

Chromosome studies of some thalloid liverworts in Bulgaria

Original Article

Abstract:

Here, we report for the first time chromosome counts for bryophytes from Bulgaria. The mitotic chromosomes from gametophytes of *Aneura pinguis*, *Pellia epiphylla*, *Pellia neesiana* and *Riccia fluitans* were studied. All counts correspond to previous reports from other parts of the species' range.

Key words:

chromosome counts, liverworts, Bulgaria

Apstrakt:

Studija hromozoma nekih taloidnih jetrenjača u Bugarskoj

Ovde prvi put izveštavamo o broju hromozoma za briofite iz Bugarske. Ispitivani su mitotički hromozomi iz gametofita *Aneura pinguis*, *Pellia epiphylla*, *Pellia neesiana* i *Riccia fluitans*. Svi brojevi odgovaraju prethodnim izveštajima iz drugih delova areala vrste.

Ključne reči:

brojanje hromozoma, jetrenjače, Bugarska

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Introduction

Chromosome studies are a useful tool for taxonomists (Fritsch, 1978). Unfortunately, chromosome studies concerning bryophytes in Europe are sporadic and represent chromosome numbers from a limited number of local populations. Although chromosome numbers in bryophytes are fairly uniform and karyotype analyses are not often informative (Newton, 1979), chromosome counts are a useful tool to distinguish morphologically similar haplo-diploid species pairs. The knowledge on bryophyte chromosome counts was summarized by Fritsch (1991). Notably, information from South-Eastern Europe is missing. Few other publications deal with chromosomes of certain genera of hepatics (Berrie, 1960; Boisselier-Dubaylee & Bischler, 1998; Zheng & Zhu, 2009; Ochrya et al., 2016). The aim of this study was to report chromosome numbers of some thalloid liverworts from Bulgaria.

Material and methods

The liverworts were collected during different excursions and kept alive in a greenhouse, for the purpose of the research. After a period of adaptation a modified Gomori's haematoxylin staining method was used (Melander & Wingstrand, 1953). Fresh actively growing thallus tips were placed in 0.01% solution of colchicine for 90 min. After washing in distilled H₂O they were fixed in Clarke's solution (3:1 ethyl alcohol/glacial acetic acid) for 2 h at room temperature or in a fridge for 24 h. After washing in distilled H₂O the thalli were placed in 1M hydrochloric acid for 40min at 60 °C followed by washing in distilled H₂O. The samples were incubated in hydrochloric acid/ether in ratio 1:1 for 15 min at 60 °C, washed in distilled H₂O the stained in Gomori's Hematoxylin for 1.45/2 h at 60 °C. Samples were squashed in 45% acetic acid and observed under a light microscope.



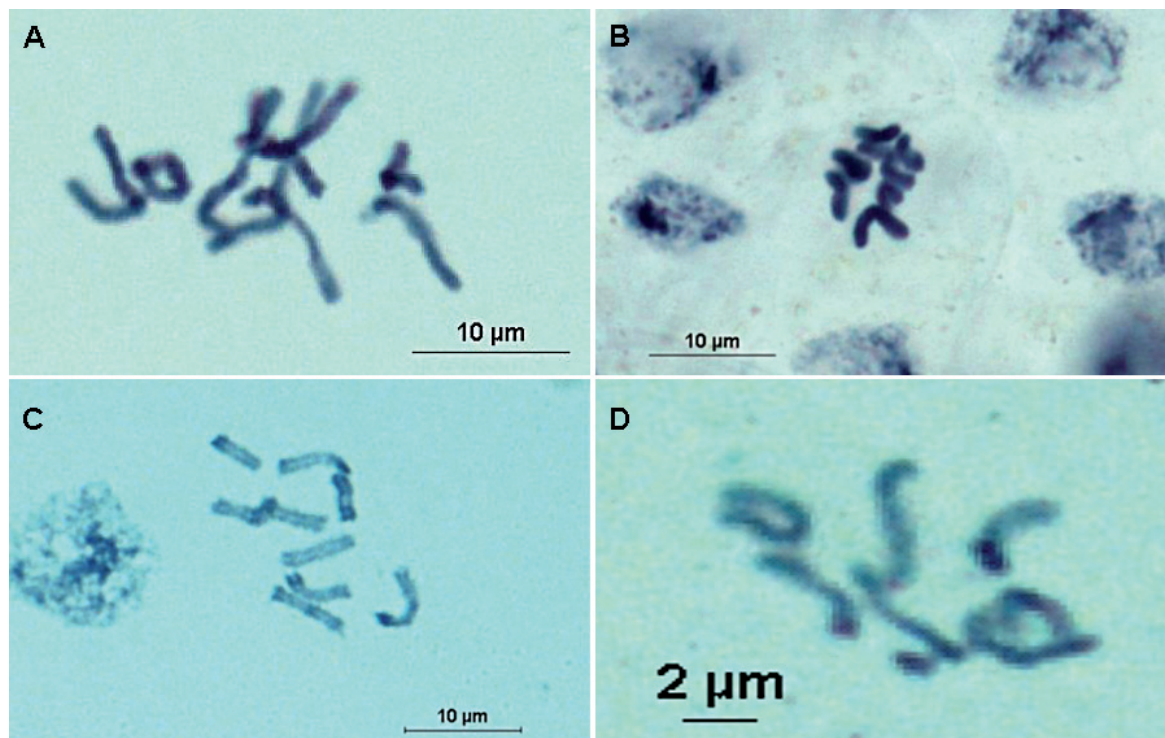


Fig. 1. Mitotic chromosomes of: A - *Aneura pinguis*, B - *Pellia epiphylla*, C- *Pellia neesiana*, D - *Riccia fluitans*

Results and Discussion

Our results were in accordance with already published chromosome numbers for the respective species. For Bulgaria this is the first chromosome report for bryophyte species.

Aneuraceae

Aneura pinguis (L.) Dumort., $n = 10$ (Fig. 1).

Only one exception in the *A. pinguis* chromosome number is known up to now (Inoe, 1975) where the species shows chromosome number of $n = 20$.

Pelliaceae

Pellia epiphylla (L.) Corda, $n=9$ (Fig. 2).

In Europe, diploid number $n=18$ is present in *Pellia borealis* Lorb, an allopolyploid species with two haploid cryptic species within *P. epiphylla* as parental taxa (Orzechowska et al., 2010). The presence of *P. borealis* in Bulgaria was expected but could not be proven by the present study.

Pellia neesiana Nees, $n=9$ (Fig. 3)

Most previous studies for this species showed haploid chromosome count of $n=9$ in mitotic counts (Fritsch, 1991) with a single old report of diploid number of $n=18$ (Showalter, 1927).

Ricciaceae

Riccia fluitans L., $n=8$ (Fig. 4)

The species shows uniformity of chromosome numbers within its range as far as it is studied (Fritsch

1991). The only polyploid reports most likely belong to its close relative *Riccia rhenana* (Heitz, 1927, Lorbeer, 1934).

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