ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA
VOL. LV SECTIO C 2000

Instytut Biologii UMCS, Zakład Geobotaniki
Ukrainkij Derżavnij Lisotechnicznij Universitet

FLORIAN ŚWIĘS, MIROSŁAWA SOROKA

Aquatic plants and rush-plants of the upper Vereshitsa river valley in the region of Lvov Roztocze

Roślinność wodna i szuwarowa górnego odcinka doliny rzeki Wereszczycy w rejonie Roztocza Lwowskiego

THE SCOPE AND METHODS OF RESEARCH

The plants of aquatic, wetland, peatland and meadow ecosystems have so far been exceptionally negligibly studied in Ukraine. Phytosociological data on these plants are basically reduced to the listing of their major phytocenoses in comprehensive geobotanical studies (4, 6, 7, 14). An exception in this respect is a study by Popiołek (13) concerning related plants belonging to the peatland-meadow group in Roztocze in the area of Lvov. The few published results of phytosociological studies on these plants come from the small, southeastern part of the investigation area now being characterized (Fig. 1).

Field studies of aquatic and waterside plants were conducted during vegetation periods in 1993-1997. The phytosociological taxonomy of the investigated plant communities was adopted after Tomaszewicz (19) and Matuszkiewicz (9). The phytosociological structure of these phytocenoses was prepared according to the generally accepted method of their investigation (20). The names of plant species were given after the study by Mirek et al. (10).

The appended phytosociological tables of the plant communities studied present the data on all the species occurring in them that are recognised as characteristic and distinctive of the group of plant communities under investigation (Table 1-9). Letters and figures given in brackets (after the name of plant species) denote: Ch -characteristic species, D – distinctive species, successive figures – numbers of phytocenoses for which a particular species is recognised as characteristic (Ch) or distinctive (D).

THE AREA OF INVESTIGATIONS

Studies of aquatic and waterside plants were conducted in the upper Vereshitsa river valley, situated in the northwestern part of the Lvov province in the Yavorov district. This is a ca. 80 km-long section of the river valley situated in the vicinity of Ivano Frankovo, 10-15 km northwest of Lvov (Fig. 10.) Physico-geographically, this is the south-easternmost part of Roztocze, previously included

in South Roztocze (7) and recently distinguished as the Lvov Roztocze (3). In the Ukrainian literature the area in question is regarded as part of the Lvov-Vereshitsa Plateau (6, 14, 15).

In the geobotanical maps of Poland and Ukraine the area investigated is located within the range of geobotanical units defined as: Roztocze Region, subdivision of the Central Upland Zone (16) and as the district of leafy forests of the Baltic province (6, 7, 14). The geomorphologic and geological features of the terrain in the area under investigation are fairly characteristic (1, 3, 6, 15). The dominant landscape is that of terraced elevations, up to 390 m above sea level, with wide inner-mountain depressions and river valleys. In inundation terraces of the Vereshitsa river valley and its tributaries of different width there are Quaternary, chiefly clayey, alluvial soils. Under these sediments, the oldest bedrock is built of Tertiary and Upper Cretaceous rocks.

The main river in the studied area is the Vereshitsa, which is a tributary of the Dnester. It is shallow and up to 10 m wide. Its main tributary is the rivulet Stavchanka flowing from an inner-forest artificial reservoir. The banks of the river and its tributaries are usually gentle and swampy. In the river valleys situated at 260 m above sea level there are numerous artificial reservoirs of different size, most often used as fishponds. The largest, called Yanovsky Stav, covers ca. 180 ha. Apart from artificial reservoirs in the broader parts of the valleys of the Vereshitsa and its tributaries, worth noting is the large number of highly swampy areas, criss-crossed with a dense network of drainage ditches and canals. River and drainage-canal water is rich in all kinds of chemical compounds and suspensions. Special attention should be drawn to a high concentration of calcium compounds in these waters, which is eventually conducive to the calciphilic succession of aquatic and wetland plants.

Almost the whole of the investigated area in the Vereshitsa valley and its tributaries is in the vicinity of vast leafy, leafy-coniferous and coniferous forests growing on hills and at the bottom of ground depressions. A small fragment of these forests together with woodless parts of river valleys covering 2,084 ha belongs to Roztocze Reserve.

The climatic conditions in the area under investigation are fairly complex (12, 14, 17). It must be emphasised first of all that the masses of the Atlantic and Continental air clash here. The average annual air temperature is in the region of 7.5°C. The warmest month is August (the average of 17.4°C) and the coldest is January (the average of 4.1°C). The average annual precipitation in the investigated area is 645 mm.

PLANT COMMUNITIES

In the area investigated, on the basis of 274 phytosociological records, 36 associations of aquatic and riverside plants and one phytosociologically indeterminate community were distinguished. The phytosociological classification of the studied plants is as follows:

CL – class, O. – order, All. – alliance, ass. – association, com. – community

CL. *Lemnetea* Koch. et Tx. 1954
Lemnetalia Koch. et Tx. 1954
All. *Lemnion minoris* Koch. et Tx. 1954
1. ass. *Lemno-Spirodeletum polyrrhizae* Koch. 1954 em. Müll. et Görs 1960
1.1. variant: with *Lemna minor* and *L. trisulca*
1.2. variant: with *Spirodela polyrrhiza*
2. ass. *Spirodelo-Salvinietum natantis* Slavnić 1956

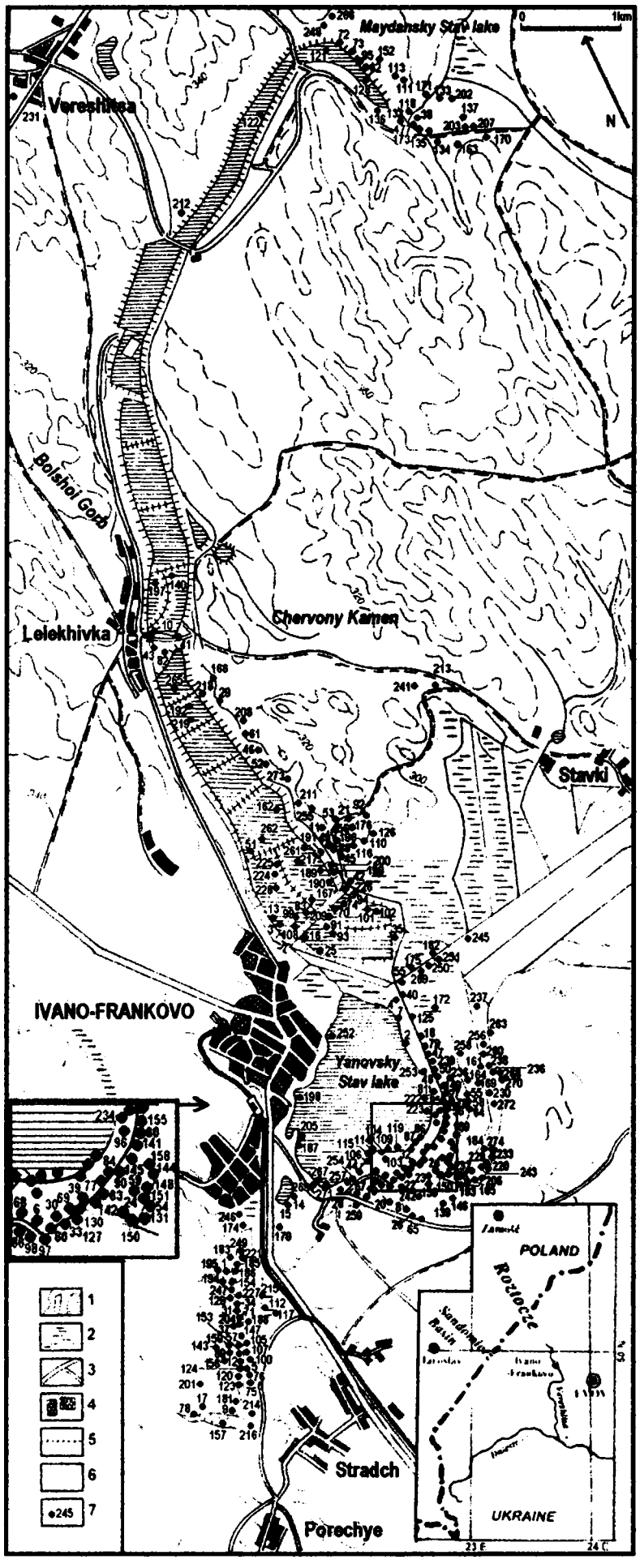


Fig. 1. Maps of the investigation area. The map in the bottom corner of the main map: location against then background of Polish-Ukrainian borderland. Main map: 1 – lakes, ponds, drains, canal etc., 2 – marshland, 3 – highways and major local roads, 4 – dense built-up areas, 5 – wooded areas, 7 – station of 274 phytosociological records

