THE VEGETATION OF THE ACCUMULATION LAKE LIEBLING (TIMIS COUNTY)

VEGETAȚIA LACULUI DE ACUMULARE LIEBLING (JUDEȚUL TIMIŞ)

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Abstract: *The accumulation lake Liebling is located on the course of the Lanca Birda brook, at the altitude of 94 m, on a surface of 60 ha. At present, it is managed by A.J.V.P.S. (The County Association of Sportive Hunters and Fishermen) Timiş, for fishing and recreation. Our research (performed in the period 2004 – 2007) consisted of several trips in the lake area, in various periods, in order to better render the structure of the phyto conenoses. The data processing implied identifying the vegetal associations, following the centralization and analysis of the samples of vegetation collected on the field, drawing up the summary of the cenoetaxonomic units and the analysis of the vegetal associations, having several viewpoints in mind. The study is based upon the principles of the Central-European floristic phyto-coenologic school. There have been identified and analyzed 19 vegetal associations, in accordance with the mentions above.*

Rezumat: *Lacul de acumulare Liebling este amplasat pe cursul pârâului Lanca Birda, la altitudinea de 94 m, pe suprafaţa de 60 ha. Este administrat în prezent de A.J.V.P.S. (Asociaţia Judeţeană a Vânătorilor şi Pescarilor Sportivi) Timiş, pentru pescuit şi agrement. Cercetările noastre (întreprinse în perioada 2004 – 2007) au constat în deplasări repetate în perimetrul lacului, în perioade diferite, pentru a putea surprinde cât mai bine structura fitocenozelor. Prelucrarea datelor a presupus identificarea asociaţiilor vegetale, în urma centralizării şi analizei eşantioanelor de vegetaţie întocmite pe teren, realizarea conspectului unităţilor cenotaxonomice şi analiza asociaţiilor vegetale prin prisma mai multor aspecte. Studiul are la bază principiile şcolii fitocenologice floristice cental-europene. Au fost identificate şi analizate conform menţiunilor de mai sus, 19 asociaţii vegetale.*

Key words: *phytocoenosis, vegetal association, aquatic and paludicolous vegetation, biodiversity, preservation*
Cuvinte cheie: *fitocenoză, asociaţie vegetală, vegetaţie acvatică şi palustră, biodiversitate, conservare*

INTRODUCTION

It is known that in the old days Banat used to be a marshy area. Following the extensive hydro-improvement works performed throughout the ages, there have disappeared from Banat territory a series of natural humid areas (marshes, flooded areas, humid hayfields, etc.), and others have considerably decreased in surface. As these areas got smaller, there have been created artificial developments on considerable surfaces. Thus, in 1970 it was founded along the brook Lanca Birda the accumulation lake Liebling.

MATERIAL AND METHODS

The study of the vegetation of accumulation lake Liebling was performed in the period 2004-2007, Thus, we have undergone several trips in the field, in order to better catch the vegetation particularities. The research is based upon the principles of the Central-European phytocoenologic school, applied for the first time in our country by BORZA (1934), according to whom the fundamental unit in the study of vegetation is the vegetal association. We have thus performed phytocoenologic sampling and after the data processing, examining the specialized references, we established the vegetal associations. We had in view the

accomplishment of the summary of cenoetaxonomic units and the analysis of the vegetal associations from various points of view (chorology, floristic composition and sinmorphology, sinecology, cenoetaxonomy, sindynamics, significance, conservative value). There were identified and analyzed in keeping with the notes above 19 vegetal associations.

RESULTS AND DISCUSSION

Following the processing of the field data, we identified in the area studied 19 vegetal associations, most of which were aquatic and paludicolous. The aquatic phytocoenoses are spread upon considerable surfaces, are scarce in species, but the edifying species are represented by populations with a large number of individuals. The paludicolous phytocoenoses are disposed in the shape of strips or clumps at the border between water and land, taking over small areas, most of them representing a nesting place for many species of birds. The number of samples performed on the field is 30, a number which we consider to be enough due to the uniformity of the aquatic phytcoenoses, reason for which it is not justified repeating their study and the fact that the paludicolous phytocoenoses, although numerous and diversified, occupy small areas, because of the narrow shores. Bearing this in mind, the phytocoenoses described by us can be considered representative.

