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** [^{1}H NMR DMSO-d_6, 400 MHz at 20° (ppm): 7.50 (1H, d, j = 2 Hz, H-2′), 7.49 (1H, d, J = 2 Hz, H-6′), 7.07 (1H, d, J = 2 Hz, H-2‴), 7.05 (1H, dd, J = 8 and 2 Hz, H-6‴), 6.69 (1H, s, H-3), 6.67 (1H, d, J = 8 Hz, H-5‴), 6.65 (1H, s, H-3″), 6.43 (1H, d, J = 2 Hz, H-8), 6.38 (1H, s, H-6″), 6.18 (1H, d, J = 2 Hz, H-6)] and 6 mg **2** [^{1}H NMR DMSO-d_6, 400 MHz at 20° (ppm): 7.44–7.43 (2H, m, H-2‴, H-6‴), 7.38 (1H, d, J = 2 Hz, H-6′), 7.36 (1H, d, J = 2 Hz, H-2′), 6.90 (1H, d, J = 8 Hz, H-5‴), 6.68 (1H, s, H-3″(, 6.61 (1H, s, H-3), 6.55 (1H, s, H-8″), 6.44 (1H, d, J = 2 Hz, H-8), 6.18 (1H, d, J = 2 Hz, H-6)]. **1** and **2** were identified by comparison of their ^{1}H NMR spectra with published data [7], and by cochromatography with authentic samples.

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