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Research paper

# Medicinal mosses in pre-Linnaean bryophyte floras of central Europe. An example from the natural history of Poland



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## ABSTRACT

**Ethnopharmacological relevance:** The paper presents information about the earliest botanical work from Poland, *Warsavia physice illustrata* which takes bryophytes into account. It was elaborated by a German physician Christian Heinrich Erndtel and issued in 1730 in Dresden. That time understanding of bryophytes was imprecise and in many cases they were confused with lichens and club mosses.

**Materials and methods:** Bryophyte taxa polynomials (18 names) were identified using pre- and post-Linnaean botanical monographs from years 1590 to 1801. Their current names and pharmacological value are provided, as well as the old ethnobotanical data about bryophytes (cited from 18th-century sources). **Results:** Altogether 18 bryophyte species were identified from the vicinity of Warsaw (17 mosses and 1 liverwort). Some of them are still abundant in this area (for example *Climacium dendroides*, *Plagiomnium undulatum* and *Polytrichum juniperinum*) while some other are rare or extinct (for example *Neckera crispa* and *Rhodobryum roseum*).

**Conclusions:** Despite the technical ability to observe specific microscopic differences among bryophytes, physicians of 18th century were hardly interested in using any of them as medicinal stock. It may be concluded that the competences in pre-Linnaean bryology did not put into practice using moss-derived *materia medica* of 18th century (the only exceptions were *Fontinalis antipyretica* and *Polytrichum* spp.).

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## 1. Background

Bryophytes are a group of plants sparsely used in phytotherapy. Some species can be found in folk medicine of a few countries, e.g. China (Glime, 2007). Although the first medicinal mosses (and moss-like organisms) are mentioned already in Renaissance herbals (e.g. by Fuchs, 1543, 1545 and Lobelius, 1581), they were either not known widely, or in any general medicinal use. This is interesting since European mosses have never been either expensive, or uncommon, or unavailable, unlike many exotic medicinal raw materials imported to Europe.

Nowadays bryophytes are a subject of intensive phytochemical studies. It has been proved that they possess real medicinal properties, as many other plants (see Asakawa, 2007 and further detailed examples in caption 7).

## 2. Introduction

The natural history of 18th-century Poland hardly possesses any botanical work which describes its flora. The nature of the whole region of Central Europe was usually studied as a source

of medicinal plants. There is very limited data concerning non-flowering plants and they have not been critically discussed so far. The reason of this contemporary lack of knowledge is that those preliminary floristic resources belong to pre-Linnaean era of taxonomy.

Our study is a divulgation of the early floristic and ethnobotanical bryological data from Poland. We compared the 18th-century notes on the medicinal value of identified bryophytes with 19th- and 20th-century folk and scientific medicinal data.

The first researcher to study Polish bryophytes was probably a German traveler Christian Heinrich Erndtel (Erndtelius). He was born in 1670 in Dresden and died in 1734 in Warsaw (Estreicher, 1898). In 1730, he published a book entitled *Warsavia physice illustrata* (Erndtel, 1730), which also contains an appendix *Viridarium Warsaviense sive Catalogus Plantarum* with a list of plants growing in the outskirts of Warsaw. The flora is designed as a review of medicinal species, as it is clearly declared in the preface. Erndtel states there that Galen of Pergamon and his successors wrote mostly about the vicinities of Rome, and the Polish flora and fauna differ from it, for example in terms of venomous vipers (and, in consequence, their natural plant-derived antidotes).

A prominent Polish bibliographer Estreicher (1898) pointed out that in 1653 doctor Paulli from Copenhagen published a Flora of Warsaw (Paulli, 1653) and Erndtel later copied large parts of this book, without even referring to Paulli. This, however, must not be

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true for the flora of bryophytes because Erndtel in his *Viridarium...* quotes most of their names mainly after Loesel's *Flora Prussica*, which was published in 1703 (Loesel, 1703). Hence, Erndtel must have studied the Polish bryophytes himself.

