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Nomenclatural changes in subfamilies of the Dicranaceae

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Abstract — The nomenclatural history of subfamilies of the Dicranaceae Schimp. is presented. The Dicranelloideae Lindb. is the oldest name for a subfamily comprising genera centred around *Dicranella* (Müll. Hal.) Schimp. and the Anisothecioideae Broth. and Campylopodioideae Broth. are synonyms of this name. The Campylopoideae (Limpr.) Ochyra, *stat. et comb. nov.*, is a new subfamily name for genera assembled around *Campylopus* Brid. and this name has to replace the Campylopodioideae sensu Frahm of 1991, whereas the Brotheroideae Takaki, *nom. nud.*, is a synonym of this name. The Paraleucobryoideae Broth. is included in the type subfamily of the Dicranaceae. The Oncophoroideae Lindb. is resurrected to accommodate genera traditionally placed in the Rhabdoweisioideae Broth. or Rhabdoweisiaceae Limpr., and the Cynodontioideae AJE Sm., *nom. inval.*, is a synonym of this name.

Bryophyta / Musci / Dicranaceae / Dicranelloideae / Campylopoideae / Oncophoroideae / Rhabdoweisioideae / nomenclature / suprageneric taxa

INTRODUCTION

It is widely accepted that the first infrafamilial classification of the Dicranaceae was proposed by Brotherus (1901), in the first edition of the Musci in *Die natürliche Pflanzenfamilien.* He divided this family into eight subfamilies, namely Trematodontoideae, Ditrichoideae, Bryoxiphioideae, Seligerioideae, Dicranelloideae, Rhabdoweisioideae, Dicranoideae and Dicnemonoideae. This concept of the Dicranaceae was subsequently refined by Brotherus (1924) in the second edition of the Musci in *Die natürliche Pflanzenfamilien*, and the Bryoxiphiaceae, Seligeriaceae, Ditrichaceae and Dicnemonaceae were removed from the Dicranaceae and elevated to families in their own rights. The other subfamilies remained in the Dicranaceae and two new subfamilies, the Anisothecioideae and Paraleucobryoideae, were added, whilst the former Dicranelloideae was replaced by the Campylopodioideae. This scheme of the classification was accepted, sometimes with slight modifications, by subsequent workers (e.g., Reimers, 1954; Walther, 1983; Allen, 1994), although some authors (e.g., Frahm, 1991; Stech, 1999) found it to be rather confusing and not satisfactory, and suggested some additional changes and modifications. Recently, Allen (1987) distinguished the monotypic subfamily Mesotoideae for the highly isolated Australasian genus *Mesotus* Mitt. It should be added that the Trematodontoideae

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and Rhabdoweisioideae are sometimes segregated into separate families, the Bruchiaceae (Buck, 1979) and Rhabdoweisiaceae (e.g., Buck & Goffinet, 2000).

Putting aside strictly taxonomic questions associated with the arrangement of the genera of the Dicranaceae into subfamilies, the nomenclature leaves much to be desired. It is generally overlooked that the first subdivision of the Dicranaceae was proposed by Lindberg (1878, 1879) who recognized five subfamilies within it, namely Dicranoideae, Dicranelloideae, Trematodontoideae, Ditrichoideae and Oncophoroideae. At least two of these names, Dicranelloideae and Oncophoroideae, have priority over the names proposed later by Brotherus (1901, 1924).

THE STATUS OF THE CAMPYLOPODIOIDEAE BROTH. AND ANISOTHECIOIDEAE BROTH.

