

New combinations for eleven nothospecies in Thelypteridaceae

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Article Details: Received: 2024-06-12 | Accepted: 2024-09-18 | Available online: 2024-09-20



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Abstract: New combinations are made for eleven nothospecies, one under the genus *Pronephrium* C.Presl, two under the nothogenus \times *Chrinephrium* Nakaike and eight under the genus *Christella* H.Lév. In addition, lectotype is designated for the name *Nephrodium* \times *occultum* C.Hope to fix the identity.

Keywords: *Chrinephrium*, *Christella*, India, Lectotype, Nepal, *Pronephrium*

Introduction

The recent molecular studies of the family Thelypteridaceae have changed the generic concept, delimitation and classification within the family (Almeida et al., 2016; Fawcett et al., 2021; Fawcett & Smith, 2021; Bloesch et al., 2022). Based on the current generic circumscriptions in the family Thelypteridaceae, for flora of India, new combinations are required for 11 nothospecies, which are made here. Furthermore, the lectotype for the name *Nephrodium* \times *occultum* C.Hope is designated here in accordance with the guidelines and recommendations of Article 9 of the Shenzhen Code (Turland et al., 2018).

Nomenclature

\times *Chrinephrium* \times *gogoi* (Fraser-Jenk.) R.Kr.Singh & V.K.Rawat, *comb. nov.*

\equiv *Thelypteris* \times *gogoi* Fraser-Jenk., New Sp. Syndr. Indian Pteridol. 248. 1997. *Cyclosorus* \times *gogoi* (Fraser-Jenk.) Mazumdar, Ann. Bot. Fenn. 50(6): 398. 2013.

Holotype: India, Assam, Jorhat District, Goiaghat, shortly north of Kosarihat village, 21 December 1995, C.R Fraser-Jenkins 23846, FN 3001 (BM).

Hybrid parents: *Christella procera* (D.Don) Mazumdar × *Grypothrix triphylla* (Sw.) S.E.Fawc. & A.R.Sm.

Distribution: Assam, India (Fraser-Jenkins et al., 2016).

× ***Chrinephrium* × *thwaitesii*** (Hook.) R.Kr.Singh & V.K.Rawat, *comb. nov.*

≡ *Meniscium* × *thwaitesii* Hook., Fil. Exot. 2: t. 83. 1858. *Abacopteris* × *thwaitesii* (Hook.) Ching, Bull. Fan Mem. Inst. Biol. Bot. 8: 243. 1938. *Cyclosorus* × *thwaitesii* (Hook.) Abeyw., Check List Pterid. Sri Lanka 9. 1978. *Dryopteris* × *thwaitesii* (Hook.) C.Chr., Index Filic. 298. 1905, *nom. illeg., non* (Baker) Kuntze, Revis. Gen. Pl. 2: 813 1891. *Phegopteris* × *thwaitesii* (Hook.) Mett. in Fil. Lechl. 2: 24. 1859. *Pronephrium* × *thwaitesii* (Hook.) Holttum, Blumea 20: 122. 1972. *Thelypteris* × *thwaitesii* (Hook.) C.F.Reed, Phytologia 17: 319. 1968.

Holotype: Sri Lanka, s.d., G.H.K. Thwaites 3145 (K000951504!, Figure 1); isotypes B200068843!, B200068848!, BM001044868!, GH00112616!, K000951505!, L0061084!, P00643850!, P00643851!, UC267428!.

= *Abacopteris* × *insularis* K.Iwats., Acta Phytotax. Geobot. 18(1): 6, f. 5. 1959. × *Chrinephrium* × *insulare* (K.Iwats.) Nakaike, New Fl. Jap. Pterid. 839. 1992. *Cyclosorus* × *insularis* (K.Iwats.) C.M.Kuo, Taiwania 47: 171. 2002. *Pronephrium* × *insulare* (K.Iwats.) Holttum, Blumea 20: 123. 1972. *Thelypteris* × *insularis* (K.Iwats.) K.Iwats., Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B, Biol. 31: 195. 1965.

