Back to types! Towards stability of names in Indian *Curcuma* L. (Zingiberaceae)

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**Abstract** The existence of the type material indicated in the protologues of all Indian *Curcuma* species names is confirmed or excluded following visits to numerous herbaria. Lectotypes, neotypes and epitypes are designated for previously untypified names or names for which the holotype is missing. Earlier ineffective or superfluous typifications are discussed, several new synonyms are recognised and notes on critical taxa are provided.

**Keywords** *Curcuma*; India; nomenclature; Sri Lanka; synonymy; typification; Zingiberaceae

### INTRODUCTION

Škorničková & Sabu (2005b) provided a general introduction to the genus *Curcuma* L. and pointed out that the application of the names of many *Curcuma* species described in early taxonomic publications, including those of commonly used and cultivated species, are still unclear (e.g., Leong-Škorničková & al., 2008a,b). Many synonyms, especially those established solely on the study of herbarium material, are unreliable and need critical reconsideration. This is mostly owing to scanty protologues and a lack of type specimens, which were either not cited or are lost or badly deteriorated. Another complication arises from the often ignored fact that there are several ploidy levels in the genus having different levels of variability within species. Some seed-setting species (namely hexaploids with 2n = 42; see Leong-Škorničková & al., 2007) express a wide range of intraspecific variability (sometimes misidentified as several species) while others, at higher ploidy levels (2n = 9x = 63 and 2n = 15x = 105), are mostly sterile with limited variation and, although superficially quite similar, have subtle but stable differences. It is important when designating a lectotype, epitype or neotype, to be clear which sort of species is in question (seed-setting or sterile) and preferably to know its range of variation in populations from direct observations in the field. Typification in this economically important genus will help to stabilize the application of names and resolve the identities and synonymy of a number of taxa.

This typification research is supported by extensive fieldwork carried out between 2001 and 2005 throughout India and Sri Lanka, where most of the taxa were observed and flowering material re-collected from type or near-to-type locations. Successful completion of a revision of Indian *Curcuma* will take more time but, as revisions of the genus are in progress in various countries, and many names described from India by early authors are widely applied to various (and not conspecific) taxa in South and Southeast Asia, it is desirable to settle the types of Indian names first, to avoid further misinterpretations and misapplications.

### METHODS

Names of taxa currently recognized as members of *Curcuma* L. from India and Sri Lanka have been investigated here, as well as several other names from adjacent areas, which are believed to be relevant to India, and names from adjacent territories where the original material is present only in Indian herbaria. The search for types and original material, including herbarium sheets, drawings/icons, manuscripts and letters was carried out in the following herbaria, libraries and archives: ASSAM, B, BHAG, BLAT, BM, BO, BSA, BSD, BSHC, BSI, C, CAL, CALI, CDRI, DD, E, G, K, KIEL, L, LD, LE, LINN, LIV, LWG, MH, P, PBL, PCM, PDA, PR, S, SING and WU.

Protologues of all names were examined. If holotypes and isotypes were explicitly mentioned, these were located and their validity confirmed or excluded. For names where no holotypes were designated, lectotypes were selected from syntypes, paratypes or other relevant original material. If no original material could be found, neotypes were designated. In a few cases, where the identity of the taxon was still doubtful (i.e., we were not able to confirm it with living material) we avoided typification and identified only ‘original material’.

Some names in *Curcuma* were published long before the type concept was adopted and typification has to be done with extreme caution. The term holotype is not used unless only a single specimen was located in all herbaria, where the collections of a particular author are known to be deposited. In these cases it was assumed that the single specimen represents the implicit holotype. For lectotype designation, all relevant material was considered and efforts made to understand the method of work of each particular author from various biographic sources.
It is widely acknowledged that gingers have to be studied from living material (e.g., Williams, 2004; Škorničková & Sabu, 2005b) and that it is impossible to conduct meaningful work from dried material only (Poulsen, 2006), as it is difficult to preserve useful specimens (Burtt & Smith, 1976). Precise colour drawings (e.g., of Roxburgh, Roscoe, Wallich), field sketches or colour photographs including flower dissections (Poulsen 2006; Škorničková & Sabu, 2005a,b,c) are invaluable, as colours in gingers are often important but are not preserved in dried or spirit material. Flowers are rarely represented on herbarium specimens and many specific characters cannot be observed, unless the specimen is of outstanding quality and accompanied by spirit material and detailed notes. This is usually not the case with historic collections, where even the locality notes are frequently imprecise or collections are not properly numbered. Often there is no direct link between a specimen and the name presumably based on it. In many instances, the drawings can be far superior to the corresponding specimen and enable the correct interpretation of the name (Forman, 1997; Škorničková & Sabu, 2005b). In Curcuma, herbarium specimens alone rarely reveal critical characters sufficient for the interpretation and unambiguous application of names as they usually lack flowers, rhizomes and colours. On the other hand, drawings by themselves do not reveal many characters derived from the three dimensional nature of the real specimen. Ideally, the specimen and the drawing (if it exists) form material adequate for interpreting the species name. In line with this, for a number of names, epitypes have been designated to support the holotype or lectotype, when appropriate material was available.

The importance of the unpublished drawings Icones Roxburghianae Ineditae (CAL, K) for typification of Roxburgh’s names has been mentioned by Sealy (1957) and Forman (1997). The problem with Roxburgh’s original specimens lies in the lack of a direct link to the descriptions. The date is usually missing and thus it cannot easily be established if a particular sheet forms original material or not, and in many of Roxburgh’s duplicates the original labels have been replaced by new ones, destroying the evidence of their originality. Illustrations, clearly linked by numbers to the names in Roxburgh’s manuscript of Flora Indica (1820) often represent better original material for some names described by him. However, the situation is slightly complicated for gingers as many names were described 10 years prior to Flora Indica (Roxburgh, 1810). This raises the question whether the specimens or drawings do indeed form part of the original material for these names. Roxburgh (1814) listed all plants cultivated at Calcutta Botanical Garden, which makes it clear that all Curcuma species have been in the garden prior to 1810, some as early as 1794. Roxburgh was in the habit of making descriptions and drawings of plants as they flowered in the Garden and is very likely, that by the time he published his Curcuma descriptions in 1810, he had at his disposal both specimens and drawings. Therefore Roxburgh’s specimens and drawings are taken here as part of the original material from which the lectotype was selected. In general, whenever a reliable original specimen with Roxburgh’s original label was available, and was in conformity with the description, such was selected as lectotype, while the drawing was assigned as an epitype. However, for most of the names, no specimen could be located and in such case the drawing was assigned as lectotype.

