

## MOSSES FROM LURA REGION (ALBANIA)

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### ABSTRACT

The bryophyte flora of Albania is not sufficiently known. Preliminary data about moss flora from Lura National Park area (Dibra district) are given for the first time in this paper. During a field trip in August 2007 were collected *ca.* 150 samples in three different sites, in Fushe Lura and at the area of Lura lakes. Altogether 62 moss species were recorded, 48 species recorded for the first time for Dibra region. Moreover, nine species were new for Albania: *Brachythecium olympicum*, *Brachythecium geheebii*, *Dicranum brevifolium*, *Dicranum tauricum*, *Hedwigia ciliata* var. *leucophaea*, *Heterocladium dimorphum*, *Plagiothecium curvifolium*, *Racomitrium elongatum* and *Schistidium papillosum*. Three taxa have conservation value according to the Red Data Book of European Bryophytes (ECCB 1995): *Brachythecium geheebii* (R, rare), also endemic for Europe, *Pseudoleskea saviana* (RT, regionally threatened) and *Schistidium papillosum* (K, insufficiently known). The occurrence of several red listed species and the new species recorded for Albania indicate about the biodiversity importance of Lura NP. However, this study was a preliminary investigation of moss flora; further exploration will certainly increase the number of species.

**Keywords:** Mosses, Biodiversity, Lura region, Albania

### INTRODUCTION

The bryoflora of Albania is not well explored in relation with other European and Southeastern European countries (for more details see: ECCB 1995; Düll 1996; Sabovljević *et al.* 2001, 2008; Colacino & Sabovljević 2006). However, in the last years several contributions were published for different areas of the country, *e.g.* Karavasta lagoon, Korça region and Kukës region (Erzberger 2007; Colacino & Marka 2009; Papp *et al.* 2009, 2010; Marka & Sabovljević *in press*). This study is a contribution in the moss flora of Lura region, Lura municipality, part of Dibra prefecture and district, as well. From Lura region are missing bryophyte records from the past. There are only 36 moss species reported for Dibra prefecture (Szepesfalvy 1926; Markgraf 1927), but in different areas from Lura. In different studies, Lura is known as an important area of biodiversity, *e.g.* vascular plants (MEFWA 2007) or microscopic algae (Miho & Lange-Bertalot 2001). Therefore, it could be expected to have also interesting moss diversity. The present study is part of floristic assessment of mosses from various regions of Albania, within the framework of PhD theses of the first author.

### MATERIAL AND METHODS

The moss samples were collected during a field trip in 17 and 18 August 2007. Altogether were collected *ca.* 150 moss samples in three different sites (Fig. 1.), in the surroundings of the village Fushe Lura, and the other two sites at the altitudes of Lura lakes (Lura National Park). The identification of the material was completed afterwards, mainly performed in the Department of Biology, Faculty of Natural Sciences, University of Tirana, but also in foreign institutes (*e.g.* Zurich University, Switzerland). For some difficult or critical taxa (*e.g.* *Grimmia*, *Schistidium*, *Leskeaceae*, etc.) the assistance of experienced bryologists was asked, as Eva Maier (Geneva, Switzerland) and Peter Erzberger (Berlin, Germany). Nomenclature of the taxa follows Hill *et al.* (2006), or otherwise specified for each taxon. The voucher specimens are conserved in the herbarium collection of the first author at Department of Biology (FNS, UT).

*General description of the area investigated.* Lura mountainous range area, geographically speaking, is part of Central Mountainous Region of Albania (Kabo 1991). It is located in the northern part of the region and surrounded by the river of Drini i Zi from the east, Mati plateau from the west, valley of Serriqa from the north and valley of Zalli i Bulqizes from the south (Kabo 1991). This mountain range has an orientation north-south. The mountain Kurora e Lures has a geology composed from ultra basics. Moreover, glacial activity during Quaternary periods has been very intense in the altitudes above 1600 – 1700 m a.s.l. Here could be mentioned the 12 glacial lakes (*e.g.* Liqeni i Madh shown in the map below), which are situated in the eastern side of the mountain. In Fushe Lure the annual mean temperature is 7.7°C, January mean temperature is -2.5°C and July mean temperature is 16.6°C. The absolute minimum temperature for Fushe Lura is -22°C, and the absolute maximum is in Kurbnesh 35°C. Rainfall precipitations are 1482 mm per year. Snow is also a frequent event, which in the high peaks stays until mid summer.