In Erndtel's flora, there exist several species of moss-like plants which were later recognized as a distinct group of plants, the club mosses (*Lycopodiopsida*). By regarding them as mosses, Erndtel repeats the approach of Renaissance botanists. This opinion is still present in Dillenius' main work *Historia Muscorum* (Dillen, 1741). It was not until 1801 when Hedwig issued his *Species Muscorum...* and distinguished club mosses from true mosses (Hedwig, 1801).

Before Erndtel, the moss flora of Poland was superficially discussed by a Polish naturalist, Jesuit Gabriel Rzączyński in his *Historia naturalis curiosa Regni Poloniae* (Rzączyński, 1721). After Erndtel, it was summarized in the 1780s in the first complete flora by a priest, Krzysztof Kluk, entitled *The Plant Dictionary* (Kluk, 1808). He added original comments about the applications of some mosses (as well as other plants), including their medicinal or economical value. The first edition of this dictionary appeared in the years 1786–1788.

### 3. Methods

The procedure of identification of Erndtel's mosses usually consisted of 4 steps:

1. Checking the Loesel's polynomial cited by Erndtel whether it is exactly quoted from the Loesel's *Flora* (Loesel, 1703). We also consulted other authors' works cited by Erndtel (Bauhin, 1620; Bauhin 1623; Theodorus, 1590; Tournefort, 1700).
2. Finding the Loesel's polynomial as a synonym of Dillen's polynomial in Dillen (1741).
3. Finding the Dillen's name as a synonym of Hedwig's binomial in Hedwig (1801).
4. Checking the status of the Hedwig's binomial and finding the currently accepted taxonomical name of the species. The accepted name is typed in **bold face**. The current names are cited according to Ochyra et al. (2003).

Medicinal uses of mosses were quoted according to above-mentioned authors (if present there) and according to Kluk's reprint (vol. 2 from 1808). Citations of old sources are provided with page numbers. This is a standard style of referring to old taxonomic names.

### 4. Results: list of identified bryophyte species from the Erndtel's *Viridarium*

1. The name *Adiantum aureum minus* listed by Erndtel (1730) after Theodorus (1590, page 798) is *Polytrichum quadrangulare Juniperi foliis brevioribus* and *rigidioribus* by Dillen (1741, p. 424–425). This species was named by Hedwig (1801, p. 89–90) ***Polytrichum juniperinum*** Hedw. It is also mentioned by Rzączyński (1721, p. 88) in the flora of Mazovia (central Poland).
2. *Adiantum aureum majus* is given with synonyms: *Adiantum aureum* by Theodorus (1590, p. 1186) and *Muscus capillaceus major, pediculo et capitulo crassioribus* by Tournefort (1700, p. 551). The first is called by Dillen (1741, p. 422) *Polytrichum quadrangulare vulgare, Juccae foliis serratis* and is, according to Hedwig (1801, p. 88) ***Polytrichum commune*** Hedw. The latter is called by Dillen (1741, p. 357–358) *Bryum reclinatum, foliis falcatis scoparium effigie* and this polynomial is named ***Dicranum scoparium*** Hedw. (Hedwig, 1801, p. 126). Erndtel either

erroneously treated all these polynomials as synonyms or meant both species. *Dicranum scoparium* can be hardly confused with *Polytrichum commune*, which is a more common plant. Kluk (1808, vol. 2, p. 218) wrote about *Polytrichum commune*: “former physicians used this plant in various ways against various diseases, and it is to produce the same effects as *Herbae capillares* of the shops. Some contemporary doctors admit it is effective in jaundice, colic pains and muddy glands”. The “muddy glands” may refer to the skin (external use).