Holotype: Japan, Kyūshū, 5 August 1958, M. Tagawa & K. Iwatsuki 2248 (KYO!); isotypes BM001044527!, BM001044528!, E00429028!, E00429029!, K000951532! (Figure 2), U0007550!, U0007551!, UC1180576!, US00067473!, US00134966!.

Hybrid parents: *Christella parasitica* (L.) H.Lév. × *Grypothrix triphylla* (Sw.) S.E.Fawc. & A.R.Sm.

Distribution: India (Kerala and Tamil Nadu), Japan (Nansei Islands), extinct from Taiwan and Sri Lanka.

Christella* × *dentarida (Fraser-Jenk.) R.Kr.Singh & V.K.Rawat, *comb. nov.*

≡ *Thelypteris* × *dentarida* Fraser-Jenk., Taxon. Revis. Indian Subcontinental Pteridophytes 189. 2008. *Cyclosorus* × *dentaridus* (Fraser-Jenk.) Mazumdar, Ann. Bot. Fenn. 50(6): 398. 2013.

Holotype: India, West Bengal, stream beneath Mongpong village, c. 2 km east of Coronation (Tiger) Bridge across the Teesta Khola river, east side of lower Teesta Valley, 7 July 2006, C.R. Fraser-Jenkins 32171 (TAIF.309036!, Figure 3).

Hybrid parents: *Christella arida* (D.Don) Holttum × *Christella dentata* (Forssk.) Brownsey & Jermy

Distribution: India (West Bengal) and Nepal (Fraser-Jenkins et al., 2016).

Christella* × *gorkhalensis (Fraser-Jenk.) R.Kr.Singh & V.K.Rawat, *comb. nov.*

≡ *Thelypteris* × *gorkhalensis* Fraser-Jenk., Taxon. Revis. Indian Subcontinental Pteridophytes 187. 2008. *Cyclosorus* × *gorkhalensis* (Fraser-Jenk.) Mazumdar, Ann. Bot. Fenn. 50(6): 398. 2013.

Holotype: Nepal, Gorkha District, Gandaki zone, c. 0.5 Km north of Rangdi village, 13 October 2000, C.R. Fraser-Jenkins 28655, FN 4630 (H.1723698!, Figure 4),

Hybrid parents: *Christella arida* (D.Don) Holttum × *Christella clarkei* (Bedd.) Holttum

Distribution: Nepal and may probably be expected to occur in West Bengal and Northeast India (Fraser-Jenkins et al., 2016).

Christella* × *inexpectata (Fraser-Jenk.) R.Kr.Singh & V.K.Rawat, *comb. nov.*

≡ *Thelypteris* × *inexpectata* Fraser-Jenk., Taxon. Revis. Indian Subcontinental Pteridophytes 190. 2008. *Cyclosorus* × *inexpectatus* (Fraser-Jenk.) Mazumdar, Ann. Bot. Fenn. 50(6): 399. 2013.

Holotype: India, West Bengal, stream beneath Mongpong village, c. 2 km east of Coronation (Tiger) Bridge across the Teesta Khola river, east side of lower Teesta Valley, 7 July 2006, C.R. Fraser-Jenkins 32179 (TAIF.309026!, Figure 5).

Hybrid parents: *Christella dentata* (Forssk.) Brownsey & Jermy × *Christella subpubescens* (Blume) Holttum

Distribution: West Bengal, India (Fraser-Jenkins et al., 2016).

Notes: In protologue of *Thelypteris* × *inexpectata*, Fraser-Jenkins mentioned hybrid parents as *T. dentata* (Forssk.) E.P.St.John × *T. evoluta* (C.B.Clarke & Baker) Tagawa & K.Iwats., but later in 2016 he corrected the parents as *T. dentata* (Forssk.) E.P.St.John × *T. subpubescens* (Blume) K.Iwats.