CL. *Potamogetonetea* R. Tx. et Prsg. 1942
O. *Potamogetonetalia* Koch. 1926
All. *Potamogetonion* Koch. 1926 em. Oberd. 1957
3. ass. *Ceratophylletum demersi* Wild. 1956
4. ass. *Elodeetum canadensis* (Ping. 1953) Pass. 1964
5. ass. *Ranunculetum circinati* (Bennema et West. 1943)
6. ass. *Potamogetonetum lucentis* (Hueck 1931)
All. *Nymphaeion* Oberd. 1957
7. ass. *Myriophylletum verticillanti* Soó 1927
8. ass. *Polygonetum natantis* Soó 1927
9. ass. *Nymphaetum candidae* Miljan 1958
10. ass. *Nupharo-Nymphaeetum albae* Tomasz. 1977
11. ass. *Potamogetonetum natantis* Soó 1927
12. ass. *Hydrocharitetum morsus-ranae* Laugendorick 1935
All. *Hottonion* Segal 1964
13. ass. *Hottonietum palustris* R. Tx. 1937
All. *Ranunculion fluitantis* Neuhusl 1959
14. ass. *Ranunculetum fluitantis* Allorge 1922
15. ass. *Ranunculo-Sietum erecto-submersi* (Roll 1939) Müll. 1962
CL. *Phragmitetea* R. Tx. et Prsg. 1942
O. *Phragmitetalia* Koch. 1926
All. *Phragmition* Koch. 1926
16. ass. *Scirpetum lacustris* (Allorge 1922) Chouand 1924
17. ass. *Typhetum angustifoliae* (Allorge 1922) Soó 1927
18. ass. *Typhetum latifoliae* Soó 1927
19. ass. *Equisetetum limosi* Steffen 1931
20. ass. *Phragmitetum communis* (Gauus 1927) Schmale 1939
21. ass. *Glycerietum maximae* Hueck 1931
22. ass. *Oenantho-Rorippetum* Lohm. 1950
23. ass. *Sparaganietum erecti* Roll 1938
24. ass. *Acoretum calami* Kobendza 1948
25. ass. *Sagittario-Sparganietum, emersi* R. Tx. 1953
26. ass. *Eleocharitetum palustris* Šennikov 1919
27. com. *Veronica beccabunga*
All. *Sparganio-Glycerion fluitantis* Br.-Bl. et Siss. in Boer 1942
28. ass. *Sparganio-Glycerietum fluitantis* Br.-Bl. 1929 n. n.
All. *Magnocaricion* Koch 1926
29. *Iridetum pseudoacori* Eggler 1933 (n.n.)
30. ass. *Caricetum rostratae* Rübel 1912
31. ass. *Caricetum vesicariae* Br.-Bl. et Denis 1926
32. ass. *Caricetum appropinquatae* (Koch 1926) Soó 1928
33. ass. *Caricetum acutiformis* Sauer 1937
34. ass. *Phalaridetum arundinaceae* (Koch 1926 n.n.) Libb. 1931
35. ass. *Caricetum ripariae* Soó 1928
36. ass. *Caricetum gracilis* (Graebn. et Hueck 1931) R. Tx. 1937
37. ass. *Thelypteridi-Phragmitetum* Kniper 1957

1. *Lemno-Spiridoletum polyrrhizae* (Table 1, rec. 1-21)

This association is composed mainly of several of its characteristic species dominant individually or in groups. Two variants are distinguished in it that are characterized by specific species found in them most often and at the same time usually in greatest numbers: one with *Lemna minor* and *L. trisulca*, the other with *Spirodela polyrrhiza*. The two variants are formed in highly complex facies patterns. They represent both easily distinguishable (typical) forms and intermediate ones. The pleustonic association in question is commonly found but

Table 1. – 1 – association *Lemno-Spirodeletum polyrrhizae* in variants: 1.1 – with *Lemna minor* and *L. trisulca*, 1.2. with *Spirodela polyrrhiza*, 2 – association *Spirodelo-Salvinietum natantis*

Number of community	1.																					2.							
	1													2															
Number of record	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Date	96-05-31	96-07-12	96-09-19	96-06-11	97-05-11	96-06-18	96-07-12	97-06-08	96-08-01	97-08-07	97-07-21	97-08-07	96-09-19	96-08-10	96-09-14	96-07-21	96-05-31	97-07-24	97-06-03	97-06-08	97-07-11	97-07-03	97-07-12	96-07-12	97-07-12	98-08-14	98-07-28	97-07-12	
Area of plot in m^2	2	2	2	5	5	2	4	2	2	4	2	5	2	2	3	2	2	2	3	2	2	10	4	10	6	10	6	4	
Cover in % the layer	80	90	90	90	60	70	90	90	90	80	80	80	80	100	100	90	100	80	40	70	80	90	40	80	80	70	70	60	
Number of species in record	2	2	2	2	2	2	4	6	8	4	5	6	6	4	5	9	8	4	5	6	5	6	9	8	5	6	4	6	
I. Ch: *Lemnetea, Lemnetalia, Lemnion minoris*																													
Lemna minor (Ch:1)	5	5	4	5	3	4	5	3	4	4	4	5	4	4	5	4	5	1	.	.	.	.	.	3	+	1	.	.	
Lemna trisulca (Ch:1)	+	1	1	.	.	.	.	4	5	.	+	+	1	+	1	1	4	.	+	3	+	4	3	.	+	.	.	.	
Spirodela polyrhiza (Ch:1)	.	.	.	1	.	.	.	.	.	1	+	+	+	5	5	3	3	4	3	4	5	2	+	+	.	+	1	3	
Salvinia natans (Ch:2)	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	5	5	5	5	2	
II. Ch: a - *Potamogetonetea, Potamogetonetalia*, b - *Nymphaeion*																													
a *Elodea canadensis* (Ch:4)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	.	.	
a *Ceratophyllum submersum*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	
b *Hydrocharis morsus-ranae* (Ch:12)	.	.	.	.	.	.	+	.	1	1	.	+	.	.	.	1	.	.	1	1	+	.	+	+	+	+	+	.	
III. Ch: a - *Phragmitetea, Phragmitetalia*, b - *Phragmition*, c - *Magnocaricion*, d - *Sparganio-Glycerion fluitantis* (x)																													
a *Glyceria maxima* (Ch:21)	.	.	.	.	.	.	.	+	+	.	.	.	3	.	+	+	.	+	.	.	.	.	.	+	.	.	.	.	
a *Typha latifolia* (Ch:18)	.	.	.	.	.	.	.	+	.	.	.	+	+	.	.	+	.	.	+	.	+	.	.	+	.	+	.	.	
a *Sparganium erectum* (Ch:23)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	.	.	.	.	.	.	.	+	
b *Typha angustifolia* (Ch:17)	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	+	.	+	.	.	+	.	.	.	.	.	
c *Carex acutiformis* (Ch:33)	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	+	.	.	.	.	.	+	+	.	.	.	.	
c *Phalaris arundinacea* (Ch:34)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	
IV. Ch: *Alnetea glutinosae*																													
Solanum dulcamara	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	
V. Ch: *Calthion*																													
Caltha palustris	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	
VI. Ubiqutous plants and plants of other syntaxonomic groups: in marshy, moist habitats																													
Mentha aquatica	.	.	.	.	.	+	.	.	+	.	.	+	.	.	.	.	.	.	.	+	+	.	+	.	.	.	.	.	
Lycopus europaeus	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	
Bidens cernua	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	

Species occurring in 1 record: IIa - *Utricularia vulgaris* 7/+, *Potamogeton lucens* (Ch:6) 22/+. IIb - *Nymphaea candida* (Ch:9) 22/2, *Nuphar luteum* (Ch:10) 23/2. IIIa - *Equisetum fluviatile* (Ch:19) 11/+. IIIc - *Cicuta virosa* 7/+, *Iris pseudacorus* (Ch:29) 16/+. IIId - *Veronica anagallis- aquatica* (Ch:15) 11/+. IV - *Caltha palustris subsp. cornuta* 8/+.

most frequently in small expanses covering 2-5 sq. m. It develops on the surface of shallow and medium deep waters, mainly on the fringes of canal, pond and lake floors.

Phytosociological records: 1. Stradch, west direction. A shallow water surface on the fringe of the Vereshitsa riverbed. 2. Ivano Frankovo. A shallow water surface on the fringe of Yanovsky Stav lake. 3. Between the village of Lelekhivka and the Gorbki forest range. A shallow water surface on the fringe of the fishpond floor. 4. Ivano Frankovo. Habitat as in rec. no. 1. 5. Stradch, from the direction of Stradchanska Gora. Habitat as in rec. no. 1. 6. Between the town of Ivano Frankovo and the Korelova Gora forest range. Habitat as in rec. no. 1. 7. Ivano Frankovo. Habitat as in record 2. 8. Roztoche Reserve, the Korelova Gora forest range. Habitat as in rec. no. 1. 9. Stradch, east side, near a brickyard. A shallow water surface on the fringe of a small lakebed. 10. The village of Lelekhivka, east side. A shallow water surface on the brink of the Lelekhivsko lakebed. 11. Roztocze Reserve, the Zalivki forest range, sect. 41. A shallow water surface on the fringe of the Stavchanka riverbed. 12. Stradch, near Stradchanska Gora. Habitat as in rec. no. 1. 13. Between the village of Lelekhivka and the Gorbki forest range. Habitat as rec. no. 3. 14. Roztocze Reserve, the Vereshitsa river valley. Habitat as in rec. no. 3. 15. Roztocze Reserve, the Vereshitsa river valley. Habitat as in rec. no. 3. 16. Ivano Frankovo, from the direction of the Gorbki forest range. A shallow water surface in a drainage canal. 17. Stradch, near Stradchanska Gora. A shallow water surface on the fringe of the lakebed. 18. Roztocze Reserve, the Zalivki forest range. Habitat as in rec. no. 1. 19. In the vicinity of Ivano Frankovo, near Korelova Gora. Habitat as in rec. no. 1. 20. Roztoche Reserve, the Korelova Gora forest range. Habitat as in rec. no. 1. 21. Roztocze Reserve, the Zalivki forest range. Habitat as in rec. no. 1.

2. *Spirodelo-Salvinietum natantis* (Table 1, rec. 22-28)

The association is chiefly characterized by the almost exclusive and most numerous occurrences of *Salvinia natans*. The species in question, *Salvinia natans*, is regarded as characteristic of this association. It is also worth noting that out of the other most often found species in some expanses of this association, the comparatively most frequent are the species recognised as characteristic of a separate association – *Lemno-Spirodeletum polyrrhizae: Lemna trisulca, L. minor and Spirodela polyrrhiza*. The association is a frequent one of aquatic plants. It develops on expanses of 4-10 sq. m. It is found in similar sites as the previous one: on the surface of shallow and medium deep water, mainly on the fringes of riverbeds and drainage canal floors.

Phytosociological records: 22. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. A shallow water surface on the fringe of the Vereshitsa riverbed. 23. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 22. 24. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 22. 25. In the vicinity of Ivano Frankovo, from the direction of the Gorbki forest range. A shallow water surface on the drainage canal floor. 26. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 22. 27. In the vicinity of Stavky village, the Korelova Gora forest range. Habitat as in rec. no. 22. 28. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 22.

3. *Ceratophylletum demersi* (Table 2, rec. 29-34)

The association is chiefly formed by *Ceratophyllum demersum*, which is the species characteristic of this phytocenosis. It should be noted that in respect of its general phytosociological structure this association exhibits the comparatively greatest links with the association *Lemno-Spirodeletum polyrrhizae*. This is evidenced by numerous occurrences in it but with different frequency of such characteristic species as mainly: *Lemna minor* and less often *Lemna trisulca* and *Spirodela polyrrhiza*. This is a fairly rare association, occurring in expanses of 2-8 sq. m. It develops chiefly inside shallow waters on the ooze-gley beds of rivers, canals and ponds.

