Cryptogamie, Bryologie, 2005, 26 (3): 335-340

Chromosome Studies on Some Turkish Mosses

Şule AYDIN (Saruhan)[a], Teoman KESERCİOĞLU[b]*

[a]125 Sok, No: 2 Kot 16/26, 35170 Kemalpaşa-İzmir, Turkey

[b]Department of Biology, Faculty of Education, Dokuz Eylül University, 35160 Buca-İzmir, Turkey

(Received 28 October 2002, accepted 28 June 2004)

Abstract – Mitotic chromosome numbers in sixteen species belonging to various genera from Turkey are reported. Mitotic chromosome numbers of five species: *Pottia starkeana* (Hedw.) C. Muell. (n = 26), *B. cylindrica* (Tayl.) Schimp. (n = 13 + 1 m), *Bryum pendulum* (Hornsch.) Schimp. (n = 20), *Metaneckera menziesii* (Hook.) Steere (n = 8), *Pterigynandrum filiforme* Hedw. (n = 11) were reported for the first time. *Tortella tortuosa* (Hedw.) Limpr. (n = 13) , *Barbula convoluta* Hedw. (n = 13), *B. rigidula* (Hedw.) Mitt. (n = 13), *Pleurochaete squarrosa* (Brid.) Lindb. (n = 13), *Ceratodon purpureus* (Hedw.) Brid. (n = 13), *Pterogonium gracile* (Hedw.) Sm. (n = 11), *Homalothecium sericeum* (Hedw.) Brunch, Schimp. & Gümbel (n = 10), *Hypnum cupressiforme* Hedw. (n = 10) showed the same chromosome number as in a previous study. *Bartramia stricta* Brid. (n = 8), *Fissidens bryoides* Hedw. (n = 12), *Leucodon sciuroides* (Hedw.) Schwaegr. (n = 10) showed the different chromosome number from in a previous mitotic study.

Musci / chromosome / mitotic metaphase

Résumé – Les nombres chromosomiques de 16 espèces appartenant à différents genres de Turquie sont reportés. Les nombres chromosomiques mitotiques de 5 espèces sont reportés pour la première fois: *Pottia starkeana* (Hedw.) C. Muell. (n = 26), *B. cylindrica* (Tayl.) Schimp. (n = 13 + 1 m), *Bryum pendulum* (Hornsch.) Schimp. (n = 20), *Metaneckera menziesii* (Hook.) Steere (n = 8), *Pterigynandrum filiforme* Hedw. (n = 11). *Tortella tortuosa* (Hedw.) Limpr. (n = 13), *Barbula convoluta* Hedw. (n = 13), *B. rigidula* (Hedw.) Mitt. (n = 13), *Pleurochaete squarrosa* (Brid.) Lindb. (n = 13), *Ceratodon purpureus* (Hedw.) Brid. (n = 13), *Pterogonium gracile* (Hedw.) Sm. (n = 11), *Homalothecium sericeum* (Hedw.) Brunch, Schimp. & Gümbel (n = 10), *Hypnum cupressiforme* Hedw. (n = 10) présentent le même nombre chromosomique que les études précédentes, tandis que *Bartramia stricta* Brid. (n = 8), *Fissidens bryoides* Hedw. (n = 12), *Leucodon sciuroides* (Hedw.) Schwaegr. (n = 10) montrent des différences.

Musci / chromosome/ métaphase mitotique

* Correspondence and reprints: mmaydin@ttnet.net.tr

INTRODUCTION

Cytotaxonomical studies can be useful for taxonomists but, unfortunately, are rarely used in bryology, because only one or two counts are available for many species. Studies in bryophyte cytology have been relatively limited in material from Turkey, despite the discovery of many Musci species within the country. Only three cytotaxonomical study have been made by Nyholm & Wigh (1973), Aydın & Kesercioğlu (2001 and 2003). In this paper, chromosome numbers are reported for sixteen moss species, on the basis of mitotic preparations. The results is presented in the context of literature records.

MATERIALS AND METHODS

The material used for this study was collected in Turkey by Ş. AYDIN between 1997 and 1999. Voucher specimens are preserved in the Herbaria of Eagean University, İzmir.

Localities for each species are as follows:

Fissidens bryoides Hedw.- B6: İZMİR; Kemalpaşa-Nif mountain, 500 m, 1997.02, EGE 37313.