Christella* × *jaculodentata (Fraser-Jenk.) R.Kr.Singh & V.K.Rawat, *comb. nov.*

≡ *Thelypteris* × *jaculodentata* Fraser-Jenk., Taxon. Revis. Indian Subcontinental Pteridophytes 189. 2008. *Cyclosorus* × *jaculodentatus* (Fraser-Jenk.) Mazumdar, Ann. Bot. Fenn. 50(6): 399. 2013.

Holotype: Nepal, Tanahun District, Gandaki Zone, c. 0.5 Km west of Dugadi, east of Jamune, c. 5 Km west of and above Damauli, 16 April 2000, C.R. Fraser-Jenkins 28489, FN 4464 (H).

Hybrid parents: *Christella dentata* (Forssk.) Brownsey & Jermy × *Christella jaculosa* (Christ) Holttum

Distribution: Nepal and may probably be expected to occur in India as well (Fraser-Jenkins et al., 2016).

Christella* × *linii (Fraser-Jenk.) R.Kr.Singh & V.K.Rawat, *comb. nov.*

≡ *Thelypteris* × *linii* Fraser-Jenk., New Sp. Syndr. Indian Pteridol. 260. 1997. *Cyclosorus* × *linii* (Fraser-Jenk.) Mazumdar, Ann. Bot. Fenn. 50(6): 399. 2013.

Holotype: Nepal, Gorkha District, Chisopani Darrah Khola, c. 6 Km above Komale Khola, 30 December 1996, C.R. Fraser-Jenkins 25081, FN 1060 (BM).

Hybrid parents: *Christella clarkei* (Bedd.) Holttum × *Christella dentata* (Forssk.) Brownsey & Jermy

Distribution: Nepal and may probably be expected to occur in India as well (Fraser-Jenkins et al., 2016).

Christella* × *nareshii (Fraser-Jenk.) R.Kr.Singh & V.K.Rawat, *comb. nov.*

≡ *Thelypteris* × *nareshii* Fraser-Jenk., New Sp. Syndr. Indian Pteridol. 322. 1997. *Cyclosorus* × *nareshii* (Fraser-Jenk.) Mazumdar, Ann. Bot. Fenn. 50(6): 399. 2013.

Holotype: Nepal, Kaski District, Pokhara, near shore of Phewa (Baidam) lake beside Fishtail Lodge, 17 August 1997, C.R. Fraser-Jenkins 25469, FN 1447 (BM).

Hybrid parents: *Christella dentata* (Forssk.) Brownsey & Jermy × *Christella procera* (D.Don) Mazumdar

Distribution: Bhutan, India (Sikkim and West Bengal) and Nepal.

Notes: Seven herbarium specimens of *Thelypteris* × *nareshii* Fraser-Jenk. (TAIF.309119, TAIF.309120, TAIF.309121, TAIF.309122, TAIF.309123, TAIF.309124 and TAIF.309125), collected by C.R. Fraser-Jenkins from Darjeeling, West Bengal, India were housed at TAIF (Figures 6–8).

Christella* × *nepalensis (Fraser-Jenk.) R.Kr.Singh & V.K.Rawat, *comb. nov.*

≡ *Thelypteris* × *nepalensis* Fraser-Jenk., Taxon. Revis. Indian Subcontinental Pteridophytes 188. 2008. *Cyclosorus* × *nepalensis* (Fraser-Jenk.) Mazumdar, Ann. Bot. Fenn. 50(6): 399. 2013.

Holotype: Nepal, Nawalparasi District, Lumbini Zone, c. 1 Km northeast of Daunne near top of pass over Siwalik ridge, shortly south of Dumkibas, east of Butwal on road to Narayanghat, 28 November 2005, C.R. Fraser-Jenkins 31892 (TAIF.309339!, Figure 9).

Hybrid parents: *Christella dentata* (Forssk.) Brownsey & Jermy × *Menisciopsis penangiana* (Hook.) S.E.Fawc. & A.R.Sm.

Distribution: Nepal and may probably be expected to occur in India as well (Fraser-Jenkins et al., 2016).

