

PROJECT REPORT
[IDOC - Non-Game]

TERRICOLOUS BRYOPHYTES AND LICHENS WITHIN THE ATWOOD RIDGE
RESEARCH NATURAL AREA, UNION COUNTY, IL.

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INTRODUCTION

During the past 12 months, research involving terricolous bryophyte and lichen communities was undertaken at the Atwood Ridge Research Natural Area to provide baseline data in the form of an inventory of these organisms. Additionally, permanent reference plots were established to allow for repeatable sampling of these organisms through time. The specific objectives, then, involved inventory as an assessment of diversity, assessment of abundance, and computation of importance values for those taxa within the permanent study plots.

PROJECT OBJECTIVES / REALIZED GOALS

At present, the project goals are in the final stages of completion and will constitute the core of a masters thesis in the department of Plant Biology, SIU-C by Mr. G. Duane Edwards. Additionally, during the tenure of the IDOC grant, two students were employed to assist in field work and in processing bryo/lichen voucher specimens. These were Mr. Brent Bielschmidt, an unclassified graduate student who was salaried in the Fall semester, 1993 and who has since been admitted to the graduate program in PLB and Mr. Jonathan Podbielski, an undergraduate PLB major who was salaried during the Spring semester, 1994. Thus, in part, the funding has benefited the educational opportunities of three biology students.

Specifically, the agreed upon goals accomplished during the term of funding by the IDOC are listed below. In a few instances, modifications in research design were made to enhance the data analysis potential and significance of this project. Such items are identified with an asterisk (*).

1. Bryo/Lichen cover was assessed within the fifty-two positioned macro plots that had been established by Weaver and Robertson following the clear cutting of the study area in 1973-1974. These data were generated on a scale of 1 - 7 and are entered into our computer for composite data analysis and are available now in print out form. Cover ranged from 1 (= 0-1%) to 6 (= 75-93%).
- *2. Rockiness was assessed within the fifty-two positioned macro plots. These data were likewise generated on a scale of 1 - 7 and are entered into our computer for composite data analysis and are available now in print out form. Cover ranged from 1 (= 0-1%) to 4 (= 25-50%).

- *3. For each of the fifty-two permanent macro plots, 4 permanent micro plots were established, one in each of four quarters of each macro-plot. These 208 plots are marked by small, metal electric fence posts. This is a modification from the initial design of 8 micro plots per macro-plot, i.e., 2 micro plots per macro-plot quarter. Field observations, in particular item #1 above, showed that 4 rather than 8 plots would yield significant data and therefore minimization of field work is justified.
- *4. Slope angle for each of the 208 micro plots has been entered into our computer for composite data analysis and are available now in print out form. The angles ranged from 4.3684° to 46.8298° .
- *5. Leaf litter depth was calculated for the 208 micro plots. These data are entered into our computer for composite data analysis and are available now in print out form. Litter depth ranged from 0.0 cm to 10 cm.
- *6. Canopy cover (density) for each of the 208 micro plots has been entered into our computer for composite data analysis and are available now in print out form. This cover ranged from 84.92 - 95.32%.
7. Bryo/lichen cover of each population of each individual taxon per each of the 208 micro plots has been mapped on grid paper to allow for assessment of total area of cover. At present, these data are being scanned into a computer to express total cover in square mm. The importance of each species will be calculated from combined frequency/cover values.
8. A complete inventory of all soil dwelling bryophytes and lichens of the study area has been made to supplement the taxon list tabulated from micro-plot mapping, allowing for a complete assessment of diversity. For a listing of taxa, see attached Appendix I. A manuscript is in preparation by Stotler and Edwards based upon this survey. IDOC will be acknowledged for financial support and a reprint, when available, will be forwarded to the Natural Heritage Biologist at Goreville.
9. Specimens have been prepared of each taxon observed within the study area and placed within standard herbarium packets.
10. Computer generated data labels for each herbarium packet are in progress. Upon completion of the labels, a complete set of these vouchers will be shipped for deposit in the herbarium of the Illinois Natural History Survey as reference material.

- *11. An ancillary study relating to this project was undertaken by Mr. Edwards that involved soil spore bank analysis. This has resulted in the addition of several taxa to the diversity list (Appendix I) that were not observed in situ. This study was reported upon by Mr. Edwards at the 45th American Institute of Biological Sciences annual meeting at the Knoxville Convention Center, Knoxville, TN on August 7, 1994. Xerographic copy of the published abstract is included as Appendix II to this report.

APPENDIX I

Terricolous Bryophytes and Lichens
Atwood Ridge

[* denotes known for the study area only from spore bank culture]

MOSESSES

* Aphanorhegma serratum
 * Bryum capillare
 * Ephemerum protonemata
Atrichum angustatum
Atrichum oerstedianum
Aulacomnium heterostichum
Barbula unguiculata
Brachythecium oxycladon
Bryoandersonia illecebra
Campylium hispidulum
Dicranum scoparium
Diphyscium foliosum
Ditrichum pallidum
Eurhynchium pulchellum
Fissidens bryoides
Fissidens bushii
Hypnum curvifolium
Leptobryum pyriforme
Leucobryum glaucum
Physcomitrium pyriforme
Plagiomnium cuspidatum
Polytrichastum ohioense
Stereocleus serrulatus
Thuidium delicatulum
Weissia controversa

LIVERWORTS

Asterella tenella
Calypogeia mulleriana
Lophocolea heterophylla
Reboulia hemisphaerica
Scapania nemorea

HORNWORTS

* Anthoceros punctatus
Phaeoceros carolinianus

LICHENS

Cladonia (squamules)
Cladonia chlorophaea
Peltigera cf polydactyla

APPENDIX II

[Abstract published in 1994: Amer. J. Bot. 81(6 Suppl.): 7.]

EDWARDS, DUANE. Department of Plant Biology, Southern Illinois University, Carbondale, IL 62901-6509. - The bryophyte diaspore bank in the soil of an upland deciduous forest.

The upper 4.0 - 8.0 cm of soil was collected from twenty 30 x 30 cm sites in a 20 year old *Quercus prinus* clear-cut in Union County, Illinois. Sample sites represented ridge-top, upper midslope, lower midslope, and ravine bottom. Two replicate sets of the soil samples were established and maintained in a growth chamber and in a greenhouse, and observed over a four month period. Both sets of soil cultures were dominated by *Physcomitrium pyriforme* and *Aphanorhegma serratum*. The following other acrocarpic mosses also were observed: *Barbula unguiculata*, *Bryum capillare*, *Fissidens bryoides*, *Leptobryum pyriforme*, *Weissia controversa*, and *Ephemerum protonemata*. Small thalli of *Phaeoceros* were present in two of the samples. Although pleurocarps were common in field sites, none were observed in either greenhouse or growth chamber samples. Bryophyte growth confirmed that diaspores in the soil aid in the maintenance of the bryophytic community of the sample area. In addition, the soil cultures contained diaspores of ferns, fungi, and algae.