



FACTORS OR MOSSES - WHAT THE BRYOBIONTS PREFER ?

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Abstract of the poster

As the knowledge about bryophytes biology increase, recent papers show that mystery of terrestrial invertebrates living in bryophytes still remains.

We know that some of invertebrates use mosses as food, insulation against heat or cold, others as a hunting place. However information about bryophages host specificity or bryobionts habitat preferences are sporadic.

In 2006 our team started first preliminary field research creating a framework of our recent project focused on key factors affecting bryophagous insect communities. One of basic research objectives was to analyze forest communities of moss living insects and compare with communities occupying habitats without moss layer.

We found out a higher species richness of the mosses habitat insect communities (about 25 % of insect species was recorded only there). RDA with Monte-Carlo permutation tests shows moisture as a main significant factor affecting insect habitat preferences ($p = 0.028$, $F = 1.81$), while impact of moss layer presence was not significant.

We presume that habitat preferences of some insect species known as bryobionts could be explained just as affinity to microclimatic factors. For example insect species in habitats with dry conditions tend to occupy moss cushions and that is why they are considered as strict bryobionts.

The research is supported by grant project GA ČR No. 206/07/0811.

You can see on the next page the poster presented during the international bryological meeting (on format A4 for the publication)



Factors of mosses - what the bryobionts prefer?

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Fig 1: *Tetrix ceperei* (Hexapoda, Caelifera) feeding on *Atrichum undulatum*



Fig 2: Snow scorpionfly *Boreus westwoodi* (Hexapoda, Mecoptera)

INTRODUCTION

As the knowledge about bryophytes biology increase, recent papers show that a mystery of the terrestrial invertebrates (especially insects) living in the bryophytes still remains. We know that some of the insect species use mosses as a moisture microhabitat for laying eggs, larval development, others as a hunting place (GERSON 1982). The cushions provide an important refuge against predation and insulation against heat or cold. Relatively stable microclimatic conditions are also very important for over wintering of invertebrates (BYERS & LOFQVIST 1989).

Furthermore few insect species (e.g. Fig 1-2) can be considered as a bryophages (e.g. VARGA 1992, CHOWN 1993) although their biology including metabolic processes or host specificity are not known even for typical bryophages from family Byrrhidae (Fig 3-4) (OTTESEN 1996). A sample of moss cells (Polytrichaceae) from an alimentary tract of *Byrrhus luniger* found HRADILEK & BOUKAL (2003), KOPECKY (2001) implies host specificity of carabid species *Acupalpus dubius* strictly recorded from *Drepanocladus aduncus*.

In 2006 our team started first preliminary field research creating a framework of our recent project focused on key factors affecting bryophagous insect communities. One of basic research objectives was to analyze forest communities of moss living insects and compare with communities occupying habitats without moss layer. Coleoptera as the most abundant taxon was used for analysis.

MATERIAL AND METHODS

Samples were taken by pitfall traps from 3 sites with different soil humidity during season 2004 near Tinec close to boundary of the Beskydy Protected Landscape Area (Czech Republic). Two traps were situated within the cushions of *Polytrichum* sp. and two traps minimally 10 m far from the nearest cushions at each site. RDA (redundancy analysis) with Monte-Carlo permutation test was used to analyze impact of the selected factors (moss presence, soil humidity) on the community structure.

The study was supported by grant no. 206/07/0811 of the Czech Science Foundation (GACR).

RESULTS AND DISCUSSION

From a total of 56 coleopteran taxons (mostly species) from pitfall traps, only one specimen of bryophagous beetles (*Simplocaria* sp., Byrrhidae) was recorded. We found out a higher species richness of the moss habitat insect communities (about 25 % of insect species was recorded only there). RDA with Monte-Carlo permutation tests shows moisture as a main significant factor (Fig 5) affecting insect habitat preferences ($p = 0.028$, $F = 1.81$), while impact of moss layer presence was not significant. We presume that habitat preferences of some insect species known as bryobionts could be explained just as affinity to microclimatic factors. For example insect species in habitats with dry conditions tend to occupy moss cushions and that is why they are considered as strict bryobionts. However we cannot validate this hypothesis, several authors discuss on similar conclusions (SMETANA 1958, HURKA 1996, ANDREW et al. 2003).



Fig 3: Bryophagous beetle *Byrrhus pilula*



Fig 4: Bryophagous beetle *Cytillus sericeus*

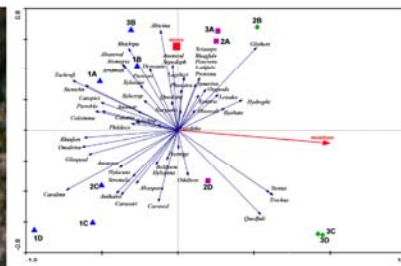


Fig 5: Direct gradient analysis RDA for 12 pitfall traps from 3 sites with different soil humidity (1-3); A, B = moss habitats; C, D = non-moss habitats; humidity (semiquantitative scale): ◀ ◀ ◀ ◀ ◀ ◀ ◀ ◀ ◀ ◀ ◀ ◀

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