Phytosociological records: 29. In the vicinity of Lelekhivka village. Shallow water on the fringe of the slimy-sandy Vereshitsa riverbed. 30. In the vicinity of Ivano Frankovo, from the direction of the Yanovsky Stav lake. Shallow water on the sandy-sandy drainage canal floor. 31. Stradch, near Stradchanska Gora. Habitat as in rec. no. 29. 32. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 29. 33. In the vicinity of Ivano Frankovo, from the direction of Yanovsky Stav lake. Shallow water on the sandy-sandy drainage canal floor. 34. Stradch, near Stradchanska Gora. Habitat as in rec. 29.

4. *Elodeetum canadensis* (Table 2, rec. 35-44)

The association is primarily distinguished by the numerous occurrences of its characteristic species – *Elodea canadensis*. It exhibits the comparatively greatest floristic ties with the association *Lemno-Spirodeletum polyrrhizae*, to a lesser extent with the association *Polygonetum natantis*. A frequent phytocenosis but developing in small-sized expanses (2-5 sq. m). It occurs inside shallow or medium deep waters on the fringe of river, and lakebeds, and canal floors.

Phytosociological records: 35. Roztocze Reserve, the Zalivki forest range, section 42. Shallow water on the fringe of the sandy-sandy Stavchanka rivulet bottom. 36. Ivano Frankovo from the direction of Yanovsky Stav lake. Shallow water on the drainage canal floor. 37. Stradch, near Stradchanska Gora. Medium deep water on the fringe of the Vereshitsa riverbed. 38. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond. Medium deep water on the drainage canal floor. 39. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 37. 40. Roztocze Reserve, the Zalivki forest range. Medium deep water on the fringe of the Stavchanka rivulet bottom. 41. Lelekhivka. In medium deep water on the fringe of the Lelikhovsko lakebed. 42. Roztoche Reserve, the Zalivki forest range. Habitat as in rec. no. 40. 43. Lelekhivka, southern part. Medium deep water on the fringe of the Lelikhovsko lakebed. 44. Ivano Frankovo. The upper layer of medium deep water on the fringe of the regulated channel of the Vereshitsa river.

5. *Ranunculetum circinati* (Table 2, rec. 45-53)

This association is distinguished primarily in respect of numerous occurrences of its characteristic species: *Batrachium circinatum*. It exhibits a comparatively high floristic linkage with the association *Lemno-Spirodeletum polyrrhizae*. It is a fairly frequent association, in expanses most often with areas of 3-10 sq. m. It is found mainly in medium deep and shallow waters on the fringes of river, canal and pond bottoms.

Phytosociological records: 45. Roztocze Reserve, the Zalivki forest range. Medium deep water on the fringe of the Stavchanka rivulet bottom. 46. In the vicinity of Lelekhivka village. Medium deep water on the fringe of the Vereshitsa riverbed. 47. Ivano Frankovo, from the direction of Yanovsky Stav lake. Medium deep water of the water channel. 48. Ivano Frankovo, from the direction of Yanovsky Stav lake. Habitat as in rec. no. 47. 49. Roztoche Reserve, the Zalivki forest range, section 42. Habitat as in rec. no. 45. 50. Ivano Frankovo, Roztocze Reserve, from the direction of Yanovsky Stav lake. Habitat as in rec. no. 47. 51. In the vicinity of Lelekhivka village, from the direction of the Gorbki forest range. Among the rushes in shallow water on the fringe of the pond floor. 52. In the vicinity of Lelekhivka village, from the east direction. Shallow water on the fringe of the Vereshitsa riverbed. 53. Roztocze Reserve, the Zalivki forest range. Habitat as in rec. no. 45.

6. *Potamogetonetum lucentis* (Table 2, rec. 54-63)

The association is primarily distinguished in respect of the most frequent and most abundant occurrences of *Potamogeton lucens*, the species recognised as characteristic of this phytocenosis. It exhibits the greatest floristic linkage with different phytocenoses of the alliances *Lemnion minoris* and *Nymphaeion*. A frequent association, in scattered stations with areas ranging from 3-8 sq. m. It develops chiefly in the medium deep waters of canals, ponds and rivers.

Phytosociological records: 54. Roztocze Reserve, the Korelova Gora forest range. Medium deep water on the drainage canal floor. 55. Roztocze Reserve, the Zalivki forest range. Habitat as in rec. no. 54. 56. Roztocze Reserve, the Zalivki forest range. Medium deep water on the fringe of the Stavchanka rivulet bottom. 57. Stradch, near Stradchanska Gora. Medium deep water on the fringe of the Vereshitsa riverbed. 58. Roztocze Reserve, the Zalivki forest range. Habitat as in rec. no. 54. 59 Ivano Frankovo, Roztocze Reserve, the Korelova Gora forest range. Habitat as in rec. no. 54. 60. Ivano Frankovo, from the direction of Yanovsky Stav lake. Habitat as in rec. no. 54. 61. Lelekhivka village, east direction. Habitat as in rec. no. 57. 62. In the vicinity of Vereshitsa village, the Maidan forest range. Medium deep water on the fringe of the fishpond bed. 63. Ivano Frankovo, Roztocze Reserve, the Korelova Gora forest range. Habitat as in rec. no. 54.

7. *Myriophylletum verticillati* (Table 3, rec. 64-69)

The association is distinguished primarily in respect of domination of its sole characteristic species: *Myriophyllum verticillati*. Other sparsely recorded plant

Table 2. – 3 – association *Ceratophylletum demersi*, 4 – association *Elodeetum canadensis*, 5 – association *Ranunculetum circinati*, 6 – association *Potamogetonetum lucentis*

Number of community	3						4										5										6										
Number of record	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
Date	97-08-08	96-08-06	97-07-17	96-08-08	96-08-08	97-07-21	95-07-16	96-06-20	97-07-03	96-06-20	97-07-03	96-08-18	96-06-19	96-06-20	94-07-16	97-07-25	96-06-18	96-07-22	96-06-18	97-07-26	96-07-22	94-07-11	96-06-12	97-07-26	96-07-11	95-08-18	95-07-10	97-09-12	97-06-17	95-07-10	97-08-28	97-07-24	96-08-08	95-07-14	97-09-12
Area of plot in m^2	5	4	8	5	4	2	2	3	5	2	5	2	2	3	2	3	4	3	10	8	3	10	10	4	5	8	4	8	3	3	5	3	4	3	8
Cover in % the layer	90	90	80	90	90	90	100	90	90	80	80	80	90	20	70	60	90	90	70	60	50	50	90	40	60	70	90	40	60	90	90	80	40	90	90
Number of species in record	4	5	6	6	4	4	4	5	4	5	5	5	4	3	7	5	3	3	3	9	8	5	6	3	5	6	5	5	7	4	8	6	6	4	5
I. Ch: *Lemnetea, Lemnetalia, Lemnion minoris*																																			
Spirodela polyrhiza (Ch:1)	3	.	.	.	.	.	.	+	+	.	.	+	.	.	+	.	1	.	.	+	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.
Lemna trisulca (Ch:1)	.	.	.	.	2	+	1	+	+	+	.	.	.	.	+	2	.	.	+	.	+	.	+	.	.	1	+	2	3	1	+	.	.	.	.	.
Lemna minor (Ch:1)	.	3	2	2	.	+	3	.	.	.	+	.	.	.	.	1	3	1	.	2	+	.	.	.	.	.	+	+	.	.	+	+	.	.	.	.
II. Ch: a - *Potamogetonetea, Potamogetonetalia*, b - *Potamogetonion*, c - *Nymphaeion*, d - *Hottonion*, e - *Ranunculion fluitantis*																																			
a *Elodea canadensis* (Ch:4)	+	+	+	+	.	.	5	5	5	4	4	4	5	2	4	2	.	.	.	+	+	.	1	+	+	+	.	.	+	+	.	+	+	.	+
a *Ceratophyllum demersum* (Ch:3)	5	5	3	5	5	5	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.
a *Batrachium circinatum* (Ch:5)	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	5	5	4	2	3	3	5	3	3	.	.	.	.	.	+	+	+	1	.
a *Potamogeton lucens* (Ch:6)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	3	5	1	2	5	5	4	2	5	5
b *Potamogeton pectinatus*	+	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.
c *Myriophyllum verticillatum* (Ch:7)	.	+	+	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c *Nuphar lutea* (Ch:10)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
c *Hydrocharis morsus-ranae* (Ch:12)	.	.	.	+	.	.	.	.	3	+	+	+	+	+	+	.	.	+	.	+	+	1	+	.	+	.	.	+	+	.	+	+	.	.	.
c *Polygonum amphibium var. terrestre* (Ch:8)	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	3	.	.	.	.	.	+	.	.	+
c *Potamogeton natans* (Ch:11)	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	2	.	.	+	.	.	.	.	1	.	.	.	.	.	.	+	.
c *Stratiotes aloides* (Ch:12)	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
d *Hottonia palustris* (Ch:13)	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
e *Batrachium trichophyllum* (Ch:14)	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.

Species occurring in 1 record: IIc - *Batrachium aquatile* (Ch:13) 32/+, *Berula erecta* (Ch:15) 59/+. IIIb - *Oenanthe aquatica* (Ch:22) 49/+, *Sparganium erectum* (Ch:23) 50/+.

