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On the cover: Deciduous forest with *Allium ursinum* L. herb layer in the Sudety Mts. Photo by Andrzej Raj



**55th MEETING OF THE POLISH BOTANICAL SOCIETY**  
**„*Planta in vivo, in vitro et in silico*”**

**September 6-12, 2010**

**Warsaw University of Life Sciences-SGGW**  
**166 Nowoursynowska St., 02-787 Warsaw, Poland**

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**GENETIC VARIABILITY OF HEPATIC *CALYPOGEIA INTEGRISTIPULA* IN POLAND**

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Genetic variability in leafy liverworts is still unknown, because only a few species have been examined. Most genetic investigations involved thallose liverworts, that showed a low level of genetic variability. It would be interesting to know whether that similar pattern of genetic variability occurs in leafy liverworts. *Calypogeia integristipula* (Steph.) is one of the most common species in Poland. It occurs in lowlands and in mountains, mainly on decaying logs and directly on the soil. It reproduces sexually (monoecious) and it frequently produces gemmae. The aim of the work was to study the intra and inter-population genetic variability of *C. integristipula* from different regions of Poland. Plants of the species *C. integristipula* were collected from 9 populations in Poland. Twelve isozyme loci from 10 studied enzyme systems were detected. All populations were polymorphic. In all loci a total of 41 alleles were found. The mean number of alleles per locus (A) was 1.6. The mean total gene diversity (HT) was 0.3047 and within populations (HS) it was 0.1833. Differentiation between populations was high (GST = 0.3985). Genetic variability in *C. integristipula* was similar to genetic variability of thallose liverworts but lower than in other leafy liverwort species. This work was financially supported by grant no. N303 344235 from the Polish Ministry of Science and Higher Education.

**GENETIC DIFFERENTIATION OF LIVERWORT *CALYPOGEIA MUELLERIANA* IN POLAND, INFERRED FROM ISOZYME AND MOLECULAR MARKERS**

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*Calypogeia muelleriana* in Poland exhibits a marked morphological variation. The aim of our studies was to recognize the genetic differentiation of this species and correlate the genetic diversity with the morphological variation. In general 58 samples from different regions of Poland were examined for isozyme loci, ISSR markers and sequences of the chloroplast DNA. Obtained results revealed high genetic differentiation of the species. The dendrogram based on Nei's genetic distances showed two distinct groups. For each group, characteristic alleles in isozyme and ISSR loci were detected. As no variation was observed among samples within a particular group in respect to these alleles, they may be used as good diagnostic markers. Sequences of trnG, trnL gene introns and trnH-psbA intergenic spacer confirmed the genetic distinctness of these groups. The 2 groups are probably separate species. Discriminant analysis showed the existence of a morphological hiatus between the groups. The morphological hiatus provides an opportunity for identification of the herbarium material on the grounds of the morphometric traits. This work was financially supported by grant no. N303 344235 from the Polish Ministry of Science and Higher Education.

**RARE AND ENDANGERED LIVERWORTS IN THE POLISH PART OF LOWER LUSATIA**

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The historic-geographical land of Lower Lusatia is situated on both sides of the Oder river valley. The main part of Lower Lusatia lies within the southern part of Brandenburg and the northern part of Saxony, in Germany. Only a small fragment lies in the Lubuskie voivodeship in Poland. Up until recently this area had hardly been investigated by botanists. Since 2003 intensive studies on flora of vascular plants and chosen plant communities have been carried out. In 2006 bryological studies began, and up to now 228 taxa of bryophytes have been recorded (45 species of liverworts and 1 species of hornwort). Hepatics grow more often in plant communities belonging to these classes: *Alnetea glutinosae*, *Scheuchzeria-Caricetea fuscae*, *Oxycocco-Sphagnetalia*, *Littorelletea uniflorae* i *Isoëto-Juncetea bufonii*. In the flora of hepatics in Lower Lusatia there is quite a big group of species (14; which is over 31%) that present an oceanic range in Europe. Eight of the species are rare in Poland and threatened with extinction. These 8 species are: *Calypogeia fissa*, *Cladopodiella fluitans*, *Fossombronina foveolata*, *F. incurva*, *Odonthoschisma sphagnii*, *Pallavicinia lyellii*, *Riccardia chamedrifoli* and *R. incurva*. The two species: *Pallavicinia lyellii* and *Fossombronina incurva* are endangered in Europe. Due to the presence of rare and endangered liverworts in the bryoflora of the area of Lower Lusatia, this area can be considered as one of the most interesting in Polish lowlands.

**CRYPTIC SPECIATION IN THE GENUS *ORTHOTRICHUM***

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The genus *Orthotrichum* is a widespread moss group which includes approximately 157 species, which are distributed over all the continents. Preliminary phylogenetics studies based on an analysis of the sequences of nuclear and chloroplast genomes as well as genotyping with ISJ and ISSR markers, revealed the presence of cryptic speciation in at least three species. Two cryptic species were found in *Orthotrichum striatum*, which belongs to the subgenus *Gymnoporos*. Two genetically distant haplotypes which occur sympatrically within the above species seem to be rather two phylogenetically different taxa with similar phenotypes. One of them is widespread over the entire distribution range; from Asia to the east coast of North America. The other is restricted to the Alps, Carpathians, Pyrenees and the Balkan Peninsula, where it grows sympatrically with the common form. While the widespread form differs significantly from the remaining members of the subgenus *Gymnoporos*, the rare form is genetically similar to *O. affine*, differing only with respect to the rpoB and rpoC genes. A different pattern of cryptic speciation was noted in common epiphytic moss, *O. affine*. In the case of this species, cryptic speciation is observed along an altitude transect. The switch between these two genetic forms occurs at 400–600 m a.s.l. However, *O. affine* remains a clearly monophyletic taxon, because the two cryptic species form sister clades.