In this treatment homotypic synonyms are listed after the accepted name in chronological sequence in a single paragraph followed by their type; heterotypic synonyms and their types are listed in separate paragraphs, followed by illegitimate and invalid names. Notes are provided where typification, existence and distribution of types, priority, synonymy or reported distribution in India were in question.

■ RESULTS

Amomum zedoaria Christm. ≡ Curcuma zedoaria (Christm.) Roscoe.

Amomum zerumbeth J. Koenig. nom. illeg. (ICBN, McNeill & al., 2006: Art 53.1) ≡ Erndlia subpersonata Giseke (see notes under E. subpersonata).

Curcuma aeruginosa Roxb. in Asiat. Res. (Calcutta) 11: 335. 1810 – Lectotype (designated here): [icon] “Curcuma aeruginosa” in Icones Roxburghianae Ineditae No. 1924 (K!).


Herbarium material distributed by Thwaites under C.P. (Ceylon Plants) numbers represents original material with which Thwaites worked and which he cited in his works, even though this material stems from various locations and was not always collected by Thwaites himself.

A colour drawing of Curcuma albiflora found at Kew is part of the original material, as the name and number C.P. 2737 is in Thwaites’s handwriting, and the printed label says “From the Royal Botanic Garden, Peradeniya. 1862”, which is most likely to be the date when it was received at Kew. It is selected here as an epitype to support the interpretation of the lectotype.

Curcuma albiflora is only known to occur in Sri Lanka. It was reported from India by Amalraj & al. (1991) but the record is not verifiable because the specimen, TCR 964, was cited without herbarium location. It seems that the authors had not examined the type material or protologues of C. albiflora and C. oligantha Trimen as the very few characters of these two species that they cite in their publication are obviously taken from Baker’s account in the Flora of British India (1890) for C. albiflora and from Bhat (1987) for C. oligantha. The description of the plant given by Amalraj & al. (1991) does not match the type of C. albiflora and its original description, but falls well within the intraspecific variability of C. cannanorensis.

Roxburgh in his manuscript quotes the species name under the number 1764 but the drawings of *C. amada* at K and CAL (n.v., Sanjappa & al., 1994) bear the number 1760.


Roxc. was in contact with many botanists, such as Wallich and Carey, who supplied plants to the Liverpool Botanic Garden. The plates in *Monandrians plants* (Roxc., 1824–1828) were drawn and the associated text written as the plants flowered in the garden. For some of the species featured in *Monandrian plants* specimens were prepared and these became part of the Liverpool Botanic Garden Herbarium, which eventually became part of Liverpool Museums (LIV), where the bulk of the collection is still held. The list of specimens linked to Roxc.’s *Monandrians plants* available at LIV was drawn up by Miss. B. Walker and reproduced in Cullen (1973), but it does not contain any *Curcuma* species. Stansfield (1955), however, mentions existence of a sheet of *C. aromatica* and a sheet of *C. zedoaria*, both of which we have been able to examine at LIV. While some material which can be linked to Roxc. survives also at K and LINN, there is no specimen of *C. amarissima* in any of the three herbaria so the only element of original material is the illustration itself, which is selected here as the lectotype.


A plate entitled *C. angustifolia* is also found in *Icones Roxburghianae Ineditae* No. 1511. The plate is not identical with plate No 3. of the protologue, but without doubt also represents *C. angustifolia*. The name *Curcuma angustifolia* “Dalzell & Gibbs., Bomb. Fl. 274:” appeared in *Index Kewensis* by mistake. This name was never published by Dalzell & Gibson; Roxburgh is cited in their work as the author of the name.


No specimens are cited in the protologue. Salisbury cultivated and studied living plants and there is no evidence that he ever possessed a herbarium. John Edward Gray (1866), who was very interested in Salisbury’s work, did not mention any herbarium sheets, though he mentions the existence of ‘a cabinet of seeds and fragments of plants, evidently the specimens described in the MSS’. After Salisbury’s death, Miss J. Burchell inherited part of his property and after her death, Gray was able to acquire all the material, which consisted of various manuscripts, the above mentioned cabinet and some separate papers. Gray gave specimens (seeds and fragments) to the British Museum (Gray, 1866), but no fragment of this taxon can be found at BM.

The name *C. aromatica* is applied in India to at least five taxa, and in all of Asia to about ten taxa, all of which fit the original description and several of which are cultivated. Neither locality nor country of origin is mentioned in the protologue or any other of Salisbury’s works, manuscripts or letters. According to Salisbury (1812), the plant of *C. aromatica*, which was the base for his description and drawing, was acquired from Sir Joseph Banks in 1797. Thus, the original drawing, published together with the description, remains the only original element and is selected here as lectotype. Given the confusion over its identity and typification and that the name is applied to so many different species, application for rejection of the name seems to be an option so that it cannot be used. That would, however, leave us with a complex of several taxa suddenly without a name. As work on the *C. aromatica* complex is in progress, we prefer to resolve the taxonomic delimitation of the taxa first and follow this by fixing the application of the name *C. aromatica* to one of the commonly cultivated taxa by designating an epitype.


Newman & al. (2004) cite the type as ‘*C. v. Zijp s.n. (1911) (Holo BO), Java*’. It is obvious from the protologue of *C. aurantiaca*, however, that the date 1911 is not a collection date but a reference to Koorders’s *Exkursionsflora von Java*. Van Zijp mentioned that no *Curcuma* species noted by Koorders (1911) matched his new *Curcuma* and that it was collected at Malang but he gave no details regarding the year of collection. There are three sheets collected by Van Zijp at Malang at BO, which form the only available original material for selection of a lectotype.