In what follows, it is presented the summary of the vegetation units and then briefly presented the vegetal associations.

The summary of the main cenoetaxonomic units:

Cls. LEMNETEA W. Koch et Tx. 1934
Ord. *Lemnetalia* W. Koch et Tx. 1954
Al. *Lemnion minoris* W. Koch et Tx. 1954
Lemnetum minoris (Oberd. 1957) Müller et Görs 1960
Lemno minoris – Spirodeletum W. Koch 1954
Ord. *Hydrocharietalia* Rübel 1933
Al. *Ceratophyllion* Den Hartog et Segal 1964
Ceratophylletum demersi (Soó 1927) Hild 1956
Cls. POTAMOGETONETEA PECTINATI R. Tx. et Prsg. 1942
Ord. *Potamogetonetalia pectinati* W. Koch 1926
Al. *Potamogetion pussili* Vollmar em. Hejný 1978
Myriophyllo – Potametum Soó 1934
Al. *Trapo – Nymphoidetum* Oberd. 1957
Trapetum natantis Müller et Görs 1960
Cls. POTAMETEA Tx. et Prsg. 1942
Ord. *Potametalia* W. Koch 1926
Al. *Nymphaeion* Oberd. 1957 emend. Neuhäusl 1959
Polygono – Potametum natantis Soó 1964
Cls. PHRAGMITETEA Tx. Et Prsg. 1942
Ord. *Phragmitetalia* W. Koch 1926 emend. Pign. 1953
Al. *Phragmition australis* W. Koch 1926
Scirpo – Phragmitetum W. Koch 1926
Typhaetum angustifoliae Pignatti 1953
Typhaetum latifoliae G. Lang 1973
Glycerietum maximae Hueck 1931
Schoenoplectetum lacustris Eggler 1933
Iretum pseudacori Eggler 1933
Ord. *Magnocaricetalia* Pign. 1953
Al. *Magnocaricion elatae* W. Koch 1926

Phalaridetum arundinaceae (Horvatič 1931) Libbert 1931
Caricetum ripariae Knapp et Stoffer 1962
Cls. ATREMISIETEA Lohm., Prsg. Et Tx. 1950
Ord. *Artemisietalia* Lohm. Et Tx. 1947
Al. *Arction lappae* Tx. 1937 emend. Siss. 1946
Conietum maculati I. Pop 1968
Cls. ALNETEA GLUTINOSAE Br.-Bl. et Tx. ex Westhoff et al. 1946
Ord. *Salicetalia auritae* Doing 1962
Al. *Salicion cinereae* Müller Th. et Görs ex Pass. 1961
Rubo – Salicetum cinereae Sonasak 1963
Cls. MOLINIO – ARRHENATHERETEA Tx. 1937
Ord. *Molinietalia coeruleae* W. Koch 1926
Al. *Agrostion stoloniferae* Soó (1933) 1971
Agrostidetum stoloniferae (Ujvárosi 1941) Burduja et al. 1956
Poëtum pratensis Răv., Căzăc. et Turenschi 1956
Ord. *Deschampsietalia caespitosae* Horvatič 1956
Al. *Alopecurion pratensis* Pass. 1964
Alopecuretum pratensis Regel 1925

The association of duckweed (1 phytocoenosis described) is frequent in all aquatic areas in our country. This community shows a reduced kenotic diversity, but an impressive number of individuals, forming a compact stratum on the water surface. It grows well in clearings but also under the protection of aquatic macrophytes. It represents a food source for the water birds. The locals use the biomass of the association for feeding the birds in the households.

Lemno minoris – Spirodeletum (1 phytocoenoses described) is frequent in stagnant waters, with a moderate content of nutrients. It grows well, just like duckweed, in clearings, but in comparison to the latter it does not stop at the border with rush, but it enters further on among rhizomes. The phytocoenoses analyzed by us was identified at the end of May, the largest development of the association being reached in June-August. It is also sensitive to currents and waves, preferring areas protected from macrophytes. The biomass represents a food source for water birds.

