Diversity And Ecological Groups Of Bryophytes In Yasamal Pass Of Azerbaijan

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The article inventoried and assessed the diversity and ecological groups of bryophytes in Yasamal pass (The road from Shamkir to Gadabay district) of Azerbaijan. Results of the study revealed 18 species of bryophytes. Thus 16 species, 13 genera and 10 families relate to mosses, while 2 species, 2 genera and 2 families to liverworts. Families *Pottiaceae* (5 species) and *Bryaceae* (3 species) dominate among mosses. The remaining 8 families are monospecific.

Key words: *Azerbaijan, Yasamal pass, bryophytes, liverworts, mosses, taxonomy*

INTRODUCTION

Bryophytes represent highly specialized group of non-vascular land plants that includes mosses, liverworts and hornworts. Although bryophytes are rarely the most noticeable elements in the landscapes and were neglected due to their small sizes by many botanists, they play an important ecological role in terms of water balance, erosion control, nitrogen source or simply providing a habitat for other organisms. Although global biodiversity patterns tend to be congruent across taxa, diversity patterns in bryophytes do not necessarily follow the patterns present in other well studied taxa, therefore a comprehensive concept of biodiversity is becoming increasingly necessary (Schulze et al., 2004; Kessler et al., 2009).

The study attempted to inventory the bryophytes and assessed their diversity and ecological groups in Yasamal pass. Specifically, the study aimed to:

1. identify, classify and describe the bryophyte species in Yasamal pass.
2. determination of the species richness and ecological groups of bryophytes (the species will be confined in specific habitats either as epiphytic on tree trunks, soils, thick litters and on rock surfaces).
3. recognize the species with species identified as rare and widespread.

MATERIAL AND METHODS

Field Surveys. The research sites are located in Yasamal pass of Azerbaijan. The field work was done 2012-2015 years. In April 2012, 50 specimens, in November 2014, 65 specimens and in April 2015, 80 specimens were collected from the area. Totally 195 specimens were collected in study area.

Organization of the study. The study area was conducted within the 3 weeks with field work in Yasamal pass of Azerbaijan and laboratory work at Botanical Garden and Botanical Museum Berlin-Dahlem (BGBM, FU Berlin, Germany).

Preparation of herbarium specimens. The specimens of bryophytes (mosses, liverworts) was placed in a plastic bag with a field label data: altitude, collection number, date of collection and information on their ecology and associated habitats. They was then air dried and placed into envelopes and properly labeled for herbarium vouchers. Voucher specimens was databased and deposited in the bryophyte herbaria of BGBM and the Institute of Botany (ANAS, Azerbaijan).

Identification, classification and description of bryophyte species – The specimens collections was identified, classified and described morphologically by their diagnostic characters such as leaf arrangement, stem structure, sporophyte characters and rhizoids using the relevant identification guides and available monographs (Любарская 1974; Игнатов et al., 2003; Smith 2004; Ignatov et al., 2006; Kürschner & Frey 2011). Further examinations was done through microscopy analyses. The identification of the species was carried out under the supervision of Dr. G. Parolly and Prof. H. Kürschner.

RESULTS AND DISCUSSION

1. Yasamal road and its vegetation Types.

The study area in Lesser Caucasus. Shamkir – Gadabay road, serpentine road ca. 3 km W Shamkir (town); 41°07’45.1’’ N / 045°26’35.8’’ E. – Alt.: 600 m. (Флора Азербайджана, 1961).

Rocky slopes with strongly degraded *Paliurus spina-christi* shibljak and scattered *Astragalus* cf. *microcephalus* thorn-cushions; sandstone, gneiss

and smaller portions of limestone (Abutalıbov et al., 1976).

2. Taxonomy.

A field inventory of the bryophyte flora in Yasamal pass showed 16 species of mosses, 2 species of liverworts. The specimens were collected, classified and identified using the taxonomic keys, existing herbaria, and related literature (Любарская 1986; Smith 2004; Kürschner & Frey 2011). . Likewise, identification of the specimens was initially identified by the researcher and was confirmed by Dr. Parolly and Prof. Kürschner. The given data for each species include the description based on the observed morphology and diagnostic characters using field lens and microscopes.