*C. aurantiaca* was reported as a new record for India by Amalraj & al. (1992a), who elaborated differences between *C. ecalcarata* and *C. aurantiaca* in colour of petals (white vs. yellow), colour of staminodes (bright yellow vs. orange), peduncle (exposed vs. concealed) and presence of epigynous glands (absent vs. present). Samaddar & Roy (1997) repeated this information. Of these four characters, only the epigynous glands are of any taxonomic importance, as the colour of the flower parts is variable in seed-setting species and the visibility of the peduncle can vary with the age of plant and habitat. Study of the holotype of *C. ecalcarata* at E and of flowering material from the type locality and other parts of South India revealed the presence of epigynous glands. In addition, type herbarium material of *C. aurantiaca* from Java (BO), herbarium material from Java including spirit collections (SING) and living plants of *C. aurantiaca* from different localities have been studied. It is concluded here that *C. ecalcarata* is conspecific with *C. aurantiaca*.

Curcuma caesia Roxb. in Asiat. Res. (Calcutta) 11: 335. 1810 – Lectotype (designated here): [icon] “Curcuma caesia” in Icones Roxburghianae Ineditae No. 1923 (K!).

Curcuma cananarensis R. Ansari, V.J. Nair & N.C. Nair in Curr. Sci. 51: 293. 1982 – Holotype: India, Kerala, Canna-

dore Dist., Karimamb, 175 m, 23.VI.1980 R. Ansari 67822 (CAL!; iso.: K!, MH!).


Trimen var. lutea (R. Ansari, V.J. Nair & N.C. Nair) K.G. Bhat in Indian J. Forest. 10: 68. 1987 = Curcuma lutea


Kerala, Cannadore Dist., Kalliaseri, 125 m, 22.VI.1980 R. Ansari 64999 (CAL!; iso.: K!, MH!).

The superficial similarity of Curcuma oligantha from Sri Lanka to C. cananarensis resulted in the latter being synonymised (e.g., Bhat, 1987; Sahidhajaran & Sivarajan 1989; Sabu, 2006). Even though these two taxa are morphologically quite close when studied from herbarium material, examination of living material from type localities of both taxa revealed not only morphological differences, but also a significant difference in chromosome number (Leong-Škornišková & al., 2007). It is thus appropriate to maintain both C. oligantha and C. cananarensis.

Ansari & al. (1982), when describing C. cananarensis, described a yellow-flowered form as C. cananarensis var. lutea based on colour difference and the size and shape of the corolla lobes, lateral staminodes and labellum. Consequently, Amralaj & al. (1992b) on the same grounds upgraded the status of this variety to specific rank, arguing that in C. cannanorensis described by Roxburgh based on material collected from Pegu, Burma and sent by F. Carey in 1809 to Calcutta Botanic Gardens, where it flowered. This species has not yet been recorded in India, but revision of herbarium material shows that it may occur in NE India. More field studies of NE Indian Curcuma species are needed to confirm or exclude the presence of this species in India.


No material was cited in the protologue of Curcuma caulina and the provenance was only mentioned as Mahabaleshwar. No sheet of Graham’s Curcuma has been encountered in any of the herbaria visited, nor was there any original illustration found. A neotype is here designated from material re-collected at the type locality Mahabaleshwar. An accurate line drawing of C. caulina by J.E. Stocks is present in the drawing collection at Kew and is designated here as an epitype. Curcuma caulina was transferred to the genus Hitchenia Wall. by Baker (1890). Examination of flowering material from the type locality revealed, however, that there are no characters warranting the exclusion of C. caulina from the genus Curcuma under which it was originally described. Recent cytological evidence by Leong-Škornišková & al. (2007) supports this conclusion.

“Curcuma coccinea” Wall., nom. nud. = Curcuma roscoeana Wall.


Curcuma comosa was described by Roxburgh based on material collected from Pegu, Burma and sent by F. Carey in 1809 to Calcutta Botanic Gardens, where it flowered. This species has not yet been recorded in India, but revision of herbarium material shows that it may occur in NE India. More field studies of NE Indian Curcuma species are needed to confirm or exclude the presence of this species in India.


ala, Idukki District, Painavu, open grasslands, 750 m, 25.V.1983, Mangaly & Sabu CU 10337 (MH!); Mangaly & Sabu CU, 10327, 10328, 10329, 10330, 10331, 10332, 10333, 10334, 10335 and 10336 (iso.: CAL!); Mangaly & Sabu CU 10338 (iso.: E!).

Specimens with collection numbers Mangaly & Sabu CU 10327, 10328, 10329, 10330, 10331, 10332, 10333, 10334 and 10335 are present at CALI, Mangaly & Sabu CU 10338 at E. As per Article 9.3. of ICBN the isotype is any duplicate of the holotype. As confirmed with the second author, all the above-mentioned specimens are part of a single collection and thus are isotypes despite having different collection numbers and not being cited in protologue. The authors cite in the protologue an altitude of 700 m, but on all their sheets (cited and uncited) the altitude is unambiguously recorded as 750 m and thus it is treated here as a typographic error and corrected to 750 m.

Dalzell did not cite a specimen in the protologue, only the locality is mentioned (‘Crescit in prov. Malwan’). Dalzell’s original material is known to be deposited at CAL, DD, K and W. All Zingiberaceae at W were destroyed during WWII. CAL does not have any C. decipiens specimens collected by Dalzell; DD houses one sheet of Dalzell’s C. decipiens, determined as C. montana with no locality details. Kew houses four of Dalzell’s sheets of C. decipiens, but none cites locality details as “Prov. Malwan”; one is annotated “Bombay Dalzell” and is labelled “Curcuma decipiens, Dalz. in Hook. Journ. of Botany 2. p. 144.” This sheet was part of Herbarium Hookerianum and is selected here as the lectotype. The remaining three sheets were donated by Mrs. Dalzell in April 1878 and are labelled as the Bombay herbarium of the late N.A. Dalzell. There is no evidence that they are part of the same collection so it is not safe to refer to any of them as isoelectotypes. They fit the protologue, however and belong to C. decipiens.


“Curcuma erubescens” Wall., nom. nud. = Curcuma rubescens Roxb.