3. *Muscus aquaticus denticulatus* after Loesel (1703, p. 173) equals ***Fontinalis antipyretica*** Hedw. According to Kluk (1808, vol. 2, p. 9) this water species used to be used against fever. It might be applied in a form of a cold cataplasm (Drobniak et al., 2007).
4. *Muscus aquaticus tenuissimis foliis, cauliculis adhaerentibus* by Loesel (1703, p. 173) is *Hypnum erectum aut fluitans, foliis oblongis perangustis acutis* in Dillen (1741, p. 299–300). Hedwig (1801, p. 296) named it *Hypnum fluitans* Hedw. The accepted binomial is ***Warnstorfia fluitans*** (Hedw.) Loeske.
5. *Muscus bifolius procumbens foliis subrotundis* (Loesel, 1703, p. 167–168) is *Lichenastrum Asplenii facie, pinnis laxioribus* in Dillen (1741, p. 482–483). This species was effectively named by Linnaeus as *Jungermannia asplenioides* L. (Linné, 1753, vol. 2, p. 1131), current name: ***Plagiochila asplenioides*** (L.) Dumort.
6. *Muscus capillaceus major stellatus* by Tournefort (1700, p. 551) equals *Bryum stellare hornum sylvarum, capsulis magnis nutantibus* by Dillen (1741, p. 402–403). Hedwig (1801, p. 188) called it ***Mnium hornum*** Hedw.
7. *Muscus erectus foliis in orbem sparsis* by Loesel (1703, p. 168) is *Bryum stellare roseum majus, capsulis ovatis, pendulis* by Dillen (1741, p. 411–412). This is *Mnium roseum* Hedw. in Hedwig (1801, p. 194), today ***Rhodobryum roseum*** (Hedw.) Limpr.
8. *Muscus filicinus minor floridus* by Bauhin (1620, p. 151) and Bauhin (1623, p. 360) is named *Hypnum filicinum, Tamarisci foliis minoribus non splendentibus* by Dillen (1741, p. 276–278). This polynomial is named by Hedwig (1801, p. 261–262) *Hypnum tamariscinum* Hedw. and is currently named ***Thuidium tamariscinum*** (Hedw.) Schimp.
9. *Muscus filicinus minor repens* by Loesel (1703, p. 167) was later named *Hypnum filicinum, Tamarisci foliis minoribus, non splendentibus* (Dillen, 1741, p. 276–277). It is according to Hedwig (1801, p. 260) *Hypnum delicatulum* Hedw. and today ***Thuidium delicatulum*** (Hedw.) Schimp.
10. *Muscus palustris terrestri similis* by Ray (1686, p. 122) was named by Dillen (1741, p. 292) *Hypnum palustre erectum, summitatibus aduncis*. This is *Hypnum aduncum* Hedw. (Hedwig, 1801, p. 295). The current name is ***Drepanocladus aduncus*** (Hedw.) Warnst. The Hedwig's name is also listed in Kluk (1808, vol. 2, p. 50–51) but without any usage.
11. *Muscus pennatus* by Bauhin (1620, p. 151) is listed under the same name by Loesel (1703, p. 167). This is *Hypnum pennatum, undulatim crispum, setis et capsulis brevibus* by Dillen (1741, p. 273–274). This taxon was named ***Neckera crispa*** Hedw. (Hedwig, 1801, p. 206).
12. *Muscus pennatus major, cauliculis ramosis, in summitate velut spicatus* by Loesel (1703, p. 167) is named by Dillen (1741, p. 286–287) *Hypnum filicinum, cristam castrensem repraesentans*. According to Hedwig (1801, p. 287) this is *Hypnum cristacastrensis* Hedw., and the accepted name is ***Ptilium cristacastrensis*** (Hedw.) De Not.
13. *Muscus pennatus minor cauliculis ramosis, in summitate velut spicatus* by Loesel (1703, p. 167) is listed by Dillen (1741, p. 281) with different authors. By himself it is named *Hypnum lutescens, alis subulatis tenacibus*. Hedwig (1801, p. 353) calls it *Hypnum abietinum* Hedw. The current name is ***Abietinella abietina*** (Hedw.) M. Fleisch. However, Hedwig (1801) cites a slightly altered polynomial after Vaillant (1723, t. 29

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