Christella* × *papilioides (Fraser-Jenk.) R.Kr.Singh & V.K.Rawat, *comb. nov.*

≡ *Thelypteris* × *papilioides* Fraser-Jenk., Taxon. Revis. Indian Subcontinental Pteridophytes 191. 2008. *Cyclosorus* × *papilioides* (Fraser-Jenk.) Mazumdar, Ann. Bot. Fenn. 50(6): 399. 2013.



Figure 1: Holotype of *Meniscium* x *thwaitesii* Hook. (K000951504, © The Trustees of the Royal Botanic Gardens, Kew)



Figure 2: Isotype of *Abacopteris x insularis* K.Iwats. (K000951532, © The Trustees of the Royal Botanic Gardens, Kew)



Figure 3: Holotype of *Thelypteris x dentarida* Fraser-Jenk. (TAIF.309036, © Herbarium of Taiwan Forestry Research Institute, Taipei)



Figure 4: Holotype of *Thelypteris* × *gorkhalensis* Fraser-Jenk. (H.1723698, © Botanical Museum, Finnish Museum of Natural History, University of Helsinki, Helsinki)



Figure 5: Holotype of *Thelypteris* × *inexpectata* Fraser-Jenk. (TAIF. 309026, © Herbarium of Taiwan Forestry Research Institute, Taipei)



Figure 6: Herbarium specimen of *Thelypteris x nareshii* Fraser-Jenk. (TAIF.309120, © Herbarium of Taiwan Forestry Research Institute, Taipei)



Figure 7: Herbarium specimen of *Thelypteris x nareshii* Fraser-Jenk. (TAIF.309122, © Herbarium of Taiwan Forestry Research Institute, Taipei)



Figure 8: Herbarium specimen of *Thelypteris x nareshii* Fraser-Jenk. (TAIF.309123, © Herbarium of Taiwan Forestry Research Institute, Taipei)



Figure 9: Holotype of *Thelypteris* × *nepalensis* Fraser-Jenk. (TAIF.309339, © Herbarium of Taiwan Forestry Research Institute, Taipei)