Ceratodon purpureus (Hedw.) Brid.- B6: İZMİR; Kemalpaşa-Nif mountain, 500 m, 1997.02, EGE 37314.

Pottia starkeana (Hedw.) C.Muell. (= *Microbryum starckeanum* (Hedw.) R.H. Zander)- B6: İZMİR;Kemalpaşa- Nif mountain, 500 m, on the soil, 1998.09, EGE 37315.

Barbula convoluta Hedw.- B6: İZMİR;Kemalpaşa , 40 m, on the soil, 1999.10, EGE 37316.

Barbula cylindrica (Tayl.) Schimp. (= *Didymodon insulanus* (De Not.) M.O. Hill).- B6: İZMİR;Kemalpaşa- Nif mountain, 500 m, on the rock, 1998.09, EGE 37317.

Didymodon rigidulus Hedw. (*Barbula rigidula* (Hedw.) Mill.).- B6: İZMİR; Kemalpaşa-Yiğitler, 50 m, river side, 1998.09, EGE 37318.

Pleurochaete squarrosa (Brid.) Lindb.-B6: İZMİR; Kemalpaşa, 40 m, on the soil, 1997.02, EGE37319.

Tortella tortuosa (Hedw.) Limpr. - B6: İZMİR; Kemalpaşa- Nif mountain, 500 m, on the soil, 1999.09, EGE 37320.

Bryum pendulum (Hornsch.) Schimp. (= *Bryum algovicum* Sendtn. Ex Müll. Hal.)- B6: İZMİR; Kemalpaşa- Nif mountain, 500 m, 1998.09, EGE 37321.

Bartramia stricta Brid.- B6: İZMİR;Ödemiş-Bozdağ-mermeroluk, 1000 m, on the soil, 1999.10, EGE 37322.

Leucodon sciuroides (Hedw.) Schwaegr.- B6: İZMİR;Kemalpaşa- Nif mountain, 500 m , on the rock, 1997.02, EGE 37323.

Pterogonium gracile (Hedw.) Sm.- B6: İZMİR;Kemalpaşa- Nif mountain, 1000 m, on the rock, 1997.02, EGE 37324.

Metaneckera menziesii (Hook.) Steere - B6: MANİSA; Spil mountain, 1200 m , canyon, on the rock, 1999.10, EGE 37325.

Pterigynandrum filiforme Hedw.- B6: İZMİR;Kemalpaşa- Nif mountain, 1000 m , on the soil, 1997.02, EGE 37326.

Homalothecium sericeum (Hedw.) Bruch, Schimp. & Gümbel- B6: MANİSA; Spil mountain, 1200 m , canyon, on the rock, 1998.09, EGE 37327.

Hypnum cupressiforme Hedw.- B6: MANİSA; Spil mountain, 1200 m, on the soil, 1999.09, EGE 37328.

Methods used in the culture and cytological preparation of the material are the same as those described in a previous report (Aydın & Kesercioğlu, 2001).

Chromosome numbers were counted in mitotic preparations. Photographs of chromosomes were taken by Carl Zeis Jena microphotography apparatus and the shapes of the chromosomes were drawn with the help of a camera lucida.

RESULTS AND DISCUSSION

The metaphase chromosomes of sixteen species are shown in Figures 1 and 2.

***Fissidens bryoides* Hedw.** (n = 12) (Figs 1a, 2a) — This chromosome number differs from previous mitotic studies (n = 10), but is in keeping with the three numbers, n = 5,10,12, which have been reported from meiotic preparations (cf. Fritsch, 1991).

***Ceratodon purpureus* (Hedw.) Brid.** (n = 13) (Figs 1b, 2b) — This chromosome number, based on a mitotic preparation, coincides with thast of all previous studies, with only a single exception of n = 11, which was based on meiotic material. (cf. Fritsch, 1991).

***Pottia starkeana* (Hedw.) C. Muell.** (= *Microbryum starckeanum* (Hedw.) R.H. Zander) (n = 26) (Figs 1c, 2c) — This is the first report on the mitotic chromosome number of this species. It is numerically identical to the only other previously reported chromosome number, which was from meiotic material (cf. Fritsch, 1991).

