



## Taxonomic novelties in the fern genus *Tectaria* (Tectariaceae)

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### Abstract

The misapplication of the name *Tectaria griffithii* is corrected, which results in the revival of *T. multicaudata* and the proposal of a new combination (*T. multicaudata* var. *amplissima*) and two new synonyms (*T. yunnanensis* and *T. multicaudata* var. *singaporeana*). For the reduction of *Psomiocarpa* and *Tectaridium* (previously monotypic genera) into *Tectaria*, *T. macleanii* (new combination) and *T. psomiocarpa* (new name) are proposed as new combinations. In addition, the new name *Tectaria subvariolosa* is put forward to replace a later homonym (*T. stenosemioides*).

**Key words:** nomenclature, *Psomiocarpa*, taxonomy, *Tectaridium*

### Introduction

*Tectaria* Cavanilles (1799) (Tectariaceae) is a fern genus frequent in tropical regions, with most species growing terrestrially in rain forests. This group is remarkable for its extremely diverse morphology, and the estimated number of species ranges from 150 (Tryon & Tryon 1982; Kramer 1990) to 210 (Holttum 1991a). Holttum (1991a) recognized 105 species in *Tectaria* from Malesia and presumed that SE Asia is its center of origin. In SE Asia outside Malesia, the exact number of species in *Tectaria* remains unknown due to lack of a modern treatment since the first revision for the area (Ching 1931). Though several regional revisions were carried out in last decades (e.g., Tagawa & Iwatsuki 1988, Wang 1999, Chandra 2000), the delimitation of *Tectaria*, especially the species concept, is different from author to author.

During an attempt to revise the taxonomy of *Tectaria* in mainland Asia and to explore the phylogenetic concept of *Tectaria*, we have made some studies of herbarium material and simultaneously conducted phylogenetic analyses based on cpDNA sequences in recent years. Before presenting our molecular results, we thought it necessary to clarify some confusion on species identities.

### Taxonomic treatment

*Tectaria griffithii* (Baker) C.Christensen (1934: 180).

Basionym:—*Nephrodium griffithii* Baker in Hooker & Baker (1867: 300). Type:—MYANMAR. Without locality, without date, *Griffith s.n.* (holotype K!).

= *Nephrodium yunnanense* Baker (1906: 11); *Tectaria yunnanensis* (Baker) Ching (1931: 24), **syn. nov.** Type:—CHINA. Yunnan: Mengtze, Red river mountains, without date, *Hancock 193* (holotype K!).

Note:—*Tectaria griffithii* has long been confused with *T. multicaudata* (Clarke 1880: 540) Ching (1931: 20). Both Ching (1931) and Holttum (1991a, b) considered the two species as conspecific, albeit Ching (1931)

took *T. multicaudata* as the accepted name while Holttum (1991a, b) adopted *T. griffithii*. In fact, *T. griffithii* and *T. multicaudata* are distinct in the venation pattern. The holotype of *T. griffithii* (Griffith s.n., K) is characterized by having fully anastomosing veins, vein areoles mostly with free veinlets included, and lacking costal or costular areoles (Fig. 1a). The holotype of *T. multicaudata* (Clarke 18427, K) has partly anastomosing veins that form narrow areoles immediately beside costae or costules, without included free veinlets (or rarely occurring) in areoles (Fig. 1b). Noticeably, the feature of venation was clearly stated in the protologues of *T. griffithii* and *T. multicaudata*. Baker described the venation of *T. griffithii* as having “main veins distinct to the edge, with copious free included veinlets” (Hooker & Baker 1867: 300). For the venation of *T. multicaudata*, Clarke stated that “I can see little difference in the venation and sori between this and *Nephrodium cicutarium* var. *coadunata*” (Clarke 1880: 540). As we know, *N. cicutarium* var. *coadunata* mentioned by Clarke is nowadays *T. coadunata* (Smith 1842: 184) C.Christensen (1931: 331), which is characterized by veins forming costal and costular areoles lacking free included veinlets (Holttum 1991a). Unfortunately, later authors ignored the easily recognizable difference of venation between the two species. It is notable that the venation in such two conditions (costal areoles present or not) is the sole difference between two sections of *Tectaria* proposed by Holttum (1988, 1991a). According to Holttum’s subdivision of *Tectaria*, *T. multicaudata* should be grouped into sect. *Sagenia*, whereas *T. griffithii* to sect. *Tectaria*.