Table 3. – 7 – association *Myriophylletum verticillati*, 8 – association *Polygonetum natantis*, 9 – association *Nymphaetum candidae*, 10 – association *Nupharo-Nymphaetum albae*, 11 – association *Potamogetonetum lucentis*, 12 – association *Hydrocharitetum morsus ranae*

Number of community		7						8									9						10			11											12									
Number of record		64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
Date		97-06-23	97-07-12	96-07-11	97-08-10	96-07-21	97-08-10	95-06-11	96-06-12	97-06-28	97-06-28	95-06-11	96-06-12	97-07-14	96-06-12	97-07-14	97-06-28	96-07-16	94-08-01	96-07-18	96-08-22	96-06-26	97-08-21	96-07-16	97-07-17	97-06-14	96-08-24	95-08-14	96-07-12	96-08-21	95-08-14	97-09-15	96-07-16	96-07-12	94-07-08	97-09-19	94-08-01	97-08-14	97-06-23	97-06-12	97-06-21	96-07-04	96-08-20	97-08-14	96-08-17	95-06-20
Area of plot in	m^2	3	5	4	3	4	3	10	10	3	4	10	10	8	10	6	10	16	16	20	12	12	8	6	5	3	6	10	6	3	8	10	4	6	6	3	3	8	8	6	8	4	8	10	5
Cover in % the layer		30	30	90	80	90	40	90	90	90	80	90	80	90	90	30	40	100	60	90	90	100	90	100	80	20	100	100	90	90	90	90	90	90	90	80	90	90	80	90	90	90	100	90	100
Number of species in record		4	4	6	4	4	3	5	4	2	3	3	2	2	2	2	2	9	7	6	1	6	3	8	6	6	8	6	3	2	5	4	5	3	2	2	6	2	2	4	5	3	5	2	6
I. Ch: *Lemnetalia, Lemnion minoris*																																													
Spirodela polyrhiza (Ch:1)				+	+			+										+				+		+		+	+			+					5								
Lemna trisulca (Ch:1)		+	+			+		+											+	+				3			5			+	+	+									+	3		
Lemna minor (Ch:1)				+								+	+	+	+	+		3	+	+		+		+	+	+		5	1								+				+	+	+		3
Salvinia natans (Ch:2)																		+	+					+	+	+																		
II. Ch: a - *Potamogetonetea, Potamogetonetalia*, b - *Potamogetonion* (x), c - *Nymphaeion*, d - *Hottonion*, e - *Ranunculion fluviatilis*																																												
a *Potamogeton natans* (Ch:11)								+											1			3				+	5	5	5	5	5	5	5	5	5									
a *Elodea canadensis* (Ch:4)		+	+	+			+	+	+	+	+	+								+							+	+					+	+							+		
a *Ceratophyllum submersum*																								3																					
a *Ceratophyllum demersum* (Ch:3)																		3	3						+												1								
a *Potamogeton lucens* (Ch:6)																		3							+																				
c *Myriophylum verticillatum* (Ch:7)		2	2	5	4	5	3	2	+																															+	+				
c *Polygonum amphibium var. terrestre* (Ch:8)						+		5	5	5	4	5	4	5	5	2	3					1																+								
c *Nymphaea candida* (Ch:9)																		4	1	5	5	5	3																							
c *Hydrocharis morsus-ranae* (Ch:12)				+	+													1	+	1					+	+	+				+	+		+	+		3	5	4	5	5	4	5	2	1	4
c *Nuphar lutea* (Ch:10)		+	+	+		+																	4	5	5	1																		
c *Stratiotes aloides* (Ch:12)																																				+		+			+		5	5	
c *Nymphaea alba* (Ch:10)																						5																							
d *Hottonia palustris* (Ch:13)																											+														+				
e *Berula erecta* (Ch:15)				+																							+																		
III. Ch: a - *Phragmitetea, Phragmitetalia*, b - *Phragmition*, c - *Magnocaricion* (x), d - *Sparganio-Glycerion fluitantis* (x)																																												
a *Typha latifolia* (Ch:13)																		+						+				+				+	+	+										
a *Equisetum fluviatile* (Ch:19)																									+																				+
b *Sagittaria sagittifolia* (Ch:25)									+								+																												
b *Schoenoplectus lacustris* (Ch:16)																											+			+		+													
b *Typha angustifolia* (Ch:17)																											+				+	+								+				3
IV. Ch: *Calthion*																																													
Scirpus sylvaticus																																				+									3

Species occurring in 1 record: IIa - *Batrachium circinatum* (Ch:5) 88/+. IIb - *Potamogeton pectinatus* 73/+. IIc - *Nymphaea alba* (Ch:10) 85/5. IIIa - *Glyceria maxima* (Ch:21) 91/+, *Rumex hydrolapathum* 99/+, *Alisma plantago-aquatica* 105/+. IIIb - *Sparganium emersum* 108/+. IIIc - *Phalaris arundinacea* (Ch:34) 86/+. IIId - *Glyceria fluitans* (Ch:28) 86/+.

species play practically no part in it. A not very frequent association. Recorded in expanses ranging 3-5 sq.m. chiefly in medium deep waters of drainage canals, less often in rivers.

Phytosociological records: 64. Roztocze Reserve, the Zalivki forest range. Medium deep water on the drainage ditch bottom. 65. Ivano Frankovo, from southeast direction. The upper layer of medium deep water on the fringe of the regulated Vereshitsa riverbed. 66. Roztocze Reserve, the Korelova Gora forest range. Habitat as in rec. no. 64. 67. Roztocze Reserve, the Korelova Gora forest range. Habitat as in rec. no. 64. 68. Roztocze Reserve, the Korelova Gora forest range. Habitat as in rec. No. 64. 69. Roztocze Reserve, the Korelova Gora forest range. Habitat as in rec. no. 64.

8. *Polygonetum natantis* (Table 3, rec. 70-79)

The association is characterized by the absolute domination of its characteristic species: *Polygonum amphibium* var. *terrestre* over other scarce plant species occurring in it. A fairly frequent phytocenosis with expanses of 3-5 sq. m. Recorded mainly in the upper layer of medium deep waters of drainage canals, fishponds and rivers.

Phytosociological records: 70. Ivano Frankovo, from the direction of the Gorbki forest range. A medium-deep water surface of a water channel. 71. Stradch, near Stradchanska Gora. The upper layer of medium deep water on the fringe of the Vereshitsa riverbed. 72. In the vicinity of Vereshitsa village, the Maidan forest range. The upper layer of medium deep water on the fringe of the fishpond bed. 73. In the vicinity of Vereshitsa village, the Maidan forest range. Habitat as in rec. no. 72. 74 In the vicinity of Ivano Frankovo, from the direction of the Gorbki forest range. The upper layer of medium deep water of the drainage canal. 75. Stradch, near Stradchanska Gora. Habitat as in rec. no. 74. 76. Stradch, near Stradchanska Gora. Habitat as in rec. no. 74. 77. Ivano Frankovo, from southeast direction. Habitat as in rec. no. 71. 78. Stradch, near Stradchanska Gora. Habitat as in rec. 71. 79 Ivano Frankovo, from the direction of Yanovsky Stav lake. Habitat as in rec. no. 74.

9. *Nymphetum candidae* (Table 3, rec. 80-85)

In the association, worth noting is the domination, individual or in groups, of several plant species. This primarily applies to *Nymphaea candida,* which is recognised as characteristic of this association. Moreover, in some expanses of this phytocenosis greater degrees of cover are exhibited by plants characteristic of separate associations, forming complex facies patterns, such as, *Lemna minor, Ceratophyllum demersum, Potamogeton lucens, Nymphaea alba* and *Nuphar luteum.* These co-dominant plant species attest to the complex succession linkage of the association *Nymphaetum candidae* with separate associations and with alliances *Lemnion, Potamogetonion* and *Nymphaeion.* A fairly infrequent phytocenosis. It develops on expanses ranging from 8 to 20 sq. m. It is found in the upper layer of medium deep waters of drainage canals, less often in rivers.

Phytosociological records: 80. Ivano Frankovo, near Korelova Gora, near Yanovsky Stav lake. The upper layer of medium deep water of the drainage canal. 81. Ivano Frankovo, near Yanovsky Stav lake. Habitat as in rec. no. 80. 82. Lelekhivka village. The upper layer of medium deep water on the fringe of the Lelekhivsko lakebed. 83. Ivano Frankovo from the direction of the Gorbki forest range. Habitat as in rec. no. 80. 84. Ivano Frankovo from the direction Yanovsky Stav lake. Habitat as in rec. no. 80. 85. Ivano Frankovo from the direction of Yanovsky Stav lake. Habitat as in rec. no. 80.

10. *Nupharo-Nymphaetum albae* (Table 3, rec. 86-88)

The association is distinguished on account of the almost exclusive presence in it, most often in large numbers, of *Nuphar lutea* as the species recognised as characteristic of this phytocenosis. This species was also recorded in other phytocenoses of the area studied. It is an interesting case that the other species characteristic of this association – *Nymphaea alba* – was found only outside the stations of this phytocenosis, among others in the association *Nymphaetum candidae* (Table 30) One of the rarest water phytocenoses, occurring in scattering in expanses with an area of 3-6 sq. m. It was recorded mainly in the near-surface layer of medium deep or shallow waters in drainage canals and on the fringe of the main river.

Phytosociological records: 86. Ivano Frankovo, near the Gorbki forest range. The upper layer of medium deep water of the drainage canal. 87. Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 86. 88. Roztoche Reserve, the Zalivki forest range. Shallow water on the fringe of the Stavchanka rivulet bottom.

11. *Potamogeton natantis* (Table 3, rec. 89-98)

This association is distinguished primarily by the absolute domination of the species *Potamogeton natans* as the characteristic plant of this phytocenosis. The association *Potamogeton natantis* exhibits the greatest floristic linkage only with the association *Lemno-Spirodeletum polyrrhizae*. This is evidenced by the high extent of cover of characteristic species such as *Lemna minor* and *L. trisulca*. A frequent association in expanses of 3-10 sq. m. Recorded mainly in the upper layers of stagnant waters, chiefly in rivers and canals.

Phytosociological records: 89. Stradch, near Stradchanska Gora. The upper layer of shallow water on the fringe of the Vereshitsa riverbed. 90. Ivano Frankovo, from the direction of Yanovsky Stav lake. The upper layer of shallow water in the drainage canal. 91. Ivano Frankovo, near the Gorbki forest range. The upper layer of medium deep water of the drainage canal. 92. Roztocze Reserve, the Zalivki forest range. Shallow water on the fringe of the Stavchanka rivulet bottom. 93. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 91. 94. Roztocze Reserve, the Zalivki forest range. Habitat as in rec. no. 92. 95. In the vicinity of

Vereshitsa village, the Maidan forest range, near a fishpond. Habitat as in rec. no. 91. 96. Ivano Frankovo from southeast direction. The upper layer of medium deep water of the Vereshitsa rivulet. 97. Ivano Frankovo, from the direction of Yanovsky Stav lake. Habitat as in rec. no. 90. 98. Roztocze Reserve, the Korelova Gora forest range. Habitat as in rec. no. 91.