In the original publication, specimen Sabu 39113 (CALI) is cited as the type and as such it was assumed to be the holotype. However, CALI houses two specimens of Sabu 39113. The first, assigned Sabu 39113 A, bears the label holotype, the second, Sabu 39113 B, bears the label isotype. Another sheet, 39113 C, labelled as an isotype has been found at E. As the sheet at CALI 39113 A bears the label holotype, the citation in the protologue is taken as a typographic error and is corrected here. The other two sheets 39113 B and C are isotypes.

In the protologue, the authors cite again collection Sabu 39113 among other specimens examined, collected at Chunagam. This sheet is not present at CALI and the citation is probably a repeat of the holotype citation by mistake. Chunagam is name of a little village near Kolathara.


229.1H (BLAT!), India, Mulgaon, Salsette, 15.VI.1941, H. Santapau J.S. 229.2H (isoneo.: BLAT!)


Blatter (1931) published two Curcuma species in the same work. The type specimens of C. inodora (Hallberg No. 12724) collected at Bombay Presidency, Mulgaon, Salsette, and of C. purpurea (Hallberg No. 14566), Western Ghats, Khandalla were expected at BLAT. A thorough search of the general and type collections, however, revealed no Curcuma specimens collected by Hallberg. Types in all monocot families were checked to exclude the possibility of specimen misplacement. No Hallberg or Blatter material is known at other herbaria and the only option is to designate neotypes. The specimen collected from Mulgaon [orth. var. of Mullogaum], Salsette in 1941 by Santapau has been selected as the neotype of C. inodora.

As mentioned by Blatter in his diagnosis, C. inodora is closely related to C. purpurea, differing only in the position of the inflorescence (central vs. lateral), absence of one sessile tuber, dorsal corolla lobe mucronate (vs. apiculate in C. inodora) and white colour of the style (vs. pink in C. inodora). Both are seed-setting species with rather high levels of variability and all characters mentioned in the diagnosis as well as all other characters mentioned in full description, are nearly identical and well within the variability of a single seed-setting taxon. The position of the inflorescence can be both lateral and central in some species (e.g., Roxburgh 1810; Dalzell, 1850; Santapau, 1945). It was noticed already by Santapau (1952), that C. inodora flowers laterally and later again from the centre of the leaves. The high variability in shape and colour of flower parts observed in seed-setting species has been also highlighted (e.g., Škorničková & al., 2004). The absence or presence of one sessile tuber is of not much importance as it is a matter of timing when the rhizome is examined. The old rhizome serves a new plant (which starts forming a new rhizome at the base of the pseudostem) until it is completely exhausted and decayed. Meanwhile a new rhizome is formed at the base of the plant and so two or more ovoid rhizomes close to each other can be observed. Curcuma inodora and C. purpurea are thus synonymized here. The name C. inodora is selected here as the one to be used for this taxon.

No specimen of C. purpurea could be located in any of the herbaria visited and perhaps the only sheet which ever bore the name was a missing type of Hallberg’s. We also failed to locate any specimen of C. inodora from Khandalla in any herbarium. As explained above, C. purpurea is conspecific with C. inodora and for this reason, a centrally flowering specimen of C. inodora is designated here as neotype of C. purpurea.

During the study of original descriptions, it was noted that a printing mistake in pagination occurred in some copies of J. Asiat. Soc. Bengal N.S., vol. 26 (e.g., the copy at CAL). As a result C. inodora was published in those issues on page 359 (instead of 357), and C. purpurea on 356 (instead of 358). However, in these issues the pages do not run in sequence and some pages numbers are printed twice while others are omitted.


The collection number of the holotype and isotypes of C. kudagensis in the protologue was given as “V 3561”. The specimen labelled as holotype of C. kudagensis at E matches as far as the collection date and locality. The collection number is, however, “V” only, without the number “3561”. The name of the species on the label was originally C. exserta, later corrected to C. kudagensis. Another sheet labelled as an isotype of C. exserta was located at MH, with collection number 3561 but without prefix V. The date of the collection, locality and altitude are identical on both specimens, and the MH specimen bears a few notes, which are consistent with the diagnosis and habitat description of C. kudagensis in protologue. Even though the MH specimen is not mentioned in the publication, it is likely to be an isotype of C. kudagensis. Unfortunately, it was not possible to verify the presence and details of the two remaining isotypes as the sheets are deposited in herbaria with limited access.

Just one year later, another collection made at the same locality was described as Curcuma thalakaveriensis. The details of the holotype are peculiar as the collection number is again V 3561, with the locality particulars being the same, including an approximate altitude (1300 m for C. kudagensis versus 4000 feet for C. thalakaveriensis), whilst the date of the collection is 9th May 1987 (C. kudagensis was collected 9th May 1988). Such a coincidence of collection number, locality details and even collection date which differs only by the year raises the question whether these are two different collections or a mistake while processing specimens. Moreover, the holotype of C. thalakaveriensis, which was supposed to be deposited at MH was not located in the type collection nor in the general collection. Unfortunately, none of the isotypes could be verified for the same reason as the isotypes of C. kudagensis.

Both these taxa are seed-setting species, where rather high variability in plant size as well as size, shape and colour of floral parts is expected, as observed in other seed-setting taxa distributed in the Western Ghats (Škorničková & al., 2004). Repeated observations of the plants over two years at the type locality (Thalakkavery, Thalakkaveri [Velayudhan & al., 1990]; Thalakavery [Velayudhan & al., 1991], the various spellings used by the authors for this locality, for which there is no standard spelling accepted yet) as well as material cultivated at Calicut University Botanical Garden have shown that the habit and size of the plants can vary greatly depending on the location they grow (grassy and rocky exposed slopes or in shrub undergrowth, etc.) and that there is a morphological continuum between C. kudagensis and C. thalakaveriensis. The name C. thalakaveriensis is thus treated here as a synonym of C. kudagensis.

Curcuma kurzii King ex Baker = Curcuma roscooana Wall.


According to the protologue, the plant was sent to Liverpool Botanical Garden by W. Carey from Serampore under the name C. comosa. It flowered in May 1820 for the first time and Roscoe wrote “…but differs so materially from that species [comosa] in many important particulars, that [it] is impossible to reconcile them”.