*Tectaria yunnanensis* is included here in *T. griffithii*. When comparing the holotypes of both species, we found that they are similar in nearly all important characters, such as coarsely dissected fronds, fully anastomosing veins without costal or costular areoles, large sori in two rows between main veins, and sori rather deeply impressed on abaxial surface of lamina. They doubtless represent a single species. It is also noticed that there are no scales above the base of stipes in this species. Scaly stipes, previously considered a diagnostic character of *T. griffithii* (e.g., Holttum 1988, Tagawa & Iwatsuki 1988, Wang 1999), is actually a characteristic feature of *T. multicaudata*.

***Tectaria macleanii*** (Copel.) S.Y.Dong, *comb. nov.*

Basionym:—*Tectaridium macleanii* Copeland (1926: 329). Type:—PHILIPPINES. Luzon: Cagayan (West Mountain, Claveria), 29 December 1919, *Maclean & Catatan 84* (neotype MICH, isoneotype CAS, all original material destroyed in 1945 at PNH).

= *Tectaridium primitivum* Copeland (1926: 329). Type:—PHILIPPINES. Leyte: Buenavista (Jaro), 9 June 1914, *Wenzel 876* (holotype PNH, destroyed, isotypes F, MO, NY, UC).

Note:—*Tectaridium* Copeland (1926: 329) is a monotypic genus in the Philippines (Holttum 1991a). In our phylogenetic trees based on six cpDNA sequences (Ding *et al.*, unpubl. data), however, the sample of *Tectaridium* was well resolved in a monophyletic clade with other *Tectaria* species. So the transfer of *Tectaridium macleanii* into *Tectaria* is needed.

***Tectaria multicaudata*** (C.B.Clarke) Ching (1931: 20).

Basionym:—*Nephrodium multicaudatum* Clarke (1880: 540). Type:—BANGLADESH. Sylhet, 30 November 1887, *Clarke 18427* (holotype K!).

≡ *Tectaria griffithii* auct. non (Baker) Christensen (1934: 180), Holttum (1991a: 54), *pro parte*, excluding the type of *T. griffithii*.

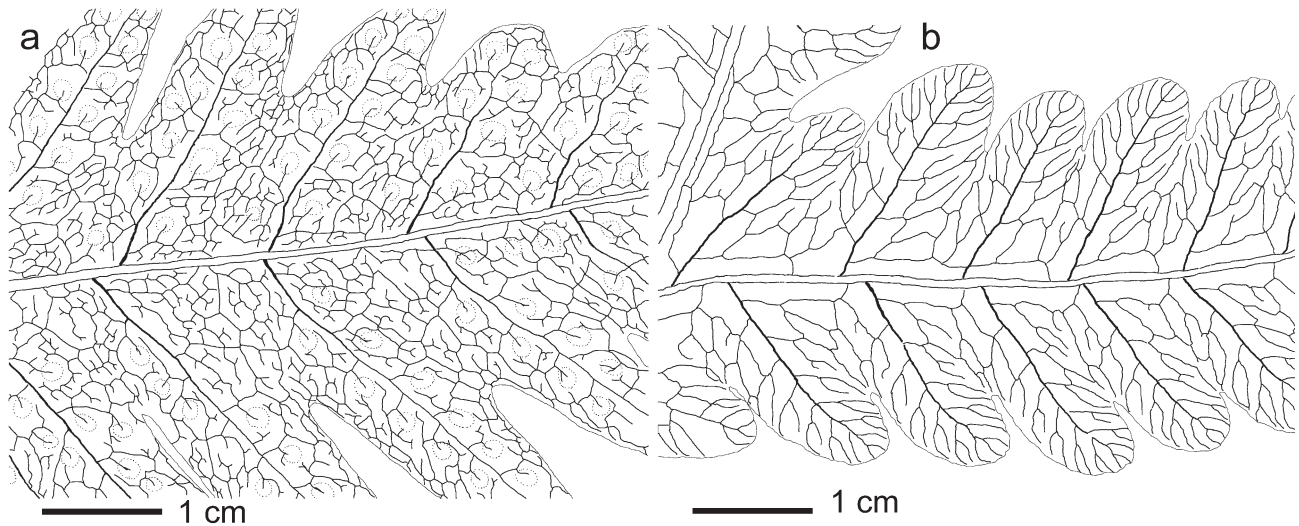
= *Tectaria griffithii* var. *singaporeana* Holttum (1991b: 551), **syn. nov.** Type:—SINGAPORE. Bukit Timah, January 1908, *Matthew s.n.* (holotype K!).