12. *Hydrocharitetum morsus-ranae* (Table 3, rec. 99-108)

Worth noting in the association is the occurrence of mainly *Hydrocharis morsus ranae*, less frequently of *Stratiotes aloides*. The two species are recognised as characteristic of this association. Moreover, it should be noted that there is a large percentage in some expanses of this phytocenosis of several species characteristic of other associations, most frequently belonging to alliances *Lemnion minoris, Phragmition* and *Calthion* (Table 3). This is a fairly frequent phytocenosis with expanses of 3-10 sq. m. Recorded mainly in the near-surface layers of medium deep or shallow waters in drainage canals and rivers.

Phytosociological records: 99. Roztocze Reserve, the Zalivki forest range, section 41. Shallow water on the fringe of the silty-gley bottom of the drainage canal. 100. Stradch, near Stradchanska Gora. The upper layer of medium deep water on the fringe of the Vereshitsa rivulet bottom. 101. Ivano Frankovo, near the Gorbki forest range. The upper layer of medium deep water in the drainage canal. 102. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 101. 103. Ivano Frankovo, near Korelova Gora, near Yanovsky Stav lake. The upper layer of shallow water of the drainage canal. 104. Ivano Frankovo, near Korelova Gora, near Yanovsky Stav lake. Habitat as in rec. no. 99. 105. Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 101. 106. Ivano Frankovo. Habitat as in rec. no. 99. 107. Stradch, near Stradchanska Gora. Habitat as in rec. no. 100. 108. Ivano Frankovo, near Korelova Gora, near Yanovsky Stav lake. The slimy-sandy canal bed, intermittently overdried or flooded by water.

13. *Hottonietum palustris* (Table 4, rec. 109-118)

The association is primarily distinguished in respect of the absolute domination of its characteristic species: *Hottonia palustris*. The *Hottonietum palustris* phytocenosis exhibits the comparatively highest floristic linkage with phytocenoses of the alliances *Lemnion minoris* and *Nymphaeion*. This is attested by fairly frequent and sometimes also numerous occurrences of characteristic species such as *Lemna trisulca, L. minor* and *Elodea canadensis*. A frequent water association. It grows on expanses of 4-10 sq. m. It is chiefly found in shallow waters on the silty-gley beds of the fringes of rivers and drainage canals.

Phytosociological records: 109. Ivano Frankovo, near Korelova Gora, near Yanovsky Stav lake. The slimy bottom of the drainage canal, intermittently overdried or flooded by water. 110. Roztocze Reserve, the Zalivki forest range. Shallow water on the slimy fringe of the Stavchanka rivulet bottom. 111. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond.

Table 4. – 13 – association *Hottonietum palustris*, 14 – association *Ranunculetum fluitantis*, 15 – association *Ranunculo-Sietum erecto-submersi*

Number of community		13												14						15						
Number of record		109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
Date		95-06-22	96-06-26	96-06-12	97-06-11	96-06-12	95-07-15	95-07-15	96-06-26	96-06-26	95-06-28	96-08-24	97-07-06	95-08-12	96-07-11	97-07-06	96-08-24	97-07-28	97-07-16	96-06-12	96-06-12	97-07-21	96-06-12
Area of plot in	m^2	6	3	4	6	10	10	5	4	6	6	8	8	6	4	5	6	6	4	6	8	10	6
Cover in % the layer		90	90	40	50	80	80	90	30	90	80	90	60	90	30	60	80	90	80	90	90	30	80
Number of species in record		4	7	4	6	4	2	2	6	6	3	4	7	6	5	6	8	6	3	3	3	5	13
I. Ch: *Lemnetea, Lemnetalia, Lemnion minoris*																							
Lemna trisulca (Ch:1)		1	1	+	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Lemna minor (Ch:1)		+	+	.	.	+	+	1	+	.	.	3	2	3	+	2	+	+	.	.	.	.	.
Spirodela polyrhiza (Ch:1)		.	.	+	.	.	.	.	.	1	.	.	+	+	.	.	+	.	.	.	.	.	.
II. Ch: a - *Potamogetonetea, Potamogetonetalia*, b - *Nymphaeion*, c - *Hottonion*, d - *Ranunculion fluitantis*																							
a *Elodea canadensis* (Ch:4)		3	.	.	+	+	.	.	+	.	.	+	.	+	+	.	+	+	.	.	.	.	.
a *Myriophyllum verticillatum* (Ch:7)		.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	.	.	.	.	.	.
a *Ceratophyllum demersum* (Ch:3)		.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.
b *Stratiotes aloides* (Ch:12)		.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
b *Hydrocharis morsus-ranae* (Ch:12)		.	+	.	+	.	.	.	+	+	.	.	1	.	+	.	.	.	.	.	.	.	.
b *Polygonum amphibium*		.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.
c *Hottonia palustris* (Ch:13)		4	5	3	3	5	5	5	2	5	5	+	+	.	+	.	.	.	.	.	.	.	.
d *Berula erecta* (Ch:15)		.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	+	5	5	5	5	2	5
d *Batrachium trichophyllum* (Ch:14)		.	.	.	.	.	.	.	.	.	.	5	3	5	2	3	5	.	.	.	.	+	+
III. Ch: a - *Phragmitetea, Phragmitetalia*, b - *Phragmition*, c - *Magnocaricion*, d - *Sparganio-Glycerion fluitantis*																							
a *Rumex hydrolapathum*		.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+
a *Equisetum fluviatile* (Ch:19)		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.
a *Alisma plantago-aquatica*		.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.
b *Typha angustifolia* (Ch:17)		.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.
c *Carex acutiformis* (Ch:33)		.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	+
d *Glyceia fluitans* (Ch:28)		.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.
d *Veronica beccabunga* (D:27)		.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	+	.	.	+
IV. Ch: a - *Cardamino-Montion*, b - *Alnetea glutinosae*																							
a *Cardamine amara*		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
b *Solanum dulcamara*		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+
V. Ubiqutous plants and plants of other syntaxonomic groups: a - in marshy, moist habitats, b - in mesophilous and dry habitats																							
a *Mentha aquatica*		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+
b *Galium aparine*		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+

Species occurring in 1 record: I - *Salvinia natans* (Ch:2) 123/+. IIa - *Potamogeton lucens* (Ch:6) 110/+. IIb - *Nuphar lutea* (Ch:10) 110/+, *Potamogeton natans* (Ch:11) 121/+. IIIa - *Typha latifolia* (Ch:18) 125/+. IIIb - *Schoenoplectus lacustris* (Ch:16) 123/+, *Oenanthe aquatica* (Ch:22) 125/+. IIIc - *Iris pseudacorus* (Ch:29) 118/+, *Galium palustre* 130/+, *Phalaris arundinacea* (Ch:34) 130/+. IIId - *Scrophularia umbrosa* 130/+. Va - *Lycopus europaeus* 130/+.

The upper layer of medium deep water on the bottom of the drainage canal. 112. Stradch near Stradchanska Gora. The slimy bottom of the fringe of the Vereshitsa rivulet bed, intermittently overdried or flooded by water. 113. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond. The upper layer of shallow water in the drainage canal. 114. Ivano Frankovo, near Korelova Gora, near Yanovsky Stav lake. Habitat as in rec. no. 109. 115 Roztocze Reserve, the Zalivki forest range. Shallow water on the fringe of the Stavchanka rivulet bottom. 116. Roztocze Reserve, the Zalivki forest range. Habitat as in rec. no. 110. 117. Stradch, near Stradchanska Gora. Habitat as rec. no. 112. 118. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond. Habitat as in rec. no. 111.

14. *Ranunculetum fluitantis* (Table 4, rec. 119-124)

The association is characterized primarily by the individual or group domination of two plant species: *Batrachium trichophyllum* and *Lemna minor*. These are species recognised as characteristic of two separate associations: the former – of the association in question – *Ranunculetum fluitantis*, the latter – of the earlier characterized association *Lemno-Spirodeletum polyrrhizae*. A rare phytocenosis developing in scattering, on expanses of 4-8 sq. m. Found mainly in the upper layer of shallow or medium deep waters in the drainage canals and rivers.

Phytosociological records: 119. Ivano Frankovo, near the Korelova Gora, near the Yanovsky Stav lake. The upper layer of medium deep water in the drainage canal. 120. Stradch, near Stradchanska Gora. Shallow water on the fringe of the Vereshitsa rivulet bottom. 121. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond. Habitat as in rec. no. 119. 122. In the vicinity of Vereshitsa village, the Maidan forest range near the fishpond. Habitat as in rec. no. 119. 123. Stradch, near Stradchanska Gora. Habitat as in rec. no. 120. 124. Stradch, near Stradchanska Gora. Habitat as in rec. no. 120.

15. *Ranunculo-Sietum erecto-submersi* (Table 4, rec. 125-130)

The association is distinguished primarily on account of the absolute domination of *Berula erecta*, recognised as the characteristic species of this phytocenosis. Moreover, in this association worth noting is a far greater percentage of indicator plant species for rush phytocenoses than for pleustonic phytocenoses. It is a rare phytocenosis, growing in scattering on expanses of 4-10 sq. m. It is found mainly in shallow waters on the fringes of rivers and drainage canals, on the silty-gley substratum.

