

The Biflavones of *Dicranum scoparium* (Dicranaceae)*

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From *Dicranum scoparium* 5',3'''-dihydroxyamentoflavone and 5',3'''-dihydroxyrobustaflavone were isolated. The compounds were identified spectroscopically.

Dicranum scoparium was the first moss from which a biflavone, namely 5',3'''-di-hydroxyamentoflavone (**1**), has been isolated [1]. In this early work only the biflavone **1** had been obtained from *D. scoparium*. Further research in the field of moss biflavonoids revealed however, that this biflavone is usually accompanied by the isomeric and biogenetically closely related 5',3'''-dihydroxyrobustaflavone (**2**) [2–4]. This is also the case with *Dicranoloma robustum* and *Dicranoloma billardieri* [5]. After these *Dicranoloma* species have been transferred recently to the genus *Dicranum* [6], it became desirable to reinvestigate the biflavonoid pattern of *D. scoparium*. This reinvestigation revealed that in this moss 5',3'''-dihydroxyamentoflavone (**1**) is also accompanied by the isomeric 5',3'''-

dihydroxyrobustaflavone (**2**). Surprisingly however the 2'-linked biluteolins that accompany **1** and **2** in the above mentioned *Dicranoloma spp.* [5] could not be found in *D. scoparium*, although they would have been easily detected in the course of our standard procedure of isolation (see for example ref. [4]). This is a significant difference between *D. scoparium* and the two *Dicranoloma spp.*, and it suggests, that a study of chemical characters might help with the taxonomic problems within the *Dicranum-Dicranoloma* group.

Experimental

The plant material – gametophytes containing a few unripe sporophytes – was collected and identified by two of us (H. G. and J. A. L.-S.) in the Kirkeler Tal between Kirkel and Lautzkirchen, Saarland, F.R.G. A voucher specimen is deposited at the herbarium “SAAR” of the Universität des Saarlandes (Nr. 3887). The extraction and isolation of the biflavonoids was carried out as described loc. cit. [4]. 285 g air dried material yielded 62 mg **1** [¹H NMR DMSO-d₆, 400 MHz at 20° (ppm): 7.50 (1 H, d, *J* = 2 Hz, H-2'), 7.49 (1 H, d, *J* = 2 Hz, H-6'), 7.07 (1 H, d, *J* = 2 Hz, H-2'''), 7.05 (1 H, dd, *J* = 8 and 2 Hz, H-6'''), 6.69 (1 H, s, H-3), 6.67 (1 H, d, *J* = 8 Hz, H-5'''), 6.65 (1 H, s, H-3'''), 6.43 (1 H, d, *J* = 2 Hz, H-8), 6.38 (1 H, s, H-6''), 6.18 (1 H, d, *J* = 2 Hz, H-6)] and 6 mg **2** [¹H NMR DMSO-d₆, 400 MHz at 20° (ppm): 7.44–7.43 (2 H, m, H-2''', H-6'''), 7.38 (1 H, d, *J* = 2 Hz, H-6'), 7.36 (1 H, d, *J* = 2 Hz, H-2'), 6.90 (1 H, d, *J* = 8 Hz, H-5'''), 6.68 (1 H, s, H-3'''), 6.61 (1 H, s, H-3), 6.55 (1 H, s, H-8''), 6.44 (1 H, d, *J* = 2 Hz, H-8), 6.18 (1 H, d, *J* = 2 Hz, H-6)]. **1** and **2** were identified by comparison of their ¹H NMR spectra with published data [7], and by cochromatography with authentic samples.

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