Three specimens belonging to Roscoe’s original material have been located. One specimen at K consists of a leaf, an inflorescence and a small sheet with a flower dissection mounted on it. There is an annotation “Hort. Liv., Curcuma comosa Roxb. Fl. Ind.” and on the flower dissection there is “C. comosa, Roscoe’s M P.” (presumably Monandrian Plants) and “C. comosa Fl. Indica”. This sheet bears no date. Two specimens are in the Smithian herbarium at LINN. One (Savage Number 0011.1) consists of a flower dissection only and was collected by H. Shepherd on 19th May 1823. On the label is the name C. latifolium Roscoe and the remark “This was sent from India for C. comosa, but does not agree with the description in Fl. Indica”. The second specimen (Savage Number 0011.9) consists of leaf and inflorescence material, and was collected by H. Shepherd in 1824 from Bot. Gard. Liverpool. It bears the additional information “Serampore, Dr. Carey, Curcuma latifolia Roscoe” and the remark, in pencil “S. t.7”, referring to the fact that plate of C. latifolia was among those planned for part 5 of Monandrian plants. Roscoe obviously intended to include eight plates per part, but after part 4, this number varied (Cullen, 1973). This sheet is selected here as the lectotype.


Another Roxburgh sheet of C. leucorrhiza has been located at G. Owing to the lack of collection dates and details on Roxburgh’s specimens it cannot be established if both it and that cited above represent part of the same collection, which prevents us from accepting it as an islectotype. However, there is no doubt that both specimens represent the same taxon.

Kua domestica Medik., Hist. & Commentat. Acad. Elect. Sci. Theod.-Palat. 6: 396. 1790, nom. illeg. [superfluous and therefore automatically homotypic with the replaced name (ICBN Art. 52.1)].


For the complex taxonomic history of C. longa and designation of lecto-, epi- and neotypes of the names involved see Leong-Škorníková (2008b). Due to a printing error, Kua domestica appeared there with the symbol for a heterotypic synonym; however it is explicitly mentioned that it is homotypic with C. longa.


Curcuma mangga has originally been described from Java and first reported in India by Balakrishnan and Bhargava (1984) from the Andaman Islands. Even though the identity of the plant described by Balakrishnan and Bhargava as C. mangga is likely to be C. elata based on their description, C. mangga is widely distributed all over South India, where it was misidentified as C. amada. The rhizomes of both these species smell of unripe mango. Curcuma amada is a centrally flowering species described originally from East India, Bengal.


A plate of Curcuma montana identical to that found in Roxburgh’s (1800) Plants of the Coast of Coromandel is present among Icones Roxburghianae Ineditae. It bears the number 151 (503), and Roxburgh cites in his Flora Indica manuscript (at BM) both these numbers. Furthermore, BM houses a set of original drawings of dissections for Roxburgh’s Plants of the Coast of Coromandel, Pl. 151, which shows a dissected flower and rhizome of C. montana. The name Curcuma montana Roscoe appeared in Horaninow’s Prodromus (1862), but Roscoe did not publish this name himself, referring it to Roxburgh.


Curcuma nilamburensis Velayudhan & al. (1999) was not validly published owing to the lack of a Latin diagnosis and designation of a type (Škorníková & al., 2004).


Wight did not cite any specimens in the protologue and only mentioned the locality as “Neilgherries, very abundant on the S. Western slopes about Neddawuttim”. Noltie (2005: 472) in his recent detailed monograph of R. Wight, suggests that the holotype may be at K: a sheet with HRWP (Herbarium Robert Wight Proprius – Wight’s own working herbarium) annotated by Wight with the name and locality “Neelgherries!”; Noltie emphasized that the point of listing this material is to make its existence known to specialists, and it is left to them to work out more accurately its precise type status and to lectotypify the names. Noltie (2005) also highlighted the existence of another sheet at K, namely Gardner’s sheet (ex. Herb. Hooker) annotated by Gardner “Neelgherries” and suggested that this sheet is almost certainly an isotype. Even though it is known that Gardner visited Wight at the beginning of 1845 and selected numerous duplicates from Wight’s herbarium and also made excursions around Ooty with Wight in February 1845, there are no dates on these two sheets nor any other direct indication that
these two specimens are duplicates, i.e., form the part of the same collection, the ultimate condition for an isotype (ICBN Art. 9.3). As Wight worked around Ooty for several years, there is always the chance that the specimens could have been collected at different times. The first sheet mentioned by Noltie as a possible holotype is indeed a half-sheet typical of Wight’s own herbarium mounted on a full-size sheet, which is marked in handwriting “Ex Herb. Wight”. Even though it does not have the usual printed HWRP label, the name C. neilgherrensis and the locality “Neilgherries” are in pencil in Wight’s handwriting and surely belong to Wight’s “top” set of specimens (Noltie, pers. comm.). Some of Wight’s specimens distributed by Kew between 1866–1868 to various herbaria also contain types. Several of these sheets containing plants of C. neilgherrensis (mixed with other Curcuma sp. on the same sheet) were located at CAL, E, L, MH and PDA but none is linked to Nedawuttim or even Neilgherries. A few of them are from various locations in Kerala. These Kew-distributed sheets of C. neilgherrensis are often mixed collections.

All plants of C. neilgherrensis found among the original material had, contrary to the protologue, lamina densely pubescent on both sides. Indumentum is, however, very variable in seed-setting herbarium specimen alone, can be confused with a few other species on the same sheet) and is depicted. The plate matches the protologue and living material of C. oligantha recently collected in Sri Lanka (Škorničková 73223, PDA, SING).

Trimen’s specimens are known to be distributed at BM, CAL, PDA and W, but only a single specimen of C. oligantha was found, at PDA. It exactly matches the information given in the protologue under habitat, i.e., Uma-Oya, near the Mahaweli River, north-west of Badulla, Cent. Province, Oct. 1884, and as such is treated here as an implicit holotype. As there was much confusion about the identity of C. oligantha and C. cannanorensis (see notes under C. cannanorensis), which look very similar in herbarium specimens, an epitype for the unambiguous application of the name is desirable. Trimen published colour plates to accompany his Hand-book to the flora of Ceylon, where C. oligantha is depicted. The plate matches the protologue and living material of C. oligantha recently collected in Sri Lanka (Škorničková 73223, PDA, SING).