Phytosociological records: 125. Roztocze Reserve, the Zalivki forest range, near Yanovsky Stav lake. Shallow water on the fringe of the slimy drainage canal bottom. 126. Roztocze Reserve, the Zalivki forest range. Shallow water on the fringe of the slimy bottom of the Stavchanka rivulet. 127. Ivano Frankovo, near Yanovsky Stav lake. Habitat as in rec. no. 125. 128. In the vicinity

Table 5. – 16 – association *Scirpetum lacustris*, 17 – association *Typhaetum angustifoliae*, 18 – association *Typhaetum latifoliae*

Number of community	16										17										18									
Number of record	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
Date	94-06-11	95-06-12	97-06-21	95-07-17	95-06-12	97-06-21	97-06-21	94-06-07	95-06-21	95-06-21	96-06-28	96-06-28	96-06-21	97-06-29	95-07-22	95-06-01	96-06-18	97-06-12	95-07-01	95-06-21	95-08-24	97-07-24	95-08-02	97-06-12	95-07-02	97-06-13	97-06-12	95-07-02	97-06-13	98-06-18
Area of plot in m^2	3	4	4	4	8	12	6	4	4	6	10	10	10	10	20	20	10	10	20	10	10	12	10	10	20	15	10	30	6	10
Cover in % the layer	100	80	100	100	80	80	80	80	100	100	90	90	90	90	80	80	80	50	100	100	100	90	90	80	80	80	60	90	80	80
Number of species in record	7	6	8	10	5	7	6	8	4	4	8	7	9	10	6	8	11	9	14	15	7	10	5	4	9	8	7	10	8	11
I. Ch: *Lemnetea, Lemnetalia, Lemnion minoris*																														
Lemna minor (Ch:1)	3	3	.	.	.	.	.	.	.	.	2	+	+	+	.	.	.	.	+	.	3	2	2	+	+	.	.	+	.	.
Lemna trisulca (Ch:1)	.	.	3	3	.	.	.	.	.	.	.	.	3	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Spirodela polyrhiza (Ch:1)	.	.	+	.	.	.	.	.	.	.	.	3	+	.	.	.	.	.	.	.	+	.	.	+	+	.	.	.	.	.
II. Ch: a - *Potamogetonetea, Potamogetonetalia*, b - *Nymphaeion*, c - *Hottonion* (x)																														
a *Ceratophyllum demersum* (Ch:3)	.	.	.	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
a *Myriophyllum verticillatum* (Ch:7)	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
b *Polygonum amphibium* (Ch:8)	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.
b *Potamogeton natans* (Ch:11)	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
III. Ch: a - *Phragmitetea, Phragmitetalia*, b - *Phragmition*, c - *Magnocaricion*, d - *Sparganio-Glycerion fluitantis* (x)																														
a *Phragmites australis* (Ch:20)	.	+	+	.	+	.	.	+	2	4	.	+	+	.	.	.	.	.	2	.	1	.	.	.	.	+	.	.	.	.
a *Rumex hydrolapathum*	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	+	+	+	.	.	.	.
a *Glyceria maxima* (Ch:21)	.	+	+	+	.	.	.	.	.	.	.	+	+	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.
a *Equisetum fluviatile* (Ch:19)	+	+	+	1	.	+	+	.	.	.	.	.	.	+	.	+	+	+	.	+	2	.	.	.	+	+	2	.	.	+
a *Alisma plantago-aquatica*	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	+	.	.
a *Typha latifolia* (Ch:18)	.	.	+	.	+	.	+	+	.	+	.	.	.	+	+	.	.	.	.	.	5	5	5	4	5	4	3	5	4	5
b *Schoenoplectus lacustris* (Ch:16)	5	5	5	5	5	5	4	5	5	5	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	+	+	.	.	.
b *Typha angustifolia* (Ch:17)	+	.	.	.	.	.	.	.	.	.	5	4	5	5	5	5	5	3	5	5	.	.	.	.	.	+	.	.	.	.
b *Oenanthe aquatica* (Ch:22)	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
b *Sparganium erectum* (Ch:23)	.	.	.	.	.	+	.	.	.	.	.	.	.	+	+	.	+	.	.	.	.	.	.	.	.	+	.	.	.	+
c *Carex rostrata* (Ch:30)	1	1	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.
c *Peucedanum palustre*	+	.	.	.	.	+	+	.	.	.	+	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.
c *Phalaris arundinacea* (Ch:34)	.	.	+	+	.	+	+	.	.	.	.	.	+	1	.	.	.	1	+	1	.	.	.	.	.	.	.	.	.	.
c *Iris pseudacorus* (Ch:29)	+	+	.	.	.	+	.	.	.	.	.	.	+	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	+
c *Galium palustre*	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	+	.	+	.
c *Carex elata*	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	+
c *Carex acutiformis* (Ch:33)	.	.	.	.	1	1	2	.	.	.	.	.	.	.	.	+	+	.	.	2	.	+	.	.	.	.	.	.	.	+
c *Cicuta virosa*	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
c *Carex riparia* (Ch:35)	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.
c *Ranunculus lingua*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	+	.	.	.	.	.	.	.	.
c *Poa palustris*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	1	.
IV. Ch: a - *Caricetalia fuscae* (x), b - *Alnetea glutinosae*																														
b *Salix cinerea* B	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
V. Ch: a - *Molinio-Arrhenatheretea*, b - *Molinietalia, Molinion, Calthion, Filipendulo-Petasition*																														
a *Poa trivialis*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	+	+
b *Lythrum salicaria*	.	.	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.
b *Caltha palustris*	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.
b *Lysimachia vulgaris*	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
b *Scirpus sylvaticus*	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
b *Myosotis palustris*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	+	+	+	+
b *Galium uliginosum*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+
VI. Ubiquitous plants and plants of other syntaxonomic groups: a - in marshy, moist habitats, b - in mesophilous and dry habitats																														
a *Lycopus europaeus*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	+	.	+	+	.	.
a *Cirsium arvense*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	+
a *Mentha aquatica*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.
b *Eupatorium cannabinum*	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.

Species occurring in 1 record: IIa - *Potamogeton lucens* (Ch:9) 156/+. IIb - *Hydrocharis morsus-ranae* (Ch:12) 143/+, *Stratiotes aloides* (Ch:12) 153/+. IIc - *Hottonia palustris* (Ch:13) 155/+. IIIb - *Sagittaria sagittifolia* (Ch:25) 148/+, *Acorus calamus* (Ch:24) 152/+. IIIc - *Scutellaria galericulata* 150/+. IIId - *Scrophularia umbrosa* 152/+. IVa - *Epilobium palustre* 152/+. V - *Holcus lanatus* 150/+, *Phleum pratense* 150/+, *Vicia cracca* 150/+. Vb - *Veronica longifolia* 149/+, *Lotus uliginosus* 150/+, *Deschampsia caespitosa* 151/+, *Cirsium rivulare* 155/+, *Juncus conglomeratus* 158/+. VIb - *Urtica dioica* 138/+, *Tussilago farfara* 150/+, *Potentilla anserina* 158/+, *Polygonum persicaria* 158/+, *Melilotus officinalis* 160/+.

of Vereshitsa village, the Maidan forest range, near the fishpond. Habitat as in rec. no. 125. 129. Stradch, near Stradchanska Gora. Shallow water on the fringe of the Vereshitsa slimy riverbed. 130. Ivano Frankovo, near Yanovsky Stav lake. Habitat as rec. no. 125.

16. *Scirpetum lacustris* (Table 5, rec. 131-140)

The association is distinguished chiefly for the absolute domination in it of the characteristic species of this phytocenosis: *Schoenoplectus lacustris*. In respect of the general floristic structure this association has the comparatively highest linkage with phytocenoses of the alliances *Lemnion minoris* and *Magnocaricion*. This is evidenced by fairly frequent and sometimes also numerous occurrences of characteristic plant species such as *Lemna trisulca, L. minor, Phragmites australis, Carex rostrata, C. acutiformis*. A fairly frequent phytocenosis with expanses of 3-12 sq. m. It is found mainly in shallow waters on the fringes of ponds and old riverbeds on the silt-gley substratum.

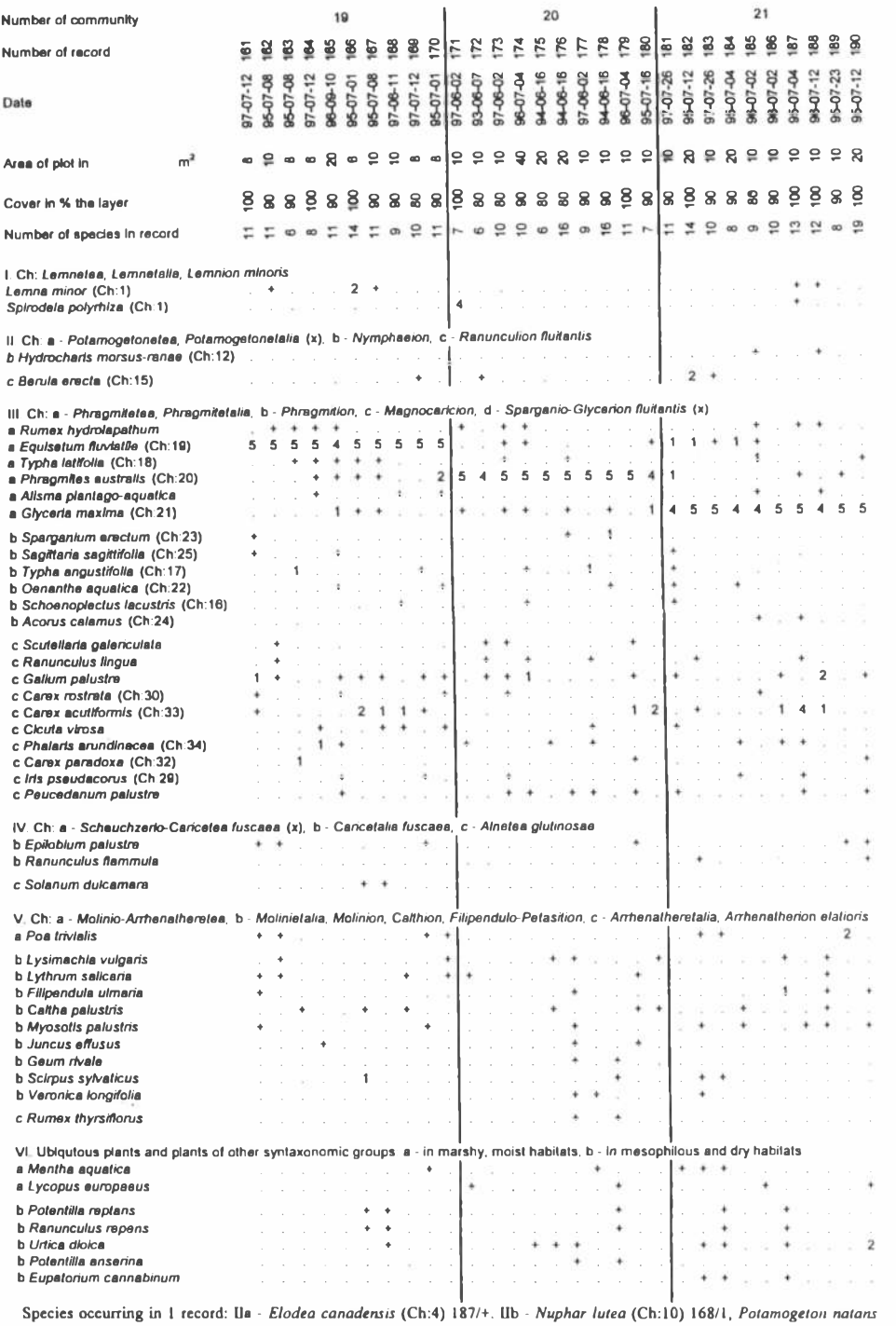
Phytosociological records: 131. Roztocze Reserve, at the Korelova Gora slope. Shallow water in the slimy old riverbed. 132. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond. Medium deep water on the drainage canal bottom. 133. In the vicinity of Vereshitsa village, the Maidan forest range. Medium deep water on the fishpond bed. 134. In the vicinity of Vereshitsa village, the Maidan forest range. Habitat as in rec. no. 133. 135. In the vicinity of Vereshitsa village, the Maidan forest range. Habitat as in rec. no. 133. 136. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond. Habitat as in rec. no. 132. 137. In the vicinity of Vereshitsa village, the Maidan forest range. Habitat as in rec. no. 133. 138. Roztocze Reserve, at the Korelova Gora slope. Shallow water on the sandy pond bed. 139. Roztocze Reserve, at the Korelova Gora slope. Habitat as in rec. no. 132. 140. Lelekhivka village, the south fringe of Lelekhivsko lake. Shallow water on the fringe of the Lelekhivsko lakebed.

