 (Isotype).

Fissidentaceae

Fissidens asperisetus var. *andamanensis* Gangulee, Mosses E. India 2: 507. 1971.; India: Andaman, Diglipur, s.d., Gangulee 5453, CAL0000063992 (Holotype).

Fissidens kalimpongensis Gangulee, Bull. Bot. Soc. Bengal 11: 71. f. 10. 1957.; India: West Bengal, Kalimpong, 1350 m, 16.10.1957, H.C. Gangulee 750 (IV), CAL0000063930 (Holotype).

Fissidens lancifolius Hampe, Gen. Musc. Frond. 62. 1900.; India: West Bengal, Darjeeling, Tongloo, 8-10000 ft, 14.10.1868, S. Kurz 2302, CAL0000063928 (Holotype).

Fissidens laxitextus Broth. ex Gangulee, Nova Hedwigia 8: 144. pl. 3. 1964.; India: West Bengal, Kurseong, Sepoydura forest, 6800 ft, 20.10.1898, P. Decoly et Schaut. s.n., CAL0000063927 (Holotype).

Fissidens manilalii K.M. Manjula, Manju & K.P. Rajesh, The Bryologist 120(3): 264, 1, 2. 2017; India: Kerala, Kozhikode District, Meenchanda, 5 m, 27.07.2016, Manjula, K.M. & Chandini, V.K. 15995, CAL0000303580 (Isotype).

Fissidens sylvaticus var. *calcuttensis* Gangulee, Mosses E. India 2: 538. f. 255. 1971.; India: West Bengal, Shibpur, Botanical Garden, 11.02.1956, H.C. Gangulee 2446 (I), CAL0000063934 (Holotype).

Fissidens sylvaticus var. *calcuttensis* Gangulee, Mosses E. India 2: 538. f. 255. 1971.; India: West Bengal, Shibpur, Botanical Garden, 11.02.1956, H.C. Gangulee 2446 (I), CAL0000310430 (Isotype).

Fissidens teraicola Mull. Hal., Linnaea 37: 164. 1873.; India: West Bengal, Darjeeling, Below Gorudom, 30.09.1868, S. Kurz 1906, CAL0000310431 (Holotype).

Frullaniaceae

Frullania larjiana Sushil K. Singh & D.K. Singh, Journal of Bryology 27: 105. f. 1-31. 2005; India: Himachal Pradesh, Kullu, GHNP, Sainj valley, Larji (ca 1300 m), 07.02.2002, S.K. Singh 99501, CAL0000063865 (Holotype).

Gymnomitriaceae

Nardia grollei Váňa & D.G. Long, Nova Hedwigia 89: 491. 2009; India: West Sikkim, Jamlinghang, Chhurong Chhu valley below Dzongri, 10.07.1992, D.G. Long 22528, CAL0000303578 (Paratype).

Jungermanniaceae

Jungermannia indrodayana Sushil K. Singh & D.K. Singh, Cryptogamie, Bryologie 28: 103. 2007; India: Himachal Pradesh, Kullu, below Marhi, 31.07.2002, S.K. Singh 101223, CAL0000063850 (Holotype).

Lejeuneaceae

Cololejeunea andamanensis M. Dey & D.K. Singh; Cryptogamie, Bryologie 37(2): 150, 1-29. 2016; India: Andaman & Nicobar Islands, South Andaman, Motor Bhanji, Chidiatapu (ca 17 m); 11° 34' 269" N, 92° 40' 356" E; 04.02.2014, D.K. Singh 61611, CAL0000063870 (Holotype).