3. List of the taxa

Marchantiophyta (Liverworts)
Marchantiopsida

Aytoniaceae
Reboulia Raddi
R.hemisphaerica (L.) Raddi
Habitat: on calcareous soil

Jungermanniopsida
Porellaceae
Porella L.
P. platyphylla (L.) Pfeiff.
Habitat: on bark of the tree (epiphytic)

Bryophyta (Mosses)
Bryopsida

Amblystegiaceae
Amblystegium Schimp. p. pte.
A. serpens (Hedw.) Schimp.
Habitat: on stump

Anomodontaceae
Anomodon Hook. & Taylor
A. viticulosus (Hedw.) Hook. & Taylor
Habitat: at the base of tree (epiphytic)

Brachytheciaceae
Homalothecium Schimp.
H. lutescens (Hedw.) H.Rob.
Habitat: on limestone rock

Bryaceae
Bryum Hedw.
B. argenteum Hedw.
Habitat: on stone
B. moravicum Podp.
Habitat: on moist soil
B. capillare Hedw.
Habitat: on rock

Encalyptaceae
Encalypta Hedw.
E. ciliata Hedw.
Habitat: on soil

Fissidentaceae
Fissidens Hedw. (incl. *Octodiceras* Brid.)
F. osmundioides Hedw.
Habitat: on soil

Grimmiaceae
Grimmia Hedw.
G. pulvinata (Hedw.) Sm.
Habitat: on limestone rock

Orthotrichaceae
Orthotrichum Hedw.
O. diaphanum Schrad. ex Brid.
Habitat: on the bark of tree (epiphytic)

Pottiaceae
Weissia Hedw.
W. controversa Hedw.
Habitat: on earthy rock
Pleurochaete Lindb.
P. squarrosa (Brid.) Lindb.
Habitat: on limestone grassland
Syntrichia **Brid.**
S. ruralis (Hedw.) F.Weber & D.Mohr
Habitat: on rock
Tortula Hedw.
T. inermis (Brid.) Mont.
Habitat: on soil
T. muralis Hedw.
Habitat: on rock

Thuidiaceae
Abietinella Müll.Hal.
A. abietina var. abietina (Hedw.) M.Fleisch.
Habitat: on bark of tree (epiphytic)

CONCLUSION

1. A total of 18 species of bryophytes were collected. Of these, the mosses include

16 species, 13 genera and 10 families, while the liverworts include 2 species, 2

genera and 2 families.

2. Mosses species in Yasamal pass belonging to the family of *Amblystegiaceae, Anomodontaceae, Brachytheciaceae, Bryaceae, Encalyptaceae, Fissidentaceae, Grimmiaceae, Orthotrichaceae, Pottiaceae, Thuidiaceae.* And 16 species of mosses with their representative genera namely: *Abietinella, Amblystegium, Anomodon, Bryum, Encalypta, Fissidens, Grimmia, Homalothecium,*

Orthotrichum, Pleurochaete, Syntrichia, Tortula, Weissia.

3. Liverworts species in Yasamal pass belonging to the family of *Aytoniaceae* and *Porellaceae.* And 2 species of liverworts with their representative genera namely: *Reboulia* and *Porella.*

4. On record, a total of five (5) species as rare based on local assessment for the area. From them belong four (4) species for mosses *(Bryum moravicum, Encalypta ciliata, Fissidens osmundioides, Pleurochaete squarrosa),* one (1) species for liverworts *(Reboulia hemisphaerica)* and all others are widespread.

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Azərbaycanın Yasamal Aşırımında Briofitlərin Müxtəlifliyi Və Ekoloji Qrupları

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Məqalədə Azərbaycanın Yasamal aşırımının (Şəmkir rayonundan Gədəbəy rayonuna gedən yol) briofitlərinin müxtəlifliyi və ekoloji qrupları tədqiq olunmuşdur. Yasamal aşırımının brioflorasının tədqiqi zamanı 18 növ briofit nümunələri təyin edilmişdir. Onlardan 16 növü yarpaq gövdəli mamırlara aiddir ki, bu da 13 cinsdə və 10 fəsilədə ümumiləşir. Ciyərotu mamırlarına aid 2 növ isə 2 cinsdə və 2 fəsilədə ümumiləşir. Yarpaq gövdəli mamırlar içərisində üstünlük təşkil edən növlər *Pottiaceae* (5) və *Bryaceae* (3) fəsilələrinə aiddir. Qalan 8 fəsilə isə hər biri bir növlə təmsil olunur.

Açar sözlər: *Azərbaycan, Yasamal aşırımı*, *briofitlər, ciyərotu mamırları, yarpaq gövdəli mamırlar, taksonomika*

Разнообразие И Экологические Группы Бриофитов Ясамальского Перевала Азербайджана

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В статье проведена инвентаризация и оценка разнообразия и экологических групп мохообразных в Ясамальском перевале Азербайджана (дорога из Шамкирского района в Гядабейский район). В результате исследования в Ясамальском перевале выявлено 18 видов бриофитов. Из них листостебельные мхи включают 16 видов из 13 родов и 10 семейств, а печёночные мхи включают 2 вида из 2 родов и 2 семейств. Среди листостебельных мхов преобладают семейства *Pottiaceae* (5 видов) и *Bryaceae* (3 вида). Остальные 8 семейств являются моновидовыми.

Ключевые слова: *Азербайджан, Ясамальский перевал, бриофиты, печёночные мхи, листостебельные мхи, таксономика*