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**LIVERWORTS OF THE NATURE RESERVES  
IN WIELKOPOLSKA.  
2. “OLBINA”**

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**ABSTRACT.** A list of liverworts in the reserve “Olbina” is presented. Altogether, twenty species were catalogued (*Calypogeia integristipula*, *C. muelleriana*, *Cephalozia bicuspidata*, *Cephalozia divaricata*, *Lepidozia reptans*, *Lophocolea bidentata*, *L. heterophylla*, *Metzgeria furcata*, *Nowellia curvifolia*, *Ptilidium pulcherrimum*, *Riccia fluitans* and *Ricciocarpos natans*). Their distribution in regard to diversity of forest plant communities in the reserve was shown. The outstanding, compared to other reserves in Wielkopolska, abundance of liverworts is connected with the presence of microhabitats generated by rotting wood in the forest bottom and oligotrophic, acid mineral ground exposed in holes after tree fall. To the rarest species of this object belong *Nowellia curvifolia* and *Ricciocarpos natans*.

**Key words:** liverworts, nature reserves, Olbina, Wielkopolska region, Poland

### **Introduction**

The paper continues a series of material studies on hepaticoflora of nature reserves in Wielkopolska. Previous work concerned the reserve “Las Łęgowy w Dolinie Pomianki” (Górski 2006). This study deals with hepaticoflora of forest ecosystems with fir tree. Such arrangements are very rare in Wielkopolska, and are located in the southern part of the region, at the northern limit of fir tree range. The forests in the reserve are mostly mixed – *Festuco-Pinetum* with *Abies alba* and *Picea abies*; in physiognomy and partially floristics they correspond to upland fir forest of *Abietetum albae* type.

Field studies were carried out in 2006. Liverworts nomenclature and depiction was applied according to Szweykowski (2006), plants communities were given according to Brzeg and Wojterska (2001). The distribution of species was drawn on the background of the diversity of forest communities of the reserve. Herbarium materials were deposited in the herbarium of Department of Botany of the August Cieszkowski Agricultural University of Poznań (POZNB).

## Profile of the reserve

### General data

The “Olbina” nature reserve functions under a regulation of Ministry of Forestry and Timber Industry no. 224 from 15 July 1958 (OP-244/45, Monitor Polski no. 62, pos. 351), kept by announcement of Wielkopolska Voivod from 4 October 2001, regarding the line up of nature reserves established by 31 December 1998 (Dz. Urz. woj. Wlkp. no. 123, pos. 2401). The reserve has been founded to “preserve a fir tree locality at its northern natural limit, for scientific and educational purpose”.

The reserve is situated in the Wielkopolskie voivodship, the Kalisz district, Brzeziny commune, near the village Pieczyska. In the geobotanical classification of Poland (Szafer 1977), the reserve is situated in the Kaliski District.

The area of the reserve (16.99 ha) is entirely the property of the Treasury under management of State Forests, Forest Inspectorate Kalisz, Forest District Wilcze Ługi. The reserve encompasses units 291 a, 291 b and 291 c, according to the plan of the Forest Inspectorate Kalisz (comp. Fig. 1).

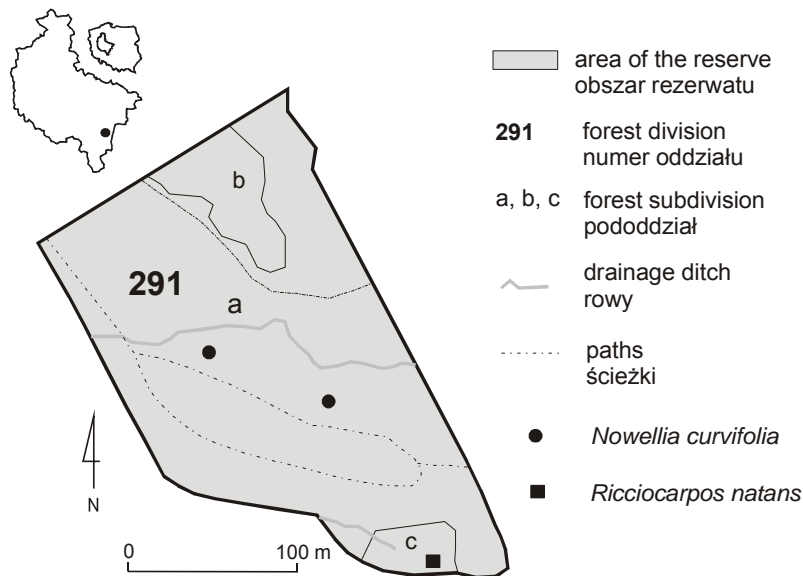


Fig. 1. Survey map and distribution of selected liverworts of the “Olbina” nature reserve

Ryc. 1. Mapa przeglądowa i rozmieszczenie wybranych wątrobowców rezerwatu przyrody „Olbina”

### Geological structure, soil and relief

The reserve is situated on a plain area. The relief is flat, with a slight fall in southern part near the swamp. The altitude is about 141 m a.s.l. Six subtypes of soils were found in the reserve: proper podzol soils (75% of the area), proper gley-podzol soils, mucky gley-podzol soils, proper gley solis, and low peat solis.