In the Dicranelloideae, Lindberg (1878) placed *Anisothecium* Mitt., *Dicranella* (Müll. Hal.) Schimp. and *Aongstroemia* Bruch & Schimp. Brotherus (1901) followed the lead of Lindberg (1878) and only added the exotic genus *Campylopodium* (Müll. Hal.) Besch. to this subfamily and merged *Anisothecium* with *Dicranella*. Later Brotherus (1924) changed his mind with regard to the identity of these latter two genera and considered them to be distinct taxa which were placed in two separate subfamilies. He recognized the Anisothecioideae for *Anisothecium*, *Aongstroemia*, *Aongstroemiopsis* M. Fleisch., *Pseudephemerum* (Lindb.) I. Hagen, and *Polymerodon* Herzog and changed the subfamily name Dicranelloideae to Campylopodioideae. However, the latter name is illegitimate because it includes the type of the earlier legitimate name Dicranelloideae. Because the type genera of the two subfamilies, *Dicranella* and *Anisothecium*, are now considered to be congeneric or very closely related taxa, recognition of the Anisothecioideae is entirely unjustified and both subfamily names must be synonymized.

Dicranaceae Schimp., *Coroll. Bryol. Eur.*: 11. 1856 subfam. **Dicranelloideae** Lindb., *Utkast Eur. Bladmoss*.: 33. 1878 ["Dicranelleae"]. – **Type**: *Dicranella* (Müll. Hal.) Schimp.

Dicranaceae subfam. Campylopodioideae Broth. *in* Engl., *Nat. Pflanzenfam.* ed. 2, **10**: 180. 1924, *nom. illeg. incl. subfam. prior.*

Dicranaceae subfam. Anisothecioideae Broth. *in* Engl., *Nat. Pflanzenfam.* ed. 2, **10**: 177. 1924. – **Type**: *Anisothecium* Mitt., ***syn. nov.***

THE CORRECT NAME FOR THE CAMPYLOPODIOIDEAE SENSU FRAHM

Brotherus (1924) placed in his Campylopodioideae ten genera centred around *Dicranella* (*Campylopodium*, *Microdus* Schimp. ex Besch., *Microcampylopus* (Müll. Hal.) M. Fleisch. and *Campylopodiella* Cardot) and *Campylopus* Brid. (*Metzleria* Schimp. ex Milde, *Pilopogon* Brid., *Dicranodontium* Bruch & Schimp.

and *Thysanomitrion* Schwägr.). The concept of this subfamily was later refined by Frahm (1991) who limited it to the genera *Metzleria*, *Pilopogon*, *Dicranodontium*, *Campylopus*, *Sphaerothecium* Hampe and *Bryohumbertia* P. de la Varde & Thér.

However, the subfamily consisting of this group of species actually remains without a legitimate name. Allen (1994) admittedly suggested the synonymization of the Campylopodioideae sensu Frahm (1991) with the Paraleucobryoideae, but Stech (1999) suggested that only two genera, *Brothera* Müll. Hal. and *Campylopodiella*, which were placed in the latter subfamily by Müller & Frahm (1987), would be better moved into the Campylopodioideae sensu Frahm (1991). However, the type of this subfamily, *Paraleucobryum* (Limpr.) Loeske, is a member of the Dicranoideae. Acceptance of the taxonomic concept proposed by Stech (1999) would mean that the Paraleucobryoideae is a synonym of the Dicranoideae. It is worth noting that Takaki (1968, 1971, 1973) intended to distinguish a separate subfamily, Brotheroideae, for *Brothera*. It would be a good candidate for a name of the subfamily replacing the Campylopodioideae sensu Frahm (1991) but, unfortunately, Brotheroideae is a *nomen nudum*, thus having been invalidly published.

Instead of describing a new subfamily for the group of genera centred around *Campylopus*, the admissible solution is to elevate the 'Gruppe Campylopodeae' to subfamily rank – which was recognized by Limpricht (1886) as one of two rankless subdivisions of the Dicranaceae. Accordingly, these nomenclatural questions are summarized as follows:

Dicranaceae Schimp. subfam. **Campylopoideae** (Limpr.) Ochyra, ***stat. et comb. nov.***

Basionym: Dicranaceae [Gruppe] Campylopodeae Limpr., *Laubm. Deutschl.* **1**: 378. 1886. – **Type**: *Campylopus* Brid.