Hydrographic network is represented by small mountain brooks, which are branches of two big rivers like Drini i Zi and Mati. There are three different soil types at this area: brown mountain soils (400 – 1100 m a.s.l.), brown forest soils (1300 – 1800 m a.s.l.) and mountain meadow soils (above 2000 m a.s.l.). Forest vegetation of Kurora e Lures is composed mainly of *Pinus nigra*,

*Fagus sylvatica*, *Abies alba* up to 1700 m; above this altitude occurs *Pinus leucodermis*. Since the year 1966, Lura lakes region (1280 ha) is declared as National Park (MEFWA 2008). It is located in the eastern part of mountain Kurora e Lures. Lura NP is considered as an important area of plant diversity (MEFWA 2007) and nature monuments (Qiriazhi & Sala 2006), as well.

Site details

Site no. 1: westwards of the village Fushë Lure, 41°48'41" N, 20°12'32" E, ca. 1,100 m a.s.l.

Site no. 2: inside the Lura National Park, 41°46'36" N, 20°11'49" E, ca. 1,700 m a.s.l.

Site no. 3: inside the Lura National Park 41°47'31" N, 20°11'43" E, ca. 1,700 m a.s.l.

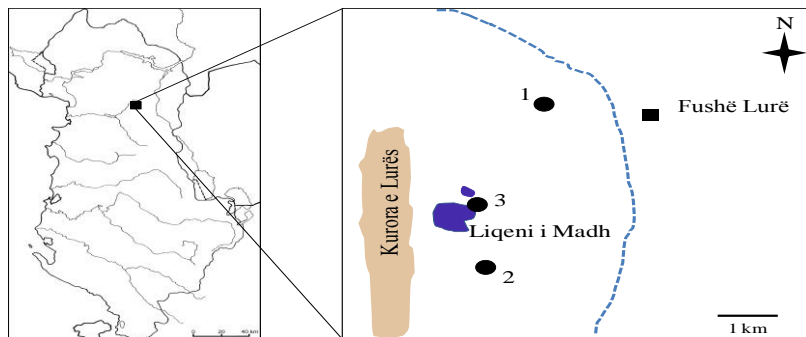


Figure. 1. Albanian map and illustration where are shown the collecting sites

RESULTS

Checklist of moss species found on the survey is given below. Following the name of the taxa the number of collections is given (in brackets), followed then by the site number and the substratum type. In some cases, it is given also the name of the bryologist who identified or confirmed the specific taxa (abbreviations: *det.* = identified by; *rev.* = revised by; *conf.* = confirmed by). There were recorded 62 moss taxa in total. Nine species are new for Albania (denoted with two asterisks in the list) and additionally 39 species were recorded for the first time for Dibra prefecture (denoted with one asterisk); hence, the number of moss species for Dibra reaches 84. It can be considered rather low compared with 341 moss taxa known for Albania, and also the relatively large area and habitat diversity.

For the species recorded for the first time for Albania there are also given a few notes, e.g. floristic element and comparison with bryoflora of SE European countries, based on the checklist of Sabovljević *et al.* (2008). The most frequent and abundant taxa for the soil substratum type were *Hypnum cupressiforme*, *Brachytheciastrum velutinum*, *Bryum capillare*, *Tortella torulosa*, *Ceratodon purpureus*, and for the rock substratum type were *Grimmia hartmanii*, *Grimmia ovalis* and *Isoetecium alopecuroides*. Conservation value – in the absence of an Albanian red list for bryophytes – is based on Red Data Book of European Bryophytes (ECCB 1995). Hence, three species have conservational value: *Brachythecium geheebii* belongs to the rare category (R) and also endemic taxa for Europe, *Pseudoleskea saviana* is considered as regionally threatened (RT) and *Schistidium papillosum* is insufficiently known taxon (K).

Checklist of moss taxa recorded from Lura region

\**Abietinella abietina* (Hedw.) M.Fleisch. – (2) 1: on soil, on rock.

\*\**Brachytheciastrum olympicum* (Jur.) Vanderp. *et al.* – (1) 2: on the base of *Fagus cortex* (*rev.* P. Erzberger).

It is a *submediterranean* (Düll 1985) species reported from Bosnia-Herzegovina, Macedonia, Romania, Slovenia and European part of Turkey in SE European countries (Sabovljević *et al.* 2008).

\**Brachytheciastrum velutinum* (Hedw.) Ignatov & Huttunen – (10) 1: on rock crevices; 2: on rock, on decaying wood; 3: on rock.