Curcuma parvula was described by Andrew Thomas Gage, who was curator of Calcutta herbarium and later director of Calcutta Botanic Garden. The whereabouts of his herbarium is not well known, but his original material of Curcuma parvula has been located only at CAL. From the protologue it is clear that the description was made by Gage from plants collected by Shaik Mokim from Upper Burma, Minbu District, which flowered in Calcutta Botanic Garden in July 1903. There are two sheets at CAL, both made from living plants cultivated at Calcutta Botanic Garden. Both were collected by Shaik Mokim and received at Calcutta on 12th February 1903. On one sheet [CAL Acc. No. 467284] there is a remark that the plant flowered in July 1903. A second sheet [without CAL Acc. No.], which represents the same taxon, however, lacks the remark about flowering time. It cannot be unambiguously established whether these two sheets are duplicates (i.e., were collected on the same day and are part of the same collection).

So far this species has not been reported in India, but herbarium material indicates that it may occur in NE India. This has to be confirmed by comparison of living materials from NE India and Burma.


Curcuma petiolata Roxb., Fl. Ind. 1: 36. 1820 – Curcuma cordifolia Roxb., Hort. Beng.: 1. 1814, nom. nud.; Fl. Ind. ms. 43; Fl. Brit. India: 216. 1890, pro syn. – Lectotype (designated here): [icon] “Curcuma cordifolia” in Icones Roxburghianae Ineditae No. 2156 (K!). The Icones Roxburghianae Ineditae plate 2156 at K is annotated, “No. 2156 Curcuma cordifolia” in ink with a pencil addition in different handwriting “= C. petiolata”. In Roxburgh’s manuscripts deposited at BM, it is obvious that Roxburgh...
treated this plant under the name *C. petiolata* at first but the specific epithet is crossed out and corrected to *C. cordifolia*. The name finally printed in *Flora Indica*, however, is *C. petiolata*.

*Curcuma petiolata* was described from material originally collected by F. Carey in Pegu, Burma and cultivated at Calcutta Botanic Garden. It was reported in India by Balakrishnan & Bhargava (1984) from the Andaman Islands, followed by Tripathi & Prakash (1998) from Northeast India, but both turned out to be misidentifications (Škorničková & Sabu, 2005b) and so this species is not yet known to occur in India.

*Curcuma picta* Roxb. ex Škornič, in Taxon 57: 959. 2008

– Holotype: India Orientalis, Roxburgh s.n. [barcode BM000784099] (BM!); Paratype: India Orientalis, Roxburgh s.n. [barcode BM000784100] (BM!).


For the complex nomenclatural history of *C. picta*, *C. zedoaria*, *C. zerumbet* refer to Leong-Škorničková & al. (2008a).


The holotype of *C. prakasha* deposited in CDRI bears the name *C. meghalayensis* Sunil & Ved Prakash. During the course of describing the new species, the second author died and the first author changed the epithet to honour Dr. Ved Prakash. The change of epithet has not been made on the holotype, yet there is no doubt about the identity of the specimen as the collection number, locality and date match the type cited in the protologue. As verified with CAL, contrary to the information given in the protologue, the isotype of *C. prakasha* has not yet been deposited there.


No material was cited in the protologue of *C. pseudomontana*, and no collections of *Curcuma* made by Graham were encountered in any of the herbaria we visited. There is also no extant illustration, so a neotype must be designated from the vicinity of Bombay. In the protologue, Graham mentions that the inflorescence spike is central, but *C. pseudomontana* is one of the many seed-setting species, that flower laterally at the beginning of the season and later from the centre of the leaf tuft (see also Santapau, 1945, 1952). The neotype and isoneotypes were collected at the beginning of the season and thus all have lateral inflorescences.

The epithet was originally published hyphenated as *pseudo-montana* by Graham. According to ICBN Art. 60.9 this has been corrected to *pseudomontana*.

The protologue of *Curcuma ranadei* states that the plants were raised from tubers sent to Calcutta, where one flowered in the Royal Botanic Garden in September 1897. Four sheets of *C. ranadei* collected by Ranade at Poona are present at CAL. One of them bears the remark “Poona, sent by Mr. N.B. Ranade 3/6/1896, flowered in nursery 8th September 1897, coll. D. Prain” and has been thus here selected as the lectotype. One more sheet annotated “3–6–1896, Poona N.B. Ranade” is available, but the date of flowering is obscure and the remaining two sheets flowered in 1898 and 1900. Even though they are likely to be part of the same plant, they are not part of the same collection so it is not appropriate to refer to any of them as an isolectotype.

Prain, when describing *C. ranadei*, either overlooked *C. pseudomontana*, or was misled by the incorrect synonymy of Baker, who in the *Flora of British India* synonymised it under *C. montana* Roxb. *Curcuma pseudomontana* is very common around Poona and the description of *C. ranadei* and all Ranade’s original specimens match *C. pseudomontana*. Santapau (1945) reached the same conclusion.

*Curcuma purpurea* Blatt. = *Curcuma inodora* Blatt.

*Curcuma raktakanta* Mangaly & M. Sabu = *Curcuma zedoaria* (Christm.) Roscoe.

*Curcuma ranadei* Prain = *Curcuma pseudomontana* J. Graham.