Fresh mixed forest (distinguished to BMśw1 and BMśw2) predominate among habitat forest types (90% of the area). On the remaining area, moist mixed forests (BMw1, LMw1) and alder forest O13 occur.

### Surface waters

Two dried out ditches and a swamp are in the reserve. The first drainage ditch is two-meter wide and runs paralelly through central part of the reserve. When there is excess of water, the ditch supply Jamnica stream which joins Pokrzywnica river (a tributary of Prosna river). The second ditch is in the southern part, it starts in a swampy area and evacuates excess of water from there.

### Vegetation of the reserve

Plant communities in the reserve have been described in detail by **Janyszek** (2006). Pine-spruce-fir forests predominate here. As far as physiognomy and floristics is concerned, these forests correspond to Świętokrzyski-type fir forest. Analysis of the material; however, showed that these phytocoenoses belong to continental mixed forest *Festuco ovinae-Pinetum* (Juraszek 1928) Kobendza 1930, in variant with *Abies alba* described by **Matuszkiewicz** (2001). The forest stand is multilayer. The upper layer is built from huge old pines, with a considerable tinge of fir and spruce. In lower layers pine does not occur at all; fir and spruce predominate there, with a tinge of common oak, birch, alder and, sporadically, other deciduous species (**Janyszek** 2006). Rich brushwood is formed by young fir. Undergrowth includes species of the class *Vaccinio-Piceetea* and floristically is relatively poor. In the moss layer, *Pleurozium schreberi* occurs frequently in carpets. Less frequent is *Thuidium tamariscinum*. The forests, depending on the moisture, are distinguished to *typicum* subassotiacion and *Festuco ovinae-Pinetum molinietosum*. The remaining forests consist of partially developed patches of *Galio sylvatici-Carpinetum* (R. Tx. 1937) Oberd. 1957 and *Carici elongatae-Alnetum* W. Koch 1926 ex R.Tx. 1931 (**Janyszek** 2006).

## Results

### Liverwort flora

Twelve liverwort species were recorded in the reserve "Olbina". The outstanding, compared to other reserves in Wielkopolska, abundance of liverworts is connected with the presence of microhabitats generated by rotting wood in the forest bottom and oli-

gothropic, acid mineral ground exposed in holes after tree fall. Among epixyls, *Nowellia curvifolia*, *Lepidozia reptans* and *Cephalozia bicuspidata* were found. Epigeic species were represented by *Cephaloziella divaricata*. Diversity of forest communities plays minor role in hepaticoflora of the reserve. Most species are connected with predominating *Festuco ovinae-Pinetum* forests. Typical epiphytic liverworts are relatively poor and are represented by *Ptilidium pulcherrimum* and *Metzgeria furcata*. Other ecological groups are water liverworts, i.e. *Riccia fluitans* and *Ricciocarpos natans* in alder forests.

A floristic peculiarity of the reserve is *Nowellia curvifolia*. This epixylic species was found in two localities. It grew on rotten, barkless logs of coniferous trees. In Wielkopolska it has been previously recorded in nature reserves "Pod Dziadem" in the Wielkopolski National Park (**Balcerkiewicz** and **Rzepka** 1996) and "Ciświckie Bagna" in Konin District (**Brzeg et al.** 2000). In Poland, this plant occurs frequently in north-eastern part of the country (**Klama** 2002, **Szweykowski** 2006). *N. curvifolia* is an endangered liverwort (category V), listed in The Red List of Poland's Liverworts (**Klama** 2006) and protected by law. There is another rare liverwort in the reserve: *Ricciocarpos natans*. This water-related species can be found in Wielkopolska in a few scattered localities (**Szweykowski** 1968, **Ochyra** and **Tomaszewicz** 1979, **Kłosowski et al.** 1999, **Brzeg et al.** 2000, **Pelechaty** and **Gąbka** 2003). In the reserve it was found in alder forest, on drying part of root-soil clod of an alder. Apart from the reserve, in southern Wielkopolska it was recorded in the Taczanów Forest Inspectorate (unit 240) in Pleszew district, ca. 2 km west from Bronów village (15.06.1997, leg. A. Czarna, P. Górski). Other liverworts of the reserve are common in Poland.

