

*C. olivacea* Liebm. Mex. Halv. 79 (1850), not Boott (1846).

*C. monticola* Boeckl. Engler's Bot. Jahrb. 1: 364 (1881), not Dewey (1861).

*C. androgyna* Bailey, Proc. Amer. Acad. 22: 101 (1886), not Balbis.

Liebmann reports it from the Peak of Orizaba.

*CAREX OBLATA* Bailey, var. **luzuliformis**, n. var.—Differs from the species in being much taller (two feet or more), with broader leaves and much larger spikes.

Idaho, Oregon, California. It is 6210 of the California Geological Survey and 1426 of the Department of Agriculture Death Valley Expedition (*Coville & Funston*). In some cases I have confounded this with *C. luzulaefolia* W. Boott, but that species differs in its broader foliage, and particularly in its broader, papery, and more turgid perigynia. The perigynia of *C. oblata* and var. *luzuliformis* are long and gradually tapering, hard and not at all inflated.

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## THE SYSTEMATIC POSITION OF THE GENUS MONOCLEA.

THE genus *Monoclea*, according to Schiffner,<sup>1</sup> contains one certainly known species, *M. Forsteri* Hook., and a second one, *M. dilatata* Leitgeb, which Schiffner thinks should probably be united with *M. Forsteri*. The American form of the latter has been separated as *M. Gottschei* by Lindberg, but is not usually considered to be distinct.

*Monoclea Forsteri* is apparently common throughout tropical America, and during a visit to Jamaica in the summer of 1897 I met with the plant repeatedly in the wet mountain ravines, and upon the dripping rocks along the margins of streams. In such situations the plant occurred in large masses and was very conspicuous.

Hooker's original description<sup>2</sup> I have not seen, but from the reference to this in Gottsche's paper,<sup>3</sup> it must be very incomplete, as there was an evident confusion of the plant with *Anthoceros* and *Dendroceros*. The locality from which the original plant came seems also to be doubtful.

The first account of the plant which is at all complete is that given

<sup>1</sup> ENGLER and PRANTL, Die natürlichen Pflanzenfamilien 91-92: 56.

<sup>2</sup> HOOKER, Musci exotici. London, 1820.

<sup>3</sup> GOTTSCHKE, Ueber das Genus *Monoclea*. Bot. Zeit. 19: 281-289. 1858.



by Gottsche in the paper already referred to. Leitgeb<sup>4</sup> in his great work upon the Hepaticæ made some additions to Gottsche's description and corrected his error as to the origin of the archegonia. Both of these observers studied the female plant only, but in the last part of this work,<sup>5</sup> Leitgeb describes the male plant of what he considered a distinct species, to which he gave the name *M. dilatata*. The specimens came from New Zealand and were supposed to be a species of *Dumortiera*, which *Monoclea* resembles very closely in general habit.

Finally Ruge<sup>6</sup> has added materially to our knowledge of the plant, especially as regards the development of the reproductive organs.

While Gottsche and Leitgeb both recognized the obvious resemblance of the thallus of *Monoclea* to that of *Dumortiera*, they concluded that the complete absence of the characteristic lacunae of the marchantiaceous thallus in the former forbade its being placed in the Marchantiaceæ, and that its nearest affinity was with the thallose Jungermanniaceæ like *Pellia* and *Pallavicinia*.

A careful examination of the material collected by me last summer, as well as a study of the observations made by Leitgeb and Ruge, have convinced me that the genus should be removed from the Jungermanniaceæ to the Marchantiaceæ with which it much more closely agrees. The form of the thallus and the character of the apical cell were recognized by Leitgeb as marchantiaceous, but as the air-chambers were quite absent he concluded that this resemblance was purely superficial. While admitting the absence of lacunae in some forms of *Dumortiera*, he claimed that these were always formed in the youngest part of the thallus and were destroyed later. However, a careful examination by the writer<sup>7</sup> of *D. trichocephala* showed that in this species these were completely absent from the beginning, and the structure of the thallus corresponded in every respect with that of *Monoclea*. The most marked difference between the latter and the other Marchantiaceæ is the absence of the ventral scales, which are here represented only by papillate hairs of very brief duration. These, however, correspond in origin with the scales of the ordinary types, and simply remain undeveloped.

*Monoclea*, unlike any of the Jungermanniaceæ, has two sorts of root-hairs, thin-walled ones like those of the latter, and thick-walled

<sup>4</sup>LEITGEB, Untersuchungen über die Lebermoose 3:62.

<sup>5</sup>Op. cit. 6:131.

<sup>6</sup>RUGE, G., Beiträge zur Kenntniss der Vegetationsorgane der Lebermoose. Flora 77: 279. 1893.

<sup>7</sup>CAMPBELL, D. H., Mosses and Ferns 49. 1895.



rhizoids which are doubtless the homologues of the characteristic tuberculate ones of the typical Marchantiaceæ.

It is the structure and arrangement of the sexual organs, however, which prove the close affinity of *Monoclea* with the Marchantiaceæ. Both Leitgeb and Ruge noticed the extraordinary resemblance of the male receptacle to that of such forms as *Conocephalus* or *Fimbriaria*, and Ruge's figures show that the development of the antheridium is thoroughly typical of the Marchantiaceæ, although he makes no mention of this fact in the text.

The origin of the archegonia is exactly as in *Targionia*, and I have found that there are six rows of neck-cells, as in the Marchantiaceæ, instead of the five regularly found in the typical Jungermanniaceæ.

It seems strange that Ruge did not recognize the obvious marchantiaceous character of the reproductive organs, but he passes over this point without comment. Schiffner<sup>8</sup> places the genus in the Jungermanniaceæ, near *Pallavicinia* and *Symphyogyna*, although admitting marked differences in the character of the sporogonium.

In regard to the exact position of *Monoclea*, it will not be possible to decide until more is known of the development of the embryo. At present it seems to approach *Targionia* more nearly than any other genus. The resemblance to *Dumortiera* is probably purely superficial, and simply indicates a similar adaptation to similar semi-aquatic environment.

We may safely conclude that the affinities of *Monoclea* are with the lower series of Marchantiaceæ, perhaps the *Targionieæ*, where the archegonia are borne directly upon the unmodified thallus, and no definite receptacle is developed. The absence of lacunae, as well as the simplification of the rhizoids and ventral scales, are with little question secondary, as they are in *Dumortiera*, where, however, the reduction is not quite so marked; and these reductions are correlated with the almost aquatic nature of these plants. There is little reason to suppose that the two genera are closely related, as *Dumortiera* shows undoubted relationship with the higher Marchantieæ, like *Marchantia*, where both antheridia and archegonia are borne upon specially modified receptacles which are compound, representing a branch-system. *Monoclea* may be supposed to bear the same relation to the lower Marchantiaceæ that *Dumortiera* does to the higher ones.—DOUGLAS HOUGHTON CAMPBELL, *Stanford University*.

<sup>8</sup> ENGLER and PRANTL, loc. cit.





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