*Brachythecium albicans* (Hedw.) Schimp. – (1) 1: on stone.

\*\**Brachythecium geheebii* Milde – (1) 2: on rock (*conf.* P. Erzberger).

It is a *subcontinental-montane* species (Düll 1985) recorded from many SE European countries except Bosnia-Herzegovina, Greece and European part of Turkey (Sabovljević *et al.* 2008); but recently it was also recorded from Greece (Orgaz Alvarez & Blockeel 2010). It is a European endemism and included in the red list in the rare category (R).

\**Brachythecium glareosum* (Bruch ex Spruce) Schimp. – (3) 1: on soil, on stone.

\**Brachythecium glareosum* (Bruch ex Spruce) Schimp. *cf.* var. *alpinum* (De Not.) Limpr. – (1) 1: on rock.

The nomenclature of this taxon follows Cortini Pedrotti (2006), but since the identity of the specimen is in doubt it is not calculated as a new report for Albania.

\**Brachythecium rutabulum* (Hedw.) Schimp. – (1) 1: on rock.

\**Bryum alpinum* Huds. ex With. – (1) 3: on stone.

\**Bryum archangelicum* Bruch & Schimp. – (2) 1: on rock.

*Bryum argenteum* Hedw. (1) 2: on soil.

*Bryum caespiticium* Hedw. – (2) 2: on soil, on decaying wood.

\**Bryum capillare* Hedw. – (13) 1: on soil, on rock; 2: on soil, on decaying wood, on rock; 3: on rock, on decaying wood.

*Bryum pseudotriquetrum* (Hedw.) P.Gaertn. *et al.* – (4) 1: on humid soil.

\**Bryum torquescens* Bruch & Schimp. – (1) 2: on *Fagus cortex*.