***Barbula convoluta* Hedw.** (n = 13) (Figs 1d, 2d) — This mitotic chromosome number corresponds with that of a previous mitotic study. Meiotic preparations, however, have revealed four different chromosome numbers, n = 10 + m, 11, 13, 14, within this species (cf. Fritsch, 1991).

***Barbula cylindrica* (Tayl.) Schimp.** (= *Didymodon insulanus* (De Not.) M.O. Hill) (n = 13 + m) (Figs 1e, 2e) — This mitotic chromosome number is one of two reported for this species, the other being n = 13, based on meiotic material (cf. Fritsch, 1991).

***Didymodon rigidulus* Hedw.** (= *Barbula rigidula* (Hedw.) Mitt.) (n = 13) (Figs 1f, 2f) — Two previous counts of n = 13 have been based on mitotic material, in addition to several reported for meiotic preparations. Only one other chromosome number, n = 12, has been reported, and that was based on meiotic material (cf. Fritsch, 1991).

***Pleurochaete squarrosa* (Brid.) Lindb.** (n = 13) (Figs 1g, 2g) — The mitotic chromosome number is the same as that of two previous studies, both of which resulted in counts of n = 13 (cf. Fritsch, 1991).

***Tortella tortuosa* (Hedw.) Limpr.** (n = 13) (Figs 1h, 2h) — In common with previous mitotic and meiotic studies on this species, the present work has identified no variation from n = 13 (cf. Fritsch, 1991).

***Bryum pendulum* (Hornsch.) Schimp.** (= *Bryum algovicum* Sendtn. Ex Müll.Hal.) (n = 20) (Figs 1i, 2i) — This is the first report on the mitotic chromosome number of this species, although three different chromosome numbers, n = 10, 27, 30, have been reported from meiotic material (cf. Fritsch, 1991).

***Bartramia stricta* Brid.** (n = 8) (Figs 1j, 2j) — This is the second report of the chromosome number of this species, both from Turkey, and both on mitotic material. Nyholm & Wigh (1973), however, reported n = 16 (cf. Fritsch, 1991).