The association of hornwort (2 phytocoenoses described) is rarely signalled in our specialized literature (it is not signalled in Banat). It is a submersible-natant association for still waters, forming compact buffer-fields, in which the currents stop and which facilitates the laying and the formation of a consistent stratum of suspensions. It prefers optimal lighting and covered places, where the currents and waves are few, although the stalks may bear strong nutation and torsion movements. The edifying species is nytrophilic, reason for which it grows very well in colmated waters. In our phytocoenoses the hornwort is accompanied by *Lemna minor, Potamogeton natans* and *P. crispu*s, and among macrophytes rarely appear *Mentha aquatica* and *Glyceria maxima.* Considering some writers, the species is detrimental, releasing a milky precipitate, toxic for the fish.

Within *the association of water milfoil with arrow grass* (1 phytocoenoses described) we have identified in Liebling the sub-association *potametosum crispi*, present at the shelter of macrophytes and constituted almost entirely of *Potamogeton crispus*. Its excessive development shows a deficit in oxygen in the water and significant accumulations of organic material. The arrow grass sometimes represents shelter for some species of fish and less of a food source.

*The association of water caltrop (*1 phytocoenosis described) grows well on loamy substratum, in the pools in process of clogging. In the phytocoenosis described, *Trapa natans*

is accompanied by other two species characteristic for the association, *Lemna minor* and *Polygonum amphibium*. Regarding its significance, the water caltrop seeds are edible, the leaves can be used as animal fodder. In this area, the caltrops are not valued also due to the fact that the association grows on small surfaces. On the other hand, as an inconvenient, it makes fishing difficult whenever it grows exaggeratedly on the surface of the water and the fruit is dangerous because of the persistent sepals, which, after blossoming, grow and turn into thorns. Because of water pollution and the embankment works performed, these phytocoenoses are endangered.

We have identified *the association of arrowgrass with pond smartweed* (1 phytocoenosis described) near the shore, at the shelter of rush, with the sub-association *potametosum natantis*. But it also grows well in open areas, reason for which we have encountered may stalks of *Potamogeton* torn by the waves and brought to the shore. *Potamogeton natans* is abundant, while *Polygonum amphibium* is rare. Due to the wide floating leaves, which occupy the entire water surface, the arrowgrass hampers the emergence of other communities of aquatic organisms.

The reed plots (1 phytocoenosis described) are present in all regions of the country. At present the areas occupied by them in Banat have decreased considerably, appearing especially isolated, in the pools with stagnant water. At Liebling they appear near shores, at the border between aquatic and land vegetation, being arranged in the shape of strips. They are well represented in species. Considering its importance, they protect the shores, they represent a shelter and nesting place for birds, they are sometimes used in light construction works.

The reeds (6 phytocoenoses described) are very frequent, developing luxuriantly in stagnant waters and sometimes having a large floristic diversity. At Liebling, most frequent are the edified communities of *Typha angustifolia*, arranged in the shape of strips, on the water shore. Reed is used in household industry, especially for knitting. At Liebling, it is not valued enough, most of the part remaining uncultivated.

The edified phytocoenoses of manna grass (1 phytocoenosis described) are arranged in the shape of narrow bands at the border of rush (as the lake shores are also narrow) representing an association passing to land vegetation. At Liebling these communities have a special aesthetic value to which, during anthesis, also contribute the numerous *Butomus umbellatus*, a species characteristic for this association. The economical value of these phytocoenoses is still reduced, sometimes the biomass is used as hay, but it has a low quality.

The phytocoenoses of bulrush (1 phytocoenosis described) are arranged in the shape of straps or clumps, usually between the reed plots and the shore. In Liebling, they often appear between the rush-beds and the manna grass communities. They have a low floristic diversity. They are sensitive to pasture and do not stand beaten soils. They handle well the fluctuations in water level. Being rich in proteins, it is recommended their use as bird fodder, due to the high content in NPK of the sprout; it is also used as fertilizer, as composite, in horticulture. Another use is in manufacturing cellulose, paper and rayon. Sometimes it represents a shelter and nesting place for birds.