- Cololejeunea manilalii* Manju, Chandini & K.P. Rajesh, Acta Botanica Hungarica 59(1-2): 262, 1-2. 2017; India: Kerala, Malappuram District, Nilambur, New Amarambalam Reserved Forest (bordering Mukurti National Park of Tamil Nadu); 06.02.2010, K.P. Rajesh 111812A, CAL0000303577 (Isotype).
- Cololejeunea tixieriana* M. Dey, D. Singh & D.K. Singh; Taiwania 53: 258. 2008; India: West Bengal, Darjeeling District, Rangji Rum, Bhutan road (ca 1750 m), 19.12.2004, K.P. Singh 36397, CAL0000063871 (Holotype).
- Cololejeunea tixieriana* M. Dey, D. Singh & D.K. Singh; Taiwania 53: 258. 2008; India: West Bengal, Darjeeling District, Mungpoo (ca 2000 m); 19.12.2004, K.P. Singh 36391, CAL0000063872 (Paratype).
- Drepanolejeunea devendrae* Sushil K. Singh & M. Dey, Nelumbo. The Bulletin of the Botanical Survey of India 54: 20. 2012; India: Meghalaya, Ribhoi District, Umiam (ca 900 m); 07.12.2011, S.K. Singh 124302, CAL0000063873 (Holotype).
- Lejeunea liromobana* Singh Deo & D.K. Singh; Indian Journal of Forestry 39(4): 359, 1,2. 2016; India: Arunachal Pradesh, West Siang district, Liromoba, ca. 550 m, 14.09.2011, S. Singh Deo 51281, CAL0000304968 (Holotype).
- Lejeunea liromobana* Singh Deo & D.K. Singh; Indian Journal of Forestry 39(4): 359, 1,2. 2016; India: Arunachal Pradesh, West Siang district, Liromoba, ca. 550 m, 14.09.2011, S. Singh Deo 51281, CAL0000304970 (Holotype).
- Lejeunea kashyapii* M. Dey, D.K. Singh & D. Singh, Journal of Bryology 30: 126. 2008; India: East Sikkim, Pangthang (ca 1988 m), 05.03.2005, D. Singh 36482, CAL0000063874 (Holotype).
- Lejeunea kashyapii* M. Dey, D.K. Singh & D. Singh, Journal of Bryology 30: 126. 2008; India: East Sikkim, Fatak (ca 1950 m), 05.03.2005, D. Singh 36477, CAL0000063875 (Paratype).
- Lejeunea kashyapii* M. Dey, D.K. Singh & D. Singh, Journal of Bryology 30: 126. 2008; India: East Sikkim, Fatak (ca 1950 m), 05.03.2005, D. Singh 36484, CAL0000063876 (Paratype).
- Lejeunea kashyapii* M. Dey, D.K. Singh & D. Singh, Journal of Bryology 30: 126. 2008; India: East Sikkim, Pangthang (ca 1988 m), 18.09.2007, D. Singh 40964, CAL0000063877 (Paratype).
- Lejeunea mehrana* M. Dey, D.K. Singh & D. Singh; India: East Sikkim, Rate Chhu (ca 1788 m), 21.02.2006, D. Singh 36891, CAL0000063878 (Holotype).
- Lejeunea punctiformis* Taylor; London Journal of Botany 5: 398. 1846; India: East Sikkim, Bitu (ca 1850 m), 21.02.2006, D. Singh 36880, CAL0000063879 (Paratype).
- Lepidozia kashyapii* D. Singh & D.K. Singh, Nova Hedwigia 94(1-2): 222. 2012; India, East Sikkim, Kyangnoshla (ca 3300 m), 29.04.2004, D.K. Singh & D. Singh 35188, CAL0000063861 (Holotype).
- Lepidozia kashyapii* D. Singh & D.K. Singh, Nova Hedwigia 94(1-2): 222. 2012; India: East Sikkim, Kyangnoshla (ca 3300 m), 29.04.2004, D.K. Singh & D. Singh 35188B, CAL0000063862 (Isotype).
- Lepidozia kashyapii* D. Singh & D.K. Singh, Nova Hedwigia 94(1-2): 222. 2012; India: East Sikkim, Kyangnoshla (ca 3300 m), 19.09.2007, D.K. Singh 41036B, CAL0000063863 (Paratype).
- Leptolejeunea arunachalensis* Sudipa Das & D.K. Singh, Journal of Japanese Botany 83: 343. 2008; India: Arunachal Pradesh, Mehao WLS, Ijuno, 29.11.2000, D.K. Singh 98485a, CAL0000063888 (Holotype).
- Leptolejeunea mirikana* M. Dey & D.K. Singh, Taiwania 55(4): 355. 2010; India: West Bengal, Darjeeling district, near Mirik Lake (ca 1700 m), 18.01.2005, D. Singh & M. Dey 36289, CAL0000063880 (Holotype).
- Leptolejeunea mirikana* M. Dey & D.K. Singh, Taiwania 55(4): 355. 2010; India: West Bengal, Darjeeling district, near Mirik Lake (ca 1700 m), 18.01.2005, D. Singh & M. Dey 36300, CAL0000063884 (Paratype).
- Leptolejeunea mirikana* M. Dey & D.K. Singh, Taiwania 55(4): 355. 2010; India: West Bengal, Darjeeling district, near Mirik Lake (ca 1700 m), 18.01.2005, D. Singh & M. Dey 36293, CAL0000063881 (Paratype).
- Leptolejeunea mirikana* M. Dey & D.K. Singh, Taiwania 55(4): 355. 2010; India: West Bengal, Darjeeling district, near Mirik Lake (ca 1700 m), 18.01.2005, D. Singh & M. Dey 36299, CAL0000063883 (Paratype).
- Leptolejeunea mirikana* M. Dey & D.K. Singh, Taiwania 55(4): 355. 2010; India: West Bengal, Darjeeling district, near Mirik Lake (ca 1700 m), 18.01.2005, D. Singh & M. Dey 36294, CAL0000063882 (Paratype).

