
The differentiation of sterile thalli of *Aneura* and *Pellia* and the problem of *Pellia* species with unistratose margins

Jan-Peter Frahm

Zusammenfassung: Thallöse Lebermoose mit einem einzellschichtigen Thallusrand werden gerne zu *Aneura maxima* gestellt, für die dieses Merkmal als charakteristisch gilt. Feucht gewachsene Formen von *Pellia epiphylla* und *P. endiviifolia* haben diesen einzellschichtigen Thallusrand aber auch und können zu Verwechslung Anlass geben. *Pellia*-Arten sind jedoch durch das Vorhandensein von Schleimhaaren bzw. –papillen von *Aneura* (*maxima*) unterschieden, die hier illustriert und beschrieben sind.

Abstract: Thalloid liverworts with unistratose thallus margins are easily determined as *Aneura maxima*, which shall be identified by this character. However, forms of *Pellia epiphylla* and *P. endiviifolia* grown under humid conditions can have an unistratose undulate thallus margin and thus confused with the latter. *Pellia* species can, however, be distinguished from *Aneura* by the presence of slime hairs vs. slime papillae, which are described and illustrated here.

The differentiation of sterile thalli of species of *Aneura* and *Pellia* can be a difficult task, especially in Europe, where aquatic forms of *Aneura pinguis*, *A. maxima*, *Pellia epiphylla* and *P. endiviifolia* grow in similar habitats and can hardly be distinguished in the field. This includes even forms of *Pallavicinia lyellii*. An example: samples of “*Aneura pinguis*” were collected by me for the exsiccate series “*Bryophyta Vogesiaca Exsiccata*” growing submersed in a small stream in the Vosges Mountains, Eastern France. The specimen was later revised by Riclef Grolle to *Pallavicinia lyellii*! Other collections remained doubtful. For example, masses of a thalloid liverworts were found by the author in a spring in the Neander Valley near Düsseldorf in western Germany (fig. 1), which were tentatively identified as *Pellia endiviifolia*, but mainly for the fact that this is the most common Metzgeriales liverwort in the area. The same happened with a thalloid liverwort growing submerged in a mill pond in the Vosges Mountains, which was identified at first as unusual form of *Aneura pinguis*, then by Martin Nebel as *Pellia endiviifolia*. Furthermore, *Pellia endiviifolia* can have an unistratose thallus margin (Damsholt 2002 fig. 252) which can lead to misidentifications with *Aneura maxima*. Also *P. epiphylla* produces unistratose as well as undulate thallus margins, which are characteristic for *Aneura maxima*.

Müller (1955) distinguishes Pelliaceae and Aneuraceae mainly by sporophytic characters. In sterile condition, the Aneuraceae shall have 1-3 large oil bodies per cell and the Pelliaceae numerous small ones. The latter is not correct, since *Aneura maxima* has 40-60 oil bodies.

According to other authors (e.g. Frey et al. 2007), the distinction of *Aneura* and *Pellia* in sterile condition follows the couplet “thallus without thickened median band” (Aneuraceae) and “with broad but indistinct median band” (Pelliaceae), however, certain aquatic forms do not allow to separate *Pellia* and *Aneura* species.



Fig. 1: *Pellia endiviifolia* floating in a spring. It can hardly be separated from *P. epiphylla* by appearance but by the shape of the slime hairs.

It was Martin Nebel, who drew my attention on a character used by Schuster (1992), who separated the species of *Pellia* by the shape of the slime hairs at the thallus apices. According to Schuster, the species of *Pellia* can be distinguished as follows:

Pellia endiviifolia: slime hairs formed of 2-4(5) or more cylindrical (3-8:1) cells + terminal slime papillae (fig. 3).

Pellia neesiana, *P. epiphylla*: slime papilla stalked, on a single, short (1.5-2.5:1) basal cell (fig. 2).