The sword flag (1 phytocoenosis described) grows in pond areas, in clumps. These phytocoenoses are not very frequent in Banat, nor throughout the country (they are identified in Danube Delta and in Moldova). The phytocoenosis described was encountered in May, during the anthesis of the sword flag, alongside which we have identified the presence of other species characteristic for the association: *Symphytum officinale, Lythrum salicaria, Lysimachia numularia, Carex riparia, Bolboschoenus maritimus.* Regarding its importance, the species is ornamental with its flowers and it has been harvested as an ornamental plant.

Phalaridetum arundinaceae (3 phytocoenoses described) is a very frequent association in the accumulation area, growing abundantly at the water shore. It is often

interposed between the communities of manna grass and reeds. It represents a shelter for certain bird species.

The reeds (2 phytocoenoses described) are very frequent both in the country and in Banat. The phytocoenoses described by us are rich in species, the majority being meso-hygrophil, characteristic for the association. The locals rake them frequently although the quality of the fodder is low. They represent a shelter and nesting place for certain species of birds.

The hemlock (1 phytocoenosis described) grows luxuriantly on waste dumps, rich in nitrogen. We have identified one phytocoenosis at the beginning of summer, at the edge of the road. It is a mesophilic association, which leads to associations of weeds, reason for which in the structure of the phytocoenosis analyzed by us, together with *Dipsacus laciniatus* and *Urtica dioica* (species characteristic for these communities), also appear many transgressive species. Because of the alkaloid conium, the species is toxic and with a bad smell, being avoided by animals.

The osier brushwood (3 phytocoenoses identified) are rarely identified in our country. In Liebling, these phytocoenoses grow on lands with excessive humidity, bordered by water and are invaded by shore weeds. They ensure a shelter and nesting place for birds and the stalks are sometimes used in household industry, for some knitting.

Agrostidetum stoloniferae (1 phytocoenosis described) is a community frequently identified in all country areas. It grows on pond shores, in dikes, humid meadows, forest cuttings, on soils periodically flooded in spring. It prefers fertile soils. It has a high capacity of adjustment, handling well the modifications in water level, temporary flood, being beaten. Considering its economical importance, these meadows have a good fodder value and a high productivity, due to the presence of many graminaceous and leguminous species in the floristic composition.

The meadow grass (1 phytocoenosis described) represents mesophilic communities, very frequent in the forest steppe of our country. In the structure of the phytocoenosis described in Liebling, there are encountered many meso-hygrophilic species, due to the humid resort it was installed. The forage value of these meadows is high.

The phytocoenosis edified by *Alopecurus pratensis* (1 phytocoenosis described) was encountered near the lake in a humid depression. It was probably installed after *Carex riparia* and, because of the fact that together with the dominant species we found many mesophilic, we consider that the phytocoenosis will be replaced by edified communities of such species. As for the economical relevance, these meadows have a high forage value.

Considering the conservative value, we mention that the associations *Potametum natantis* and *Trapetum natantis* are part of habitats with a high conservative value while the associations *Lemnetum minoris, Lemno-Spirodeletum, Phalaridetum arundinaceae, Glycerietum maximae, Scirpo-Phragmitetum* and *Caricetum ripariae* have a moderate conservative value, but with a tendency of becoming high, under the conditions of the threat of extinction for many species. The other associations are common.

(Because of their scale, the synthetic tables for the associations could not be included in the paper. The authors may offer them to those interested in analyzing them.)

CONCLUSIONS

The ecological conditions from around the accumulation lake Liebling have favoured the installation of an important vegetation from the point of view that here are found phytocoenoses with a high conservative value and which, also, represents an island where many species of birds live. The summary of the cenoetaxonomic units comprises 19 vegetal associations, 8 of which have a conservative significance. We consider to be necessary the

continuous monitoring of the vegetation in the area studied, in order to complete the cenotic inventory with phytocoenoses whose emergence is dependent upon the natural multi-annual dynamics as well as on man's influence, and to better catch the possible directions of development of the vegetation. Due to the phytocoenotic diversity but also to that of the characteristic bird fauna and ichtyofauna, we consider that it is required the accomplishment of an adequate management plan and also a careful monitoring of man's interventions, which endanger the originality of this habitat.

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