There are two almost identical plates at K. The first is numbered 1510 but the yellow colour of the flower does not match the protologue well. The second drawing appears to be unnumbered on the drawing itself but its lower edge is trimmed so it may be that the original inscription has gone. This drawing bears the name *C. reclinata* in an unknown hand and is mounted on a sheet with the inscription *C. reclinata* and No. 1510 in two different hands. This matches the protologue description exactly as the flowers are purple except for a small tinge of yellow on the centre of the lip. This drawing also includes a flower dissection and the overall craftsmanship of the drawing, especially the flowers and bracts, seems more elaborate. According to Sanjappa & al. (1994), the situation is similar at CAL; there are two drawings, one of them unnumbered but possessing a flower dissection. There is no mention of trimming or the colour of the flowers, however. Sealy (1957) comments that, in addition to the numbered drawings,
there are 150+ paintings at Kew presented by the British Museum in June 1889 which, though not specifically marked as Roxburgh’s drawings, are certainly for the most part copies or versions of Roxburgh originals, or even in some cases originals themselves. They bear names and other data derived from Roxburgh’s manuscript numbers. These drawings have been trimmed at some time and not infrequently, part of the inscription has been cut off and their origin remains unknown. Sealy (1957) hypothesized that these drawings may have formed part of a set of drawings which Roxburgh had for his own use but, so far there, is no direct evidence that he had a personal set of the paintings. The unnumbered drawing with flower dissection and purple flowers has been selected here to serve as the lectotype of Curcuma reclinata as it is the best fit to the original description. Three sheets of Haines 170 P are present at K. One of them is labelled in Haines’s handwriting “C. sulphata sp. nov.” and is selected here as lectotype of that species.

Both Curcuma sulcata and C. reclinata were described from the central part of India and their descriptions match well. Field collections across central India revealed that there is only one widely distributed seed-setting species for which the older name C. reclinata has to be adopted.


“Curcuma cocceina” Wall. ex Baker, in Hook. f., Fl. Brit. India 6: 216. 1890, nom. inval. (pro syn.; ICBN Art. 34.1c).

For details refer to Škorničká & Sabu, 2005b.


= Curcuma erubescens Wall., Numer. List No. 6608. 1832, nom. nud.

The drawing at K determined as Curcuma rubescens has number 1761, whereas Roxburgh’s manuscript cites the drawing under number 1763.

Curcuma longiflora Salisb. (1812) is illegitimate, being a superfluous name for Curcuma rubescens Roxb. (1810), cited by Salisbury in synonymy.

The name Curcuma rubricaulis was completely based on ‘Curcuma no. 3’ mentioned by Roscoe in his paper on Dr. Roxburgh’s Scitamineae (Rosc, 1816). The second reference mentioned by Link (1821) is a German translation of the same. There is no material cited by Roscoe (1816) but, from Roscoe’s later work Monandrian plants (1824–1828), it is obvious that the only Curcuma species known to Roscoe and fitting the sparse description highlighting the red colour of the petioles (Rosc, 1816) is Roxburgh’s Curcuma rubescens. Curcuma rubescens as described and depicted by Roscoe, fits well to Roxburgh’s original description and to Roxburgh’s drawing. Roscoe also cites Roxburgh’s plant in synonymy and moreover he obtained this plant from Bengal from William Carey, who had access to Roxburgh’s plants, and Roscoe’s plant might have actually originated from Roxburgh’s plant. A specimen, which is almost certainly Roscoe’s original sheet of C. rubescens made from his living collection in April 1822, has been found at K (see notes under C. amarissima). This sheet has an unmistakeable flower dissection, typical for Roscoe’s sheets, and there is a label Curcuma rubescens Roscoe. This sheet bears the remark in pencil ‘Roscoe tab. 107’, which is the number of the plate of C. rubescens in Roscoe’s Monandrian plants (1824–1828, C. rubescens published 1825). This sheet is thus proposed here as the neotype of Curcuma rubricaulis.

Curcuma rubricaulis Link = Curcuma rubescens Roxb.


A single specimen of C. sessilis collected by Shaik Mokim in Minbu Distr. and cultivated in Calcutta Botanic Garden was located at CAL. So far this species has not been reported in India but, based on herbarium material, this species may be present in NE part of the country. This has to be confirmed by comparison of living material.

The name Curcuma sessilis Rich. was mentioned by Petersen as a dubious name which appeared on herbarium specimen of a species allied to Calathea propinqua collected by L.C. Richard’s from Antilles (Flora Brasiliensis 3(3): 95, 1890). This information was repeated in Schumann’s account.
of *Marantaceae* in *Das Pflanzenreich* (1902: 98). As none of these authors accepted this name, it cannot be considered validly published and as such does not cause illegitimity of *C. sessilis* Gage.

*Curcuma speciosa* Link, nom. illeg. = *Curcuma zedoaria* (Christm.) Roscoe.


*Curcuma strobilifera* Wall. was reported from India by Graham as one of the five species introduced to Bombay by Nimmo from Bengal (Graham, 1839). *Curcuma strobilera* [C. *strobilina* Wall. ms.] is, however, native in Burma. It was collected by Wallich in 1826 near Rangoon and was cultivated at HBC (Hortus Botanicus Calcuttensis), where Nimmo presumably got the plant. Several sheets of *Wallich 6599* are distributed in various herbaria. Among them, the sheet deposited at K-W was selected as lectotype as it has several plants including dissected inflorescences and matches the protologue well.

Wallich, following Roxburgh’s example, employed local artists (including some of those Roxburgh himself used) to illustrate the plants from living material. Some of these drawings later served as base for Wallich’s *Planta asiaticae rariores* (1829–1832). These very fine drawings, which originated from the East India Company (India Museum), were transferred to Kew in 1879 and are annotated in a later hand “Royle, Carey & others” (Noltie, 1999). There are two drawings annotated in ink *Curcuma strobilina* Wall. and in pencil “Royle, Carey & others” and numbered in pencil 1217 and 1218. They are both very precise, accompanied by a flower dissection but they differ in the colour of the corolla lobes. In 1217 corolla lobes are yellow, while 1218 depicts them as light yellowish to almost white. Baker describes the corolla lobes as “corolla segments small, whitish”, a character which could not be derived from a herbarium specimen. Besides, Baker himself admitted that his descriptions are mostly based on colour drawings. Thus the drawing No. 1218 reflecting the original description is selected here as an epitype. Recently we have seen a photograph of flowering material from the collections of the Smithsonian Institution (courtesy Dr. J.W. Kress) collected from Burma, which indeed fits well with the drawing No. 1218.

“*Curcuma strobilina*” Wall. ex J. Graham, nom. nud. = *Curcuma strobilifera* Wall. ex Baker.

