



## *Retispatha* subsumed in *Calamus* (Arecaceae)

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### Abstract

Based on research in progress and previously published, *Retispatha* is placed in synonymy under *Calamus*. The new combination *Calamus dumetosus* (Dransfield) Henderson & Floda is made.

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The subtribe Calaminae of subfamily Calamoideae currently comprises five genera: *Calamus* Linnaeus (1753: 325; 374 species), *Ceratolobus* Blume in Schultes & Schultes (1830: lxxx; 6 species), *Daemonorops* Blume in Schultes & Schultes (1830: 1333; 103 species), *Pogonotium* Dransfield (1980a: 763; 3 species), and *Retispatha* Dransfield (1980b: 529; 1 species). A sixth genus, *Calospatha* Beccari (1911: 232; 1 species) was recently placed in synonymy under *Calamus* (Baker & Dransfield 2008). The subtribe is strongly supported as monophyletic based on morphological and molecular data, and there is moderate to strong support for a sister-group relationship with subtribe Plectocomiinae (Baker *et al.* 1999, 2000a, 2000b, 2000c). Morphologically Calaminae exhibits great diversity, but all species share the synapomorphy of inflorescences adnate to internodes and sheaths (Baker *et al.* 2000b). All species are dioecious, and most are climbers and are the source of the rattan canes of commerce.

Phylogenetic research based on morphological and molecular data (Baker *et al.*, 1999, 2000a, 2000b, 2000c, Kramadibrata 1992) has shown that the currently accepted generic delimitation in the Calaminae is problematic, and that four of the genera are variously embedded within a paraphyletic *Calamus*. The three small genera, *Ceratolobus*, *Pogonotium*, and *Retispatha*, have been separated from *Calamus* based on inflorescence characters, such as the highly reduced inflorescences of *Ceratolobus* and *Pogonotium*, and unusual inflorescence bracts in *Retispatha*, and vegetative characters, like the unique leaf-sheath ocreas of *Pogonotium* and the rhomboid leaflets of most species of *Ceratolobus*. The larger genus *Daemonorops* has been separated from *Calamus* based on the structure of the inflorescence rachis bracts, which split along their entire length. In subgenus *Daemonorops* the prophyll encloses the other rachis bracts and in subgenus *Piptospatha* the rachis bracts are free from the prophyll (Dransfield *et al.* 2008). In the second edition of *Genera Palmarum*, Dransfield *et al.* (2008) continued to recognize the five genera of the Calamineae while noting that further analyses would most likely result in a modified generic delimitation.

Evidence from the most densely sampled phylogenetic study (Baker *et al.*, 2000c), using 5S nrDNA spacer sequence data for 26 species of *Calamus*, six of *Daemonorops*, two of *Ceratolobus*, one of *Pogonotium*, and one of *Retispatha*, indicated that *Calamus* was divided into three major clades. One clade included *Calamus* species (*C. castaneus* Griffith [1845: 28] and *C. thysanolepis* Hance [1874: 265]) and *Retispatha*; the second included the majority of other *Calamus* species; and the third included *Daemonorops* species as well as *Ceratolobus* and *Pogonotium*. Phylogenetic study of the Calaminae based on molecular data is being carried out by Floda and this shows similar results to those of Baker (2000c). Preliminary results from this study, using data from plastid markers *matK* and *rbcL*, as well as the nuclear marker *PRK*, resolve *Retispatha* in a clade with *Calamus arborescens* Griffith (1845: 33), *C. laoensis* Evans *et al.* (2000: 929), *C. dongnaiensis* Pierre ex Beccari (1902: 198), *C. kampucheaensis* Henderson & Khou Eang Hourt (2013: 179), and *C. spiralis* Henderson *et al.* (2008: 196).

A revision of *Calamus* is underway by Henderson. A phylogeny based on parsimony analysis of a morphological data set comprising 140 characters taken from 4,738 specimens representing 336 species of *Calamus* (and including

other genera of the Calaminae) shows high levels of homoplasy and generally low levels of support for constituent clades. However, the results are in general agreement with those of Baker *et al.* (2000c) and Floda. *Retispatha* is resolved in a well supported clade of 22 species, referred to as the *Calamus longisetus* Griffith (1845: 36) group. This includes *C. castaneus* and *C. thysanolepis* (two species included in the Baker study, as well as *C. arborescens*, *C. laoensis*, *C. dongnaiensis*, *C. kampucheaensis*, (four species included in the Floda study), but excluding *C. spiralis*.

Morphologically, *Retispatha* shares with members of the *C. longisetus* group two synapomorphies: leaf sheath spines usually densely arranged and comprising two kinds, one large, flat, straight, triangular, usually black or brown and lighter colored at the bases, the other shorter, black, with both kinds usually borne on short to long, horizontal to oblique, raised ridges; and partial inflorescences stalked with the stalk parallel to the rachis and nested within the concave rachis surface. Furthermore, and most notably, it shares a distinctive ocrea with a subset of species in the *C. longisetus* group (*C. arborescens*, *C. castaneus*, *C. dongnaiensis*, *C. erectus* Roxburgh (1832: 774), *C. flagellum* Griffith ex Martius in Walpers (1852: 484), *C. laoensis*, *C. longisetus*, *C. rudentum* Loureiro (1790: 209), and *C. thwaitesii* Beccari in Hooker (1892–1893: 441)). These species have well-developed, densely spiny ocreas which are not tubular and not developed above the petiole and are early splitting and disintegrating. Dransfield *et al.* (2008) recorded *Retispatha*, incorrectly, as lacking an ocrea. The main justification for *Retispatha*, however, was its unusual inflorescences (Dransfield, 1980b), including net-like bracts subtending the rachillae and solitary pistillate flowers lacking an accompanying neuter flower. However, the inflorescence of *Retispatha* is similar to those of the *C. longisetus* group in its splitting and tattering rachis bracts, and only differs in the net-like rachillae bracts and lack of a neuter flower. Fruits and seeds of *Retispatha* closely resemble those of the *C. longisetus* group.

We are less certain of the relationships of *Daemonorops*, *Ceratolobus*, and *Pogonotium*, although morphological data place all three in a clade within *Calamus*, in general agreement with Baker (2000c). We prefer to leave these until more data is available. However, results from the studies of Baker (2000c) as well as unpublished data from Floda and Henderson make it clear that *Retispatha* is embedded within *Calamus*, and the transfer is needed for the ongoing revision of the genus. We therefore make the transfer here.

## Taxonomic treatment

*Calamus dumetosus* (Dransfield) Henderson & Floda, *comb. nov.*

Basionym: *Retispatha dumetosa* Dransfield (1980b: 531).

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