Leptolejeunea udarii M. Dey & D.K. Singh; Taiwania 55(4): 359. 2010; India: East Sikkim, Rolep (ca 1300 m), 30.10.2005, D. Singh 36711, CAL0000063885 (Holotype).

Leptolejeunea udarii M. Dey & D.K. Singh; Taiwania 55(4): 359. 2010; India: East Sikkim, Busuk–near Pamtenj military house (ca 1340 m), 22.02.2006, D. Singh 36911, CAL0000063886 (Paratype).

Lopholejeunea sikkimensis var. *tenuicostata* Sushil K. Singh & D.K. Singh; Bulletin of the Botanical Survey of India 47: 189. 2005; India: Himachal Pradesh, Kullu, GHNP, Sainj Valley, Bah-lapah (ca 2000 m), 26.05.2002, S.K. Singh 99594b, CAL0000063851 (Holotype).

Rectolejeunea devendrae Sushil K. Singh; Indian Journal of Forestry 35(2): 269. 2012; India: West Bengal, Howrah botanic Garden (c. 116 m), 03.02.2006, S.K. Singh 40062, CAL0000063889 (Holotype).

Lepidoziaceae

Bazzania mizoramensis Sk.N.Ali, D.Singh & Sushil K. Singh, Phytotaxa 739(3): 297, f. 1–2; India: Mizoram, Champhai, Champahai-Khazawl, 23°28'37" N, 93°14'14" E, 936 m., 24.02.2009, S.K. Singh & Party 102163, CAL0000310697 (Isotype).

Lophocoleaceae

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CONCLUSION

This systematic survey underscores the exceptional scientific and historical significance of the cryptogamic collections housed at the Central National Herbarium (CAL). By documenting 453 type specimens, it reveals a striking predominance of Pteridophyte types (79%), while also establishing a verified inventory for type specimens of Bryophytes, Algae, and Lichens. Far from being a regional repository, CAL emerges as a global center of biodiversity, safeguarding critical 19th and 20th century materials that span the Indian subcontinent, China, Southeast Asia, and the Pacific. This updated record provides a vital baseline for resolving taxonomic ambiguities and lays the foundation for future digitization and revisionary studies. Ultimately, these findings reaffirm CAL's stature as a premier institution dedicated to preserving the botanical heritage of the Paleotropical world—and extending its relevance well beyond.

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Scientific Abbreviation used

s.n. – Without collection no., s.d. – Without collection Date, s. coll. – Without collector, s.l. – Without location.

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No specific permits were required for field studies as no human or animal subjects were involved.

Originality and Plagiarism:

All authors hereby certify that the manuscript is an original work and has not been published previously, nor is it currently under consideration for publication elsewhere. All sources used in this work have been properly cited and acknowledged in accordance with standard academic referencing practices. We confirm that there is no plagiarised content within this article.

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All authors have agreed to the publication of this content.

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There are no conflicts of interest.

Data Availability:

All data supporting the findings of the study has either been included within the manuscript or cited appropriately from authenticated sources. And all listed herbarium specimens are physically available at CAL for any reference and also can be accessed at Indian Virtual Herbarium using the given Barcode number or other details provided in the article.

Author Contributions:

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