### List of species

Abbreviations:

CA – *Carici elongatae-Alnetum*, FH – *Festuco-Hypnetum jutlandici*, FP – *Festuco ovinae-Pinetum*, GC – *Galio sylvatici-Carpinetum*

291 a, 291 c – nos. of forest units numerary

north ditch – ditch running through the reserve in its central part (comp. Fig. 1)

*Calypogeia integristipula* Steph. – 291 a, eroding slopes in northern part of the north ditch (FP),

*Calypogeia muelleriana* (Schiffn.) Müll. Frib. – 291 a, eroding slopes in northern part of the north ditch (FP),

*Cephalozia bicuspidata* (L.) Dumort. – 291 a, common, in the north ditch on soil and rotten logs (FP) and on trampled soil of a poth in south-eastern part of the reserve (FH),

*Cephaloziella divaricata* (Sm.) Schiffn. – 291 a, three localities, on root-soil clod of fallen trees hollows in central part of the reserve (FP), c. per., c. spor.,

*Lepidozia reptans* (L.) Dumort. – common in the entire area, on rotting woods (stumps, logs, small branches), less frequent on soil (mostly FP),

*Lophocolea bidentata* (L.) Dumort. – 291 a, two localities, on forest bed in north-eastern part of the reserve (FP),

*Lophocolea heterophylla* (Schrad.) Dumort. – common in the entire area, on live and rotting wood, less frequent on soil, c. per., c. spor.,

- Metzgeria furcata* (L.) Dumort. – 291 a, one locality in south-western part of the reserve, on bark of ash and oak (GC),
- Nowellia curvifolia* (Dicks.) Mitt. – 291 a, two localities (comp. Fig. 1), on rotting log in central part of the reserve (FP),
- Ptilidium pulcherrimum* (Weber) Vain. – common in the entire reserve, most often on bark of birch, also on rotting logs, c. per.,
- Riccia fluitans* L. emend. Lorb. – 291 c, one locality in alder forest in southern part of the reserve, at root-soil clod of alder,
- Ricciocarpos natans* (L.) Corda – 291 c, one locality (comp. Fig. 1) in alder forest in southern part of the reserve (CA), at root-soil clod of alder.

### Menace to liverworts

A potential menace to liverwort epiphytes and epixyls, is caused by actions lowering moisture inside forest ecosystems of the reserve (Klama 2003, 2004, Górski and Urbański 2005). These are losing the forest stand in the nearby area, removing the brushwood or any actions, leading to drying caused by wind (including defragmentation of forest stands near the reserve and cutting the forest edges). For plants connected with rotting wood (particularly *Nowellia curvifolia*), it is important to leave dead wood in the forest, including withered but still standing trees. Current water conditions in alder forests should be kept because of the presence of species connected with stagnant water (*Riccia fluitans*, *Ricciocarpos natans*).

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## WĄTROBOWCE REZERWATÓW PRZYRODY WIELKOPOLSKI. 2. „OLBINA”

### Streszczenie

Rezerwat przyrody „Olbina” został utworzony w 1958 roku dla zachowania stanowiska jodły na północnym krańcu jej naturalnego zasięgu. Lasy obiektu przedstawiają postaci kontynentalnego boru mieszanego *Festuco ovinae-Pinetum* w wariancie z *Abies alba*. Drzewostan omawianego zbiorowiska budują potężne, stare sosny, ze znaczącą domieszką jodły i świerka. Charakterystycznym rysem fizjonomii wnętrza lasu są duże zasoby martwego drewna. Na terenie rezerwatu przyrody „Olbina” stwierdzono występowanie dwunastu gatunków wątrobowców (*Calypogeia integristipula*, *C. muelleriana*, *Cephalozia bicuspidata*, *Cephaloziella divaricata*, *Lepidozia reptans*, *Lophocolea bidentata*, *L. heterophylla*, *Metzgeria furcata*, *Nowellia curvifolia*, *Ptilidium pulcherrimum*, *Riccia fluitans* i *Ricciocarpos natans*). Wyjątkowe bogactwo tej grupy roślin w obiekcie, na tle innych rezerwatów Wielkopolski, jest związane z obecnością wielu mikrosiedlisk generowanych przez próchniejące drewno na dnie lasu oraz oligotroficzne, kwaśne podłoże mineralne odślaniane po wykrocie drzew.

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