Note:—As stated above, *Tectaria multicaudata* is a separate species from *T. griffithii*. They are distinct in the venation pattern, i.e., costal and costular areoles are present in *T. multicaudata* but absent in *T. griffithii* (Fig. 1).

Holttum (1991b) proposed two varieties under his misunderstood *Tectaria griffithii*, i.e., *T. griffithii* var. *singaporeana* and *T. griffithii* var. *amplissima*, both having costal and costular areoles of veins. The only difference between the two varieties is “veins all free in lobes of fertile pinnae” in “*T. griffithii* var. *singaporeana*” but “veins amply anastomosing in fertile fronds” in “*T. griffithii* var. *amplissima*” (Holttum 1991b). When carefully comparing a large number of specimens of *T. multicaudata* in herbaria, we found the

form of veins of “*T. griffithii* var. *singaporeana*” falling within the variation range of veins of *T. multicaudata*. Therefore we propose to include *T. griffithii* var. *singaporeana* in *T. multicaudata*. The holotype of the second variety, *T. griffithii* var. *amplissima*, however, represents a distinct taxon, which is transferred to *T. multicaudata* as a variety.

*Tectaria malayensis* (Christ 1907: 187) Copeland (1907: 416) was submerged by Holttum (1991a) under his misapplied *T. griffithii*. It was based on a collection from Luzon (*Loher* 858, K!) with the same venation pattern of *T. multicaudata*. If *T. malayensis* will be eventually proved to be a synonymous name, it should be reduced to *T. multicaudata* instead of *T. griffithii*.



**FIGURE 1.** Comparison of the venation between *Tectaria griffithii* (Baker) C.Chr. (a) and *T. multicaudata* (C.B.Clarke) Ching (b). a) Portion of a pinnule on basal pinna, based on the holotype of *T. griffithii* (*Griffith s.n.*, K); b) portion of a pinnule on basal pinna, based on the holotype of *T. multicaudata* (*Clarke 18427*, K).

***Tectaria multicaudata* var. *amplissima* (Holttum) S.Y.Dong, *comb. nov.***

Basionym:—*Tectaria griffithii* var. *amplissima* Holttum (1991b: 551). Type:—INDONESIA. Sumatra: Padang Panjang (Bukit Tilabung), 9 January 1913, *Matthew s.n.* (holotype K!).

Note:—As Holttum (1991a, b) has pointed out, *T. multicaudata* var. *amplissima* has rather finely dissected fronds with as many as six pairs of pinnules on the basal pinnae. In contrast, the fronds are not so dissected with only one or rarely two pinnules on basal pinna in *T. multicaudata* var. *multicaudata*.

***Tectaria psomiocarpa* S.Y.Dong, *nom. nov.* for *Polybotrya apiifolia* J.Sm. ex Kunze (1844: 142). *Psomiocarpa apiifolia* (J.Sm. ex Kunze) Presl (1851: 161). *Acrostichum apiifolium* (J.Sm. ex Kunze) Hooker (1864: 248). Type:—PHILIPPINES. Luzon, 1936–1940, *Cuming 26* (holotype MICH!, isotypes E!, MO!, P!).**

Blocking name:—*Tectaria apiifolia* (Schkuhr 1809: 198) Copeland (1907: 410). Type:—JAMAICA. Without locality, *Sloane s.n.* (holotype? BM!).

Note:—*Psomiocarpa* C.Presl (1851: 161) is currently an accepted genus containing only one species, *P. apiifolia* (Schkuhr) Copeland (1907: 410) (Holttum 1991a). Our molecular analyses (Ding *et al.*, unpubl. data), however, do not support the monophyly of *Psomiocarpa*, as *P. apiifolia* is constantly embedded with *Tectaria* species in all resulting phylogenetic trees. Thus, in taxonomic treatment *P. apiifolia* should be transferred into *Tectaria*. Since an earlier *T. apiifolia* (Schkuhr) Copeland (1907: 410) exists, which is based on material from Jamaica, we have to propose a new name for *P. apiifolia*, *Tectaria psomiocarpa*.

*Tectaria subvariolosa* S.Y.Dong, *nom. nov.* for *Tectaria stenosemioides* Tardieu & C.Christensen (1938: 88). Type:—VIETNAM. Quang Tri: Vinh Linh (Liem-Cong), July 1910, *Cadière 14* (holotype P!, isotypes BM!, P!). Blocking name:—*Tectaria stenosemioides* (van Alderwerelt van Rosenburgh 1920: 164) Christensen (1934: 184). Type:—INDONESIA. Sumatra: Sibolangit, 4 June 1917, *Lorzing 5161* (holotype BO).

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