17. *Typhetum angustifoliae* (Table 5, rec. 141-150)

The phytocenosis is distinguished primarily for the domination of *Typha angustifolia*, a species characteristic of the association. In respect of the general floristic structure, the *Typhetum angustifoliae* association exhibits the comparatively greatest linkage with phytocenoses of the alliances *Magnocaricion* and *Lemnion minoris*. Moreover, worth noting is a fairly large percentage in it of wetland plants. It is a frequent phytocenosis on expanses of 10-20 sq. m.It is found mainly in shallow waters in the silty-gley fringes of drainage canals, old riverbeds and rivers.

Phytosociological records: 141. Ivano Frankovo, from the direction of Yanovsky Stav lake. Shallow water on the silty-gley drainage canal bottom. 142. Ivano Frankovo, from the direction of Yanovsky Stav lake. Habitat as in rec. no. 141. 143. Stradch, near Stradchanska Gora. The fringe of the silty-gley Vereshitsa riverbed intermittently flooded by water and overdried. 144. Ivano-

Table 6. – 19 – association *Equisetetum limosi*, 20 – association *Phragmiteteum communis*, 21 – association *Glycerietum maximae*



Species occurring in 1 record: IIa - *Elodea canadensis* (Ch:4) 187/+, IIb - *Nuphar lutea* (Ch:10) 168/1, *Potamogeton natans* (Ch:11) 172/+. IIIa - *Eleocharis palustris* (Ch:26) 170/+. IIIc - *Carex gracilis* (Ch:36) 166/+, *C. elata* 184/+, *C. riparia* 190/+. IIId - *Glyceria fluitans* (Ch:28) 162/+, *Scrophularia umbrosa* 182/+, *Veronica beccabunga* (D:28) 182/+. IVa - *Pedicularis palustris* 178/+, *Comarum palustre* 187/+, *Menyanthes trifoliata* 189/+, *Juncus articulatus* 190/+ Va - *Symphytum officinale* 176/+, *Festuca pratensis* 178/+, *Holcus lanatus* 178/+, *Alopecurus pratensis* 187/+. Vb - *Epilobium hirsutum* 166/+, *Galium boreale* 176/+, *G. uliginosum* 178/+, *Caltha palustris subsp. cornuta* 177/+, *Cirsium rivulare* 180/+, *Deschampsia caespitosa* 189/+, Vc - *Bromus hordeaceus* 190/+, *Lotus corniculatus* 190/+, *Trifolium dubium* 190/+. VIa - *Bidens cernua* 168/+, *Cirsium arvense* 179/+ VIb - *Galium aparine* 175/+, *Rumex acetosella* 178/+, *Capsella bursa-pastoris* 189/+, *Ranunculus polyanthemos* 189/+ 189/+, *Agrostis stolonifera* 190/+, *Polygonum persicaria* 190/+, *Tussilago farfara* 190/+

-Frankovo, at the Korelova Gora slope, from the direction of Yanovsky Stav lake. Habitat as in rec. no. 141. 145. Ivano Frankovo, from the direction of Yanovsky Stav lake. Habitat as in rec. no. 141. 146. Roztocze Reserve, at the Korelova Gora slope. Shallow water on the slimy-gley old riverbed. 147. Stradch, near Stradchanska Gora. Habitat as in rec. no. 143. 148. Ivano Frankovo, from the direction of Yanovsky Stav lake, at the Korelova Gora slope. Habitat as in rec. no. 141. 149. Roztocze Reserve, between the Korelova Gora and Gorbki forest ranges. Habitat as in rec. no. 141. 150. Roztocze Reserve, at the Korelova Gora slope. Habitat as in rec. no. 146.

18. *Typhetum latifoliae* (Table 5, rec. 151-160)

This is generally a waterside phytocenosis not very rich in plant species. It is distinguished mainly for the absolute domination of *Typha latifolia,* a characteristic species of this association. Apart from *Typha latifolia, Lemna minor* and *Equisetum fluviatile* also exhibit the comparatively greatest co-occurrence. A frequent phytocenosis on scattered expanses of 6-20 sq. m. It is found mainly on flooded or swampy, silty-gley beds of drainage canals and river fringes.

Phytosociological records: 151. Ivano Frankovo, from the direction of Yanovsky Stav lake, at the Korelova Gora slope. Shallow water on the fringe of the slimy-gley drainage canal bottom. 152. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond. Habitat as in rec. no. 151. 153. Stradch, near Stradchanska Gora. Shallow water on the fringe of the slimy-gley Vereshitsa riverbed. 154. Stradch, near Stradchanska Gora. On the fringe of the slimy-gley Vereshitsa riverbed, intermittently flooded by water or overdried. 155. Ivano Frankovo, near Korelova Gora and Yanovsky Stav lake. Habitat as in rec. no. 151. 156. Stradch, near Stradchanska Gora. Habitat as in rec. no.153. 157. Stradch, near Stradchanska Gora. Habitat as in rec. no. 153. 158. Ivano Frankovo, near Korelova Gora and Yanovsky Stav lake. Habitat as in rec. no. 51. 159. Stradch, near Stradchanska Gora. Habitat as in rec. no. 153. 160. Ivano Frankovo, near Korelova Gora and Yanovsky Stav lake. Habitat as in rec. no. 151.

19. *Equisetetum limosum* (Table 6, rec. 161-170)

The association is distinguished primarily for the domination of *Equisetum fluviatile,* at the same time the sole species characteristic of this phytocenosis. It exhibits the comparatively highest floristic linkage with phytocenoses of the alliance *Magnocaricion* and the order *Molinietalia* (Table 6). It is one of the more frequent phytocenoses, found on expanses of 6-20 sq. m. It develops most often on flooded, swampy, silty-gley fringes of drainage canals, fishponds and rivers.

Phytosociological records: 161. Roztocze Reserve, the Zalivki forest range, section 41. Shallow water on the slimy-gley drainage canal bottom. 162. In the vicinity of Ivano Frankovo, the Gorbki forest range. Shallow water on the fringe of the slimy-gley Yanovsky Stav lakebed. 163. In the vicinity of Vereshitsa village, from the east direction, the Maidan forest range. Shallow water on the fringe of the fishpond bottom. 164. Roztocze Reserve, the Zalivki forest range, section 41. Habitat as in rec. no. 161. 165. Roztocze Reserve, the Zalivki forest range. Habitat as in rec. no. 161. 166. In the

vicinity of Lelekhivka village, the Gorbki forest range. Shallow water on the fringe of the slimy-gley Vereshitsa riverbed. 167. Ivano Frankovo, from the southeast direction, near the Gorbki forest range. Habitat as in rec. no. 161. 168. Roztocze Reserve, the Zalivki forest range, section 40. Habitat as in rec. no. 161. 169. Roztocze Reserve, the Zalivki forest range, section 41. Habitat as in rec. no. 161. 170. In the vicinity of Vereshitsa village from the southeast direction, the Maidan forest range. Habitat as in rec. no. 163.

20. *Phragmitetum communis* (Table 7, rec. 171-180)

It is characterized by the most abundant and almost exclusive domination of *Phragmites australis*. This species is regarded as the only characteristic one of this association. Other plant species are found in this rush-plant association basically in scarce numbers and with low classes of stability. Only *Spirodela polyrrhiza* and *Carex acutiformis* attain greater degrees of cover. The most common and widespread rush-plant phytocenosis. It develops on expanses with highly varying areas, on the fringes of shallow waters of rivers, ponds, lakes and drainage canals as well as on flooded, wetland habitats.

Phytosociological records: 171. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond. Shallow water on the slimy-gley bottom of the drainage canal. 172. In the vicinity of Stavky village. Shallow water on the slimy-gley fringe of the Yanovsky Stav lakebed. 173. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond. Habitat as in rec. no. 171. 174. In the vicinity of Ivano Frankovo. Habitat as in rec. no. 172. 175. Roztocze Reserve, the Zalivki forest range, section 40. Habitat as in rec. no. 171. 176. Roztocze Reserve, the Zalivki forest range, section 40. Habitat as in rec. no. 171. 177. In the vicinity of Vereshitsa village, the Maidan forest range, near the fishpond. Habitat as in rec. no. 171. 178. In the vicinity of Ivano Frankovo. Habitat as in rec. no. 172. 179. In the vicinity of Ivano Frankovo. Shallow water on the slimy-gley fringe of the Vereshitsa river. 180. In the vicinity of Ivano Frankovo. Habitat as in rec. no. 172.