Newton (1999) used this character as distinction of *Pellia* and *Aneura*: “Papillae on ventral surface of apex sessile” (*Aneura*, also *Riccardia*) or “...on stalk, one or several cells long” (*Pellia*).

Damsholt (2002) differentiates even *Pellia epiphylla* ssp. *epiphylla* and ssp. *borealis* by the size of the slime hairs.

In contrast, *Aneura* has no slime hairs. This is insofar important as submerged forms of *Pellia* can have a wide, undulate and unistratose thallus margin, which looks much like *Aneura maxima* (figs. 4-5). Therefore the records of *Aneura* “*pseudomaxima*” (Frahm 2011) have to be referred to *Pellia epiphylla*. Not all thaloid liverworts with *Aneura* appearance and unistratose thallus margins of various width are *Aneura maxima*! Wet grown *Pellia* species look the same (figs. 6-7)!

For observation of the slime hairs of *Pellia*, the thallus apex has to be cut off with the ventral side on top, and slightly squeezed under the mounting glass.

Literature

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Fig.2 : Slime hairs of *Pellia epiphylla* at the end of the thallus.

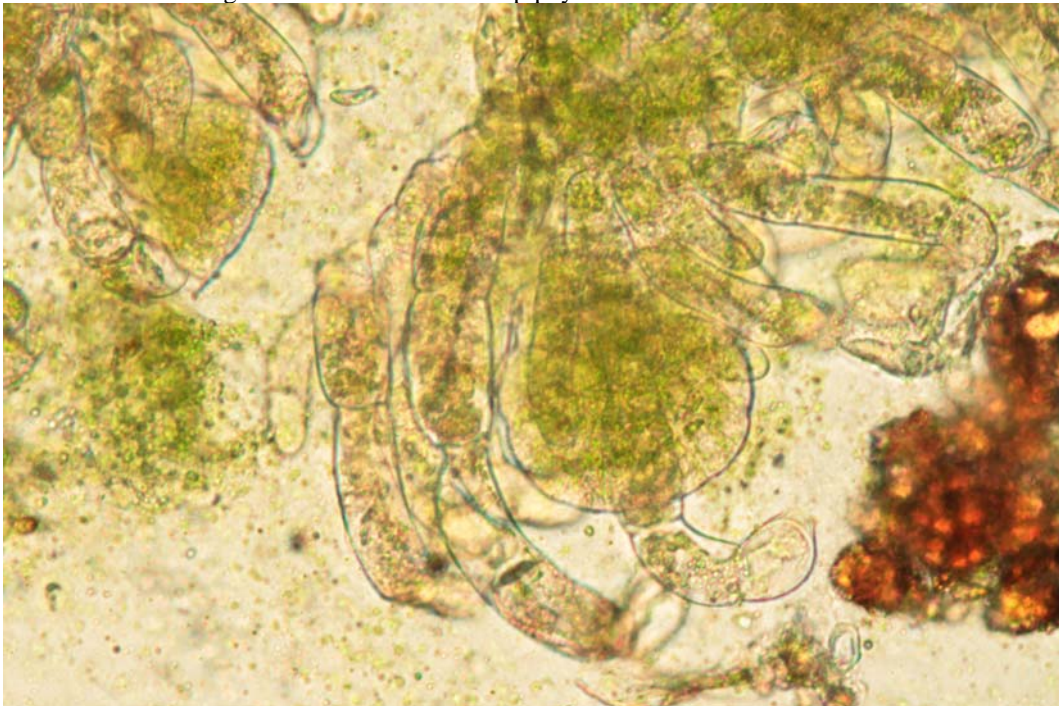


Fig. 3: Slime hairs of *Pellia endiviifolia* at the end of the thallus (squeezed).



Figs. 4-5: *Pellia epiphylla* growing in a swamp with unistratose margin resembling *Aneura maxima*.



Figs. 6-7: *Aneura* “*pseudomaxima*” (Frahm 2011) is a form of *Pellia epiphylla*. It has slime papillae.