*Curcuma sulcata* Haines = *Curcuma reclinata* Roxb.


*Curcuma tinctoria* Guibourt = *Curcuma longa* L.


In the protologue and in Sabu (2006), the holotype is cited as *Sabu & Mangaly CU 37342* (MH), while the two isotypes were cited as *Sabu & Mangaly CU 37343A* (CALI) and *Sabu & Mangaly CU 37343B* (CAL). Since these materials have different collection numbers, it is questionable whether the sheets designated by the authors can qualify as isotypes, or whether they are merely paratypes. However, the specimen at MH has the collection number *Sabu & Mangaly CU 37343*. It is clearly marked as the holotype and the date of collection is that given in the protologue, namely 20th July 1984. Sheet *Sabu & Mangaly CU 37342* has been found in unicate at CALI only. It was collected at the identical locality but on 19th July 1984 and therefore does not form a part of the same collection. It also bears no holotype or isotype label. Thus the collection number of the holotype *Sabu & Mangaly CU 37342*, cited in the protologue and consequent publications, is taken as a typographical error and corrected here to *Sabu & Mangaly CU 37343*.

There is no isotype at CAL available, but *Sabu & Mangaly CU 37343B* was found at CALI, together with *Sabu & Mangaly CU 37343*, which are both isotypes. In addition to that, there are another two isotypes deposited at E (*Sabu & Mangaly CU 37343 & CU 37343B*).

Sabu (2006) treated *C. peethapushpa* as nom. superfl. of *C. vamana*. However, *C. peethapushpa* is based on a different type, while the concept of nomina superflua is applicable to certain cases of homotypic synonyms only (ICBN Art. 52.1.) After examination of holotypes and living material from near to type localities, it is confirmed that these two names represent the same species and that *C. peethapushpa* is a heterotypic synonym of *C. vamana*.

“*Curcuma vellanikkarensis*” Velay., Mural., Amalraj, P.L. Gautham, S. Mandal & D. Kumar, Curcuma Genetic Resources: 41. 1999, nom. inval. (ICBN Art. 32.1.d) = *Curcuma cf. karnatakensis*. This name was published without a Latin diagnosis and type designation. Examination of living material revealed the close affinity of this species to *C. karnatakensis* but, owing to the limited material available, which lacks flowers, this cannot yet be verified.

Judging by the original description and plate, this species is almost surely a synonym of *Curcuma longa* L., while *Curcuma longa* sensu Roxb. (*Icones Roxburghiana Ineditae* No. 906) represents a different species. Collection of living material of *C. viridiflora* from the type locality in Sumatra is needed to test this hypothesis and to allow designation of an epitype.


For the complex nomenclatural history of *C. zedoaria*, see Leong-Škornišková & al. (2008a).

*Curcuma zedoaria* sensu Roxb. in Asiat. Res. (Calcutta) 11: 332. 1810, non (Christm.) Roxb = *Curcuma sp.*

In 1810, Roxburgh, probably unaware of the existence of Roscoe’s 1807 paper, published the combination *C. zedoaria* (Christm.) Roxb. He cited “*Amomum zedoaria* Linn. Sp. Pl., Willd. 1.7” as the only element, which is the same element cited by Roscoe for the same combination published three years earlier. Roxburgh’s *C. zedoaria* should, therefore, be considered an synonym, having no nomenclatural relevance. It is interesting to note that Roxburgh understood *C. zedoaria* differently from *C. zedoaria* Roscoe or from *C. zerumbet* Roxb. The name *C. zedoaria* Roxb. was always treated as a synonym of *C. aromatica* Salisb. as proposed by Roscoe (1816) but this judgement was based solely on the fact that both names refer to taxa with green leaves, which are sericeous underneath. Shedding light on the identity of the plant treated by Roxburgh (1810) as *C. zedoaria*, however, calls for further investigation, as the history of the name *C. aromatica* Salisb. is obscure and interpretation of this historical name involves a complex of several superficially similar species (Leong-Škornišková & al., 2008a).

*Curcuma zerumbet* sensu Roxb. in Asiat. Res. (Calcutta) 11: 333. 1810 et Pl. Coromandel 3: t. 201. 1811 (description and plate only, synonymy excluded), non Roxb. (l.c. 1810) = *Curcuma picta* Škornišková.

*Curcuma zerumbet* Roxb. ≡ *Erndlia subpersonata* Giseke (see notes under *E. subpersonata*)


*Curcuma zerumbet* as understood from Roxburgh’s description and plate represents a plant recently named as *C. picta* (Leong-Škornišková & al., 2008a). *Curcuma zerumbet* Roxb. is a nomen illegitimatum and, for nomenclatural reasons, it has to be accepted to the taxon described as *Amomum zerumbet* J. Koenig, nom. illeg., which now includes also *Curcuma officinalis* Salisb. nom. illeg. and the earliest legitimate name for this taxon *Erndlia subpersonata* Giseke (Leong-Škornišková & al., 2008a). Further investigation into identity of Koenig’s *A. zerumbet*, for which tab. 68 of Rumphius’s *Herbarium amboinense* V (1747) is the only element eligible as a type, revealed that it is the same as *C. euchroma* Valeton, a taxon described from Java. Based on the ICBN Art. 11.4. the name *Curcuma subpersonata* should be accepted as correct name for this taxon. Creating such combination would, however, lead to undesirable change of the name of this rather common, well-known and cultivated species. In order to sustain a nomenclatural stability a proposal to conserve the name *C. euchroma* Valeton against *Erndlia subpersonata* Giseke will be well-considered.

*Hedychiunm scaposum* Nimmo = *Curcuma scaposa* (Nimmo) Škornišková & M. Sabu.

*Hitchenia caulina* (J. Graham) = *Curcuma caulina* J. Graham.

*Hitchenia roscoeana* (Wall.) = *Curcuma roscoeana* Wall.

*Hitcheniopsis roscoeana* (Wall.) Loes. = *Curcuma roscoeana* Wall.


*Monolophus scaposus* (Nimmo) = *Curcuma scaposa* (Nimmo) Škornišková & M. Sabu.


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