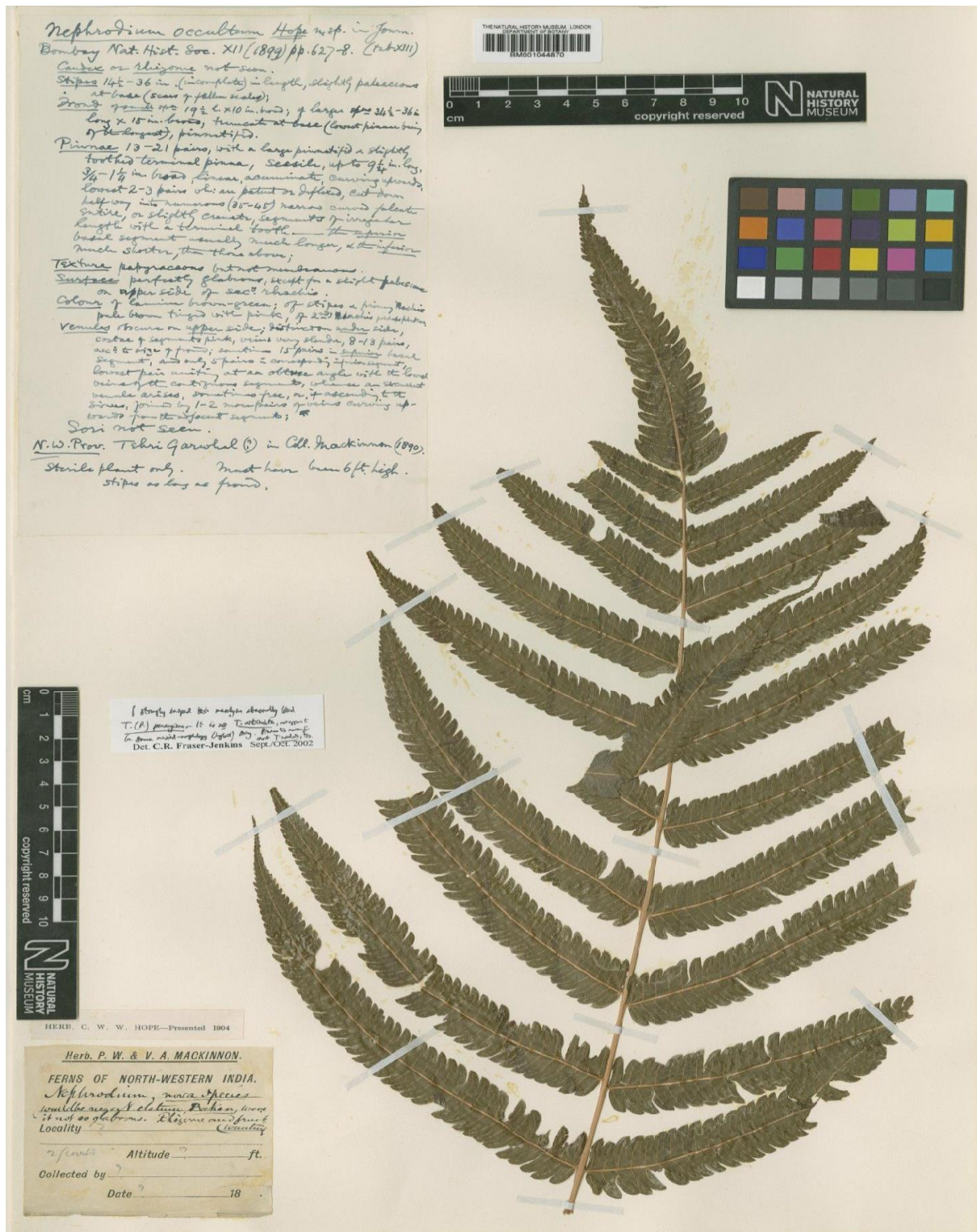


Figure 10: Lectotype of *Nephrodium* × *occultum* C.Hope (BM001044870, © The Natural History Museum, London)

Holotype: Nepal, Gorkha District, Gandaki Zone, open bank of Chisopani Darrah Khola, c. 0.25 Km up the stream to south of path from Gopling northeast to Deurali, north side of Marsyangdi river, 6 October 2000, C.R. Fraser-Jenkins 28626, FN 4601 (H).

Hybrid parents: *Christella papilio* (C.Hope) Holttum × *Christella procera* (D.Don) Mazumdar

Distribution: Nepal and may probably be expected to occur in India as well (Fraser-Jenkins et al., 2016).

Pronephrium* × *occultum (C.Hope) R.Kr.Singh & V.K.Rawat, *comb. nov.*

≡ *Nephrodium* × *occultum* C.Hope, J. Bombay Nat. Hist. Soc. 12: 627, t.13. 1899. *Cyclosorus* × *occultus* (C.Hope) Ching, Bull. Fan Mem. Inst. Biol. Bot. 8: 228. 1938. *Dryopteris* × *occulta* (C.Hope) C.Chr., Index Filic. 280. 1905. *Thelypteris* × *occulta* (C.Hope) C.F.Reed, Phytologia 17: 297. 1968.

Lectotype (designated here): India, North-western India, Uttarakhand, 1890, P.W. Mackinnon & V.A. Mackinnon s.n. (BM001044870!, Figure 10).

Hybrid parents: *Glaphyopteridopsis erubescens* (Wall. ex Hook.) Ching ? × *Menisciopsis penangiana* (Hook.) S.E.Fawc. & A.R.Sm.

Distribution: India (Uttarakhand).

Notes: Hope (1899) described *Nephrodium occultum* based on specimens collected by P.W. Mackinnon and V.A. Mackinnon from North-western India. At present, only one specimen of *N. occultum* C.Hope collected by P.W. Mackinnon and V.A. Mackinnon from North-western India is extant at BM (BM001044870), which is designated here as the lectotype.

Acknowledgments

The authors are thankful to the Director, Botanical Survey of India, Kolkata for facilities and also grateful to the curators of B, BM, E, GH, H, K, KYO, L, P, TAIF, U, UC and US for the images and information of type specimens.

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