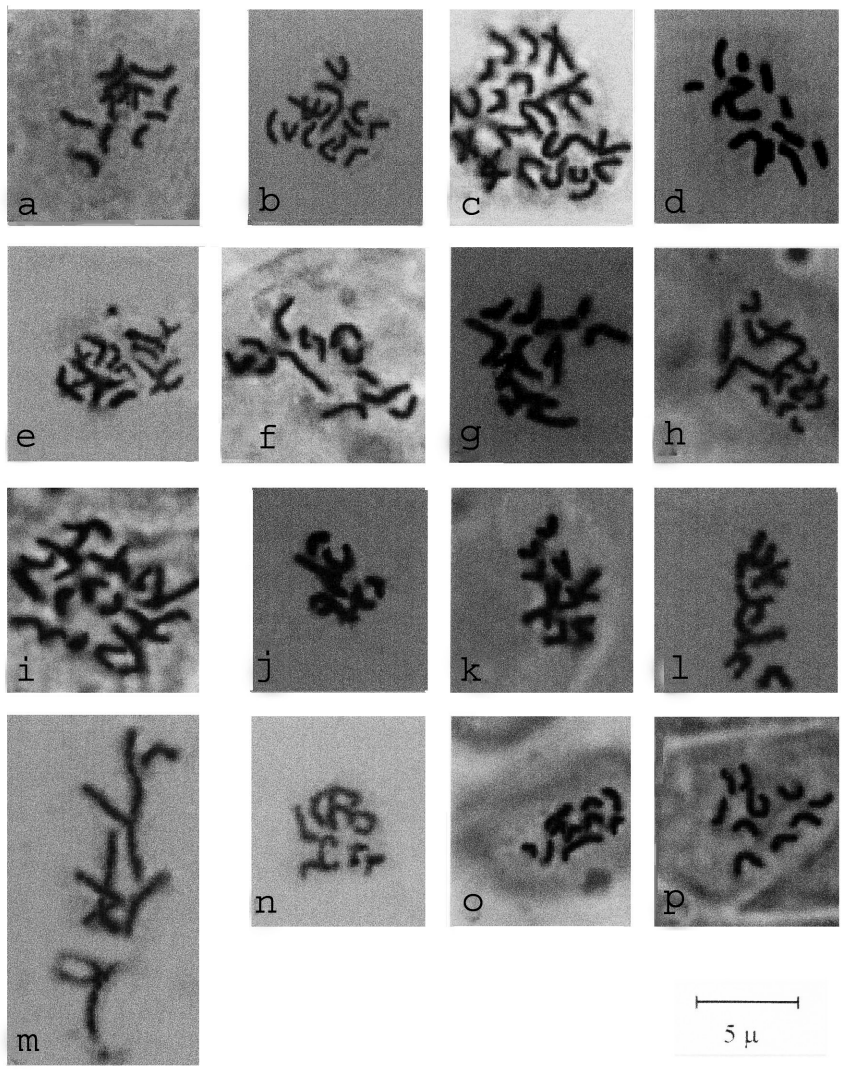

Fig. 1. Photomicrographs of the mitotic metaphase chromosomes in gametophytes of species. **a**: *Fissidens bryoides* (n = 12). **b**: *Ceratodon purpureus* (n = 13). **c**: *Pottia starkeana* (n = 26). **d**: *Barbula convoluta* (n = 13). **e**: *B. cylindirica* (n = 13+m). **f**: *Didymodon rigidulus* (n = 13). **g**: *Pleurochaete squarrosa* (n = 13). **h**: *Tortella tortuosa* (n = 13). **i**: *Bryum pendulum* (n = 20). **j**: *Bartramia stricta* (n = 8). **k**: *Leucodon sciuroides* (n = 10). **l**: *Pterogonium gracile* (n = 11). **m**: *Metaneckera menziesii* (n = 8). **n**: *Pterigynandrum filiforme* (n = 11). **o**: *Homalothecium sericeum* (n = 10). **p**: *Hypnum cupressiforme* (n = 10).

Fig. 2. Mitotic metaphase chromosomes in gametophytes of species. **a**: *Fissidens bryoides* (n = 12). **b**: *Ceratodon purpureus* (n = 13). **c**: *Pottia starkeana* (n = 26). **d**: *Barbula convoluta* (n = 13). **e**: *B. cylindirica* (n = 13+m). **f**: *Didymodon rigidulus* (n = 13). **g**: *Pleurochaete squarrosa* (n = 13). **h**: *Tortella tortuosa* (n = 13). **i**: *Bryum pendulum* (n = 20). **j**: *Bartramia stricta* (n = 8). **k**: *Leucodon sciuroides* (n = 10). **l**: *Pterogonium gracile* (n = 11). **m**: *Metaneckera menziesii* (n = 8). **n**: *Pterigynandrum filiforme* (n = 11). **o**: *Homalothecium sericeum* (n = 10). **p**: *Hypnum cupressiforme* (n = 10).

***Leucodon sciuroides* (Hedw.) Schwaegr.** (n = 10) (Figs 1k, 2k) — This is the second report on the mitotic chromosome number of this species, the other being of n = 11. Chromosome numbers of n = 9 and n = 10 have been reported from meiotic material (cf. Fritsch, 1991).

***Pterogonium gracile* (Hedw.) Sm.** (n = 11) (Figs 1l, 2l) — There have been two previous cytological studies of this species. In common with the present work, both were based on mitotic material, and both resulted in chromosome counts of n = 11 (cf. Fritsch, 1991).

***Metaneckera menziesii* (Hook. ex Drum.) Steere** (n = 8) (Figs 1m, 2m) — This is the first report on the mitotic chromosome number of this species. It coincides with the only other count which was based on meiotic material (cf. Fritsch, 1991).

***Pterigynandrum filiforme* Hedw.** (n = 11) (Figs 1n, 2n) — This report of the mitotic chromosome number coincides with the only previous count for this species, which was reported from meiotic material (cf. Fritsch, 1991).

***Homalothecium sericeum* (Hedw.) Bruch, Schimp. & Gümbel** (n = 10) (Figs 1o, 2o) — A wide range of chromosome numbers has been reported for this species, both mitotically and meiotically (Fritsch, 1991). A count of n = 10 has been previously obtained from mitotic and meiotic material.

***Hypnum cupressiforme* Hedw.** (n = 10) (Figs 1p, 2p) — This chromosome number is the same as that obtained from previous mitotic studies. Three other chromosome numbers, n = 10 + m, 11, 16, as well as n = 10, have been reported from meiotic material (cf. Fritsch, 1991).

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