- \**Calliergonella cuspidata* (Hedw.) Loeske – (1) 1: on rock (*rev.* P. Erzberger).
- \**Campylium protensum* (Brid.) Kindb. – (2) 1: on soil.
- Ceratodon purpureus* (Hedw.) Brid. – (6) 1: on soil, on rock; 3: on rock.
- Cratoneuron filicinum* (Hedw.) Spruce – (4) 1: on humid soil; 3: on rock.
- \*\**Dicranum brevifolium* (Lindb.) Lindb. – (1) 2: on decaying wood.
- It is a *subarctic-alpine* species (Düll 1984) reported only from Bosnia-Herzegovina, Bulgaria, Romania and Slovenia in the SE European countries (Sabovljević *et al.* 2008).
- Dicranum scoparium* Hedw. – (5) 1: on stone; 2: on rock, on decaying wood; 3: on rock.
- \*\**Dicranum tauricum* Sapjegin – (4) 2: on decaying wood; 3: on decaying wood, on base of *Pinus* cortex.
- It is a *European-temperate* species (Smith, 2004) reported from all SE European countries except European part of Turkey (Sabovljević *et al.* 2008).
- \**Didymodon tophaceus* (Brid.) Lisa – (1) 1: on humid soil.
- \**Fissidens dubius* P.Beauv. – (6) 1: on rock crevices; 2: on soil.
- Funaria hygrometrica* Hedw. – (1) 3: on soil.
- \**Grimmia alpestris* (F.Weber & D.Mohr) Schleich. – (2) 3: on rock.
- \**Grimmia anomala* Hampe ex Schimp. – (1) 3: on rock.
- \**Grimmia decipiens* (Schultz) Lindb. – (4) 1: on rock; 2: on rock (*det.* E. Maier and P. Erzberger)
- \**Grimmia hartmanii* Schimp. – (14) 1: on rock; 2: on rock; 3: on rock (*conf.* P. Erzberger), on the base of *Fagus* cortex.
- \**Grimmia montana* Bruch & Schimp. – (2) 3: on rock.
- \**Grimmia ovalis* (Hedw.) Lindb. – (9) 1: on rock; 3: on rock.
- \**Grimmia pulvinata* (Hedw.) Sm. – (3) 1: on rock.
- \*\**Hedwigia ciliata* var. *leucophaea* Bruch & Schimp. – (1) 1: on rock (*conf.* P. Erzberger).
- It is an *oceanic-temperate* species (Smith 2004). In the checklist of Sabovljević *et al.* (2008) is presented only at species level, without any distinction between var. *ciliata* and var. *leucophaea*. However, *H. ciliata* is reported from all SE European countries, except Montenegro. *H. ciliata* var. *leucophaea* is also reported from Macedonia (Martinčić 2009).
- \*\**Heterocladium dimorphum* (Brid.) Schimp. – (2) 3: on rock.
- It is a *European boreal-montane* species (Smith 2004) reported from all SE European countries except European part of Turkey (Sabovljević *et al.* 2008). It is also collected from us in the Albanian Alps and Kukës region in Albania, but not published before.
- Homalothecium sericeum* (Hedw.) Schimp. – (2) 1: on rock.
- Hypnum cupressiforme* Hedw. – (11) 1: on rock, on soil; 2: on stone.
- \**Hypnum cupressiforme* var. *lacunosum* Brid. – (5) 1: on soil, on rock.
- \**Isothecium alopecuroides* (Lam. ex Dubois) Isov. – (6) 1: on soil, on rock; 2: on rock; 3: on rock.
- \**Kindbergia praelonga* (Turner) Dixon – (2) 3: on rock, on decaying wood.
- \**Orthotrichum pallens* Bruch ex Brid. – (1) 3: on *Fagus* cortex.
- \**Orthotrichum rupestre* Schleich. ex Schwägr. – (3) 1: on rock.
- \*\**Plagiothecium curvifolium* Schlieph. ex Limpr. – (3) 2: on rock, on decaying wood.
- It is a *European-temperate* species (Smith, 2004) reported from many SE European countries except Bulgaria, Croatia and Macedonia (Sabovljević *et al.* 2008).
- \**Plagiothecium denticulatum* (Hedw.) Schimp. – (2) 2: on soli; 3: on decaying wood.
- \**Pohlia cruda* (Hedw.) Lindb. – (1) 2: on soil.
- \**Polytrichastrum alpinum* (Hedw.) G.L.Sm. – (2) 3: on soil.
- \**Pseudoleskea radicata* (Mitt.) Macoun & Kindb. – (3) 2: on the base of *Fagus* cortex, on decaying wood (*conf.* E. Maier).
- Pseudoleskea saviana* (De Not.) Latzel – (4) 2: on rock, on *Fagus* cortex (*conf.* E. Maier).
- \**Pseudoleskeella nervosa* (Brid.) Nyholm – (1) 3: on *Fagus* cortex.
- \**Pseudoscleropodium purum* (Hedw.) M.Fleisch. – (2) 1: on rock.
- Pterigynandrum filiforme* Hedw. – (7) 1: on rock, on *Pinus* cortex; 2: on *Fagus* cortex; 3: on rock, on decaying wood.
- \**Racomitrium canescens* (Hedw.) Brid. – (1) 1: on soil.
- \*\**Racomitrium elongatum* Ehrh. ex Frisvoll – (1) 1: on rock.
- It is a *suboceanic boreo-temperate* species (Smith 2004) reported from Greece, Montenegro, Romania, Serbia and Slovenia in the SE European countries (Sabovljević *et al.* 2008). It is also collected from us in the Albanian Alps, but not published before.
- \**Rhizomnium punctatum* (Hedw.) T.J.Kop. – (1) 3: at the base of wood cortex.
- \**Schistidium confertum* (Funck) Bruch & Schimp. – (3) 1: on rock; 3: on rock (*conf./det.* P. Erzberger)
- \**Schistidium crassipilum* H.H.Blom – (1) 1: on rock.
- \*\**Schistidium papillosum* Culm. – (7) 1: on rock; 3: on rock (*conf.* P. Erzberger).
- It is a *circumpolar boreo-artic montane* species (Smith 2004) recorded from Bulgaria, Romania, Serbia and doubtfully reported from Slovenia (Sabovljević *et al.* 2008).
- \**Syntrichia cf. montana* Nees – (1) 1: on rock.
- Syntrichia ruralis* (Hedw.) F.Weber & D.Mohr – (1) 1: on stone.
- Tortella tortuosa* (Hedw.) Limpr. (11) 1: on rock, on soil; 2: on rock; 3: on soil, on rock.
- \**Tortula subulata* Hedw. (3) 1: on rock crevices.
- \**Trichostomum crispulum* Bruch (1) 1: on soil.
- Weissia controversa* Hedw. (1) 1: on soil.

## CONCLUSIONS

About 62 moss taxa were recorded for the first time for Lura region (Lura NP) in a very preliminary investigation, where 9 taxa are new records for Albanian bryoflora. The number of moss species recorded seems not relatively high, compared with other biological data. But, the occurrence of several red listed species and the new species recorded for Albania indicate about its eventual biodiversity importance.

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