Dicranaceae subfam. Brotheroideae Takaki, *J. Hattori Bot. Lab.* **31**: 285. 1968, *nom. nud.*; *Misc. Bryol. Lichenol.* **5**: 136. 1971, *nom. nud.*; *J. Hattori Bot. Lab.* **37**: 512. 1973, *nom. nud.*, ***syn. nov.***

Dicranaceae subfam. Campylopodioideae sensu Frahm, *J. Hattori Bot. Lab.* **69**: 72. 1991 [*non* Brotherus 1924], ***syn. nov.***

Dicranaceae Schimp. subfam. **Dicranoideae**

Dicranaceae subfam. Paraleucobryoideae Broth. *in* Engl., *Nat. Pflanzenfam.* Ed. 2, **10**: 191. 1924. – **Type**: *Paraleucobryum* (Limpr.) Loeske, ***syn. nov.***

THE ONCOPHOROIDEAE REPLACES THE RHABDOWEISIOIDEAE

Lindberg (1878) recognized the separate subfamily Oncophoroideae to accommodate *Dichodontium* Schimp. and *Oncophorus* (Brid.) Brid., which was very broadly understood to include also the genera *Oreas* Bruch & Schimp. and *Rhabdoweisia* Bruch & Schimp. Excluding *Oncophorus* in the narrow sense, these genera along with *Cynodontium* Bruch & Schimp. and *Oreoweisia* (Bruch & Schimp.) De Not. were subsequently placed by Brotherus (1901) in the separate subfamily Rhabdoweisiodeae, but somewhat earlier Limpricht (1886) considered it as the distinct family Rhabdoweisiaceae. Circumscription of the Rhabdoweisioideae is difficult not only on morphological grounds, but also concerning the

molecular data because exceptions occur with regard to almost all characters which separate this subfamily from the other subfamilies of the Dicranaceae. On the basis of the molecular data Stech (1999) found that *Oncophorus* does not belong to the Dicranoideae and according to Frahm *et al*. (1998) this genus is morphologically closely related to *Cynodontium* with which it shares many gametophyte and sporophyte characters except for more or less smooth laminal cells. Therefore Stech (1999) suggested to be most practical to maintain the Rhabdoweisioideae in a broad sense, including, among other things, *Oncophorus* and *Rhabdoweisia*. If such concept of this subfamily is accepted, the Oncophoroideae is the oldest name for it and has priority over the Rhabdoweisioideae. If one considers these two genera to be in different associations, then obviously the Oncophoroideae does not replace the Rhabdoweisioideae.

Quite recently Smith (1978) placed *Rhabdoweisia*, *Oncophorus*, *Cynodontium*, *Dichodontium* as well as *Ceratodon* Brid., *Saelania* Lindb. and *Cheilothela* Lindb. ex Broth. in the newly established subfamily Cynodontioideae. This name has been accepted by Frey *et al*. (1995) and Cortini Pedrotti (2001) but it is invalid being described only in English.

Dicranaceae Schimp. subfam. **Oncophoroideae** Lindb., *Utkast Eur. Bladmoss.*: 34. 1878 ["Oncophoreae"]. – **Type**: *Oncophorus* (Brid.) Brid.

Dicranaceae subfam. Rhabdoweisioideae Broth. *in* Engl. & Prantl, *Nat. Pflanzenfam.* 1(3): 312. 1901. – **Type**: *Rhabdoweisia* Bruch & Schimp., **syn. nov.**

Rhabdoweisiaceae Limpr., *Laubm. Deutschl.* **1**: 271. 1886. – **Type**: *Rhabdoweisia* Bruch & Schimp., ***syn. nov.***

Dicranaceae subfam. Cynodontioideae A.J.E. Sm., *Moss Fl. Brit. Irel.*: 126. 1978 ["Cynodontoideae"], *nom. inval. descr. angl.*, ***syn. nov.***

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