21. *Glycerietum maximae* (Table 6, rec. 181-190)

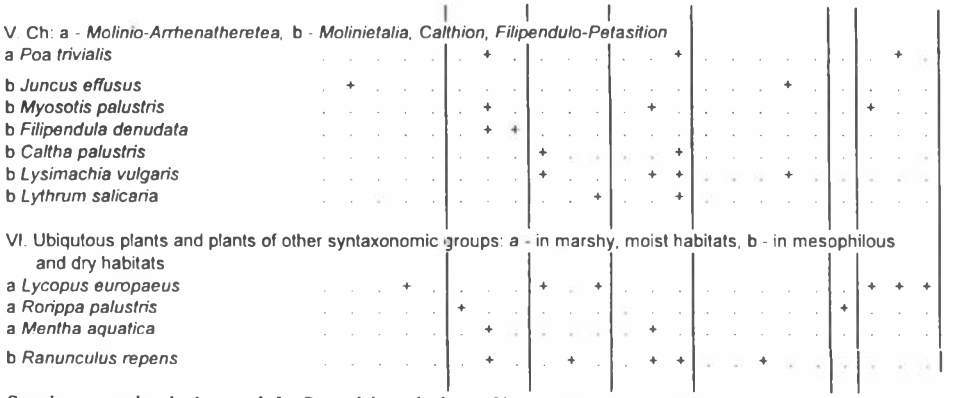
The association is distinguished basically for the absolute domination of *Glyceria maxima*, a species recognised as characteristic of this phytocenosis. Among other plant species, *Berula erecta, Carex acutiformis, Galium palustre, Poa trivialis* and *Urtica dioica* have the comparatively largest extent of plant cover. This association represents one of the most common rush phytocenoses. It is found scattered, on expanses of 10-20 sq. m. sometimes even far bigger. It develops equally often in flooded and swampy places, on the fringes of lake, pond and riverbeds, and often on the whole area of the drainage canal bottom.

Phytosociological records: 181. Stradch, near Stradchanska Gora. Shallow water on the fringe of the slimy-gley Vereshitsa riverbed. 182. Roztocze Reserve, the Zalivki forest range. Shallow water on the slimy-gley drainage canal bottom. 183. Stradch, near Stradchanska Gora. Habitat as in

Table 7. – 22 – association *Oenantho-Rorippetum*, 23 – association *Sparganietum erecti*, 24 – association *Acoretum calami*, 25 – association *Sagittario-Sparganietum emersi*, 26 – association *Eleocharitetum palustris*, 27 – community with *Veronica beccabunga*, 28 – association *Sparganio-Glycerietum fluitantis*

Number of community	22						23			24			25			26				27	28		
Number of record	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213
Date	96-06-12	97-06-24	96-06-12	97-07-22	97-07-22	97-07-22	96-06-12	96-06-12	95-08-01	95-08-01	97-06-21	97-07-14	97-07-14	96-06-11		95-07-01	96-06-24	96-06-24	95-08-12	94-05-06	96-07-21	96-07-21	96-07-28
Area of plot in m^2	4	8	8	8	6	6	10	10	5	10	8	6	6	5	4	10	6	8	8	10	10	10	10
Cover in % the layer	90	40	40	20	30	40	90	100	90	10	100	40	90	100	40	90	40	90	100	90	80	100	90
Number of species in record	8	6	7	6	6	5	12	9	12	8	10	3	10	14	5	6	7	11	5	12	9	6	7
I. Ch: *Lemnetea, Lemnetalia, Lemnion minoris*																							
Lemna minor (Ch:1)	+	1	1	+	.	.	.	+	.	.	.	.	.	.	2	.	.	.	.	2	+	.	.
Lemna trisulca (Ch:1)	.	.	.	.	.	.	+	2	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
II. Ch: a - *Potamogetonetea, Potamogetonetalia*, b - *Nymphaeion*, c - *Hottonion*, d - *Ranunculion fluitantis*																							
a *Elodea canadensis* (Ch:4)	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.
b *Hydrocharis morsus-ranae* (Ch:12)	+	+	+	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	+
b *Polygonum amphibium* (Ch:8)	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	+	.	.	.	.	.
c *Hottonia palustris* (Ch:13)	1	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
d *Berula erecta* (Ch:15)	.	.	.	+	1	.	1	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
III. Ch: a - *Phragmitetea, Phragmitetalia*, b - *Phragmition*, c - *Magnocaricion*, d - *Sparganio-Glycerion fluitantis*																							
a *Glyceria maxima* (Ch:21)	2	.	.	.	.	1	+	+	.	.	.	.	.	.	.	.	+	.	.	+	+	.	.
a *Rumex hydrolapathum*	+	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	.
a *Tilia latifolia* (Ch:18)	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
a *Alisma plantago-aquatica*	.	.	.	.	.	+	.	.	.	+	.	.	+	+	.	+	1	+	+	+	+	.	.
a *Equisetum fluviatile* (Ch:19)	.	.	.	.	.	.	+	+	1	.	.	.	.	1	.	+	1	.	.	2	.	.	.
a *Phragmites australis* (Ch:20)	.	.	.	.	+	.	.	3	+	.	.	.	.	.	+	.	+	+	.	.	.	.	.
a *Eleocharis palustris* (Ch:26)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	5	3	5	5	.	.	.	.
b *Acorus calamus* (Ch:24)	+	.	.	.	.	.	.	.	5	5	4	.	.	.	.	.	.	.	.	.	.	.	.
b *Oenanthe aquatica* (Ch:22)	4	3	2	1	2	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	1	.	.
b *Sparganium erectum* (Ch:23)	.	.	.	.	.	3	5	5	.	.	.	.	.	.	.	.	.	.	.	+	.	2	.
b *Schoenoplectus lacusris* (Ch:16)	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
b *Sagittaria sagittifolia* (Ch:25)	.	.	.	.	.	.	.	.	.	.	.	3	5	2	.	.	.	.	.	.	.	.	.
b *Sparganium emersum*	.	.	.	.	.	.	.	.	.	.	.	+	2	5	.	.	.	.	.	.	.	.	.
c *Iris pseudacorus* (Ch:29)	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c *Carex vesicaria* (Ch:31)	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
c *Galium palustre*	.	.	+	.	.	.	.	.	+	+	+	.	.	+	.	.	.	.	.	.	+	.	.
c *Carex rostrata* (Ch:30)	.	.	+	.	.	.	.	.	.	2	1	.	.	.	1	.	.	+	.	.	.	.	+
c *Ranunculus lingua*	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c *Phalaris arundinacea* (Ch:34)	.	.	.	.	+	.	.	.	.	.	1	.	.	.	.	.	.	.	2	.	.	.	+
c *Peucedanum palustre*	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.
c *Carex acutiformis* (Ch:33)	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	+	.	.	.
c *Cicuta virosa*	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.
d *Veronica beccabunga* (D:27)	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.
d *Glyceria fluitans* (Ch:28)	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	.	+	4	5	5
IV. Ch: a - *Scheuchzerio-Caricetea fuscae*, b - *Caricetalia fuscae* (x), c - *Alnetea glutinosae* (x)																							
a *Juncus articulatus*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.
a *Comarum palustre*	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.

Table 7 continued



Species occurring in 1 record: I - *Spirodela polyrhiza* (Ch:1) 197/+. IIa - *Ceratophyllum demersum* (Ch:3) 210/+, IIb - *Stratiotes aloides* (Ch:12) 209/+, *Potamogeton natans* (Ch:11) 213/+. IIIb - *Rorippa amphibia* (Ch:22) 193/+, *Typha angustifolia* (Ch:17) 194/+, IIIc - *Poa palustris* 201/+, *Scutellaria galericulata* 201/+. IVb - *Ranunculus flammula* 206/+, IVc - *Solanum dulcamara* 200/+. VIb - *Urtica dioica* 197/+, *Potentilla anserina* 208/+.

rec. no. 181. 184. Roztoche Reserve, the Zalivki forest range, section 40. Habitat as in rec. no. 182. 185. Stradch, near Stradchanska Gora. Habitat as in rec. no.181. 186. Stradch, near Stradchanska Gora. The slimy-sandy bottom of the Vereshitsa river fringe, intermittently overdried or flooded by water. 187. In the vicinity of Ivano Frankovo, on the south fringe of Yanovsky Stav lake. Shallow water on the slimy-gley fringe of Yanovsky Stav lake. 188. Stradch, near Stradchanska Gora. Habitat as in rec. 181. 189. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 182. 190. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 182.

22. *Oenantho-Rorippetum* (Table 7, rec. 191-195)

The association is characterized by the most abundant occurrence of *Oenanthe aquatica*, the most characteristic species of this association. The other indicator species in this association, *Rorippa amphibia*, occurred in it only sporadically. Generally this is a very heterogeneous phytocenosis in respect of its floristic composition. Other species with the comparatively highest degree of cover are: *Lemna minor, Glyceria maxima, Hottonia palustris* and *Berula erecta*. They are species recognised as characteristic of separate associations of aquatic and wetland plants. A rare phytocenosis. It is found in scattering, on expanses of 4-8 sq. m. It develops on flooded and swampy places on the fringes of drainage canals, rivers, ponds and lakes.

Phytosociological records: 191. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Shallow water on the fringe of the slimy-gley bottom of the drainage canal. 192. In the vicinity of Lelekhivka. Shallow water on the slimy-sandy fringe of the fishpond bed. 193. In the vicinity of

Ivano Frankovo, the Korelova Gora forest range. Shallow water on the slimy-gley fringe of the Vereshitsa river. 194. Stradch, near Stradchanska Gora. Habitat as in rec. no. 193. 195. Stradch, near Stradchanska Gora. Habitat as in rec. no. 193.

23. *Sparganietum erecti* (Table 7, rec. 196-198)

The phytocenosis with a simplified and heterogeneous floristic composition. It is distinguished by the absolute domination of *Sparganium erectum*. This species is recognised as characteristic of this association. Other plants with comparatively higher degrees of cover include: *Lemna trisulca, Phragmites australis* and *Berula erecta*. A rare phytocenosis. It occurs in scattering, on expanses of 6-10 sq. m. It develops on flooded, slimy-gley fringes of lakes and rivers.

Phytosociological records: 196. Roztocze Reserve, the Zalivki forest range, section 41. Shallow water on the fringe of the slimy-gley Stavchanka rivulet bed. 197. Lelekhivka village, southeast side. Shallow water on the southeast fringe of Lelekhivsko lake. 198. Ivano Frankovo, south side. Shallow water on the slimy-gley fringe of Yanovsky Stav lake.

24. *Acoretum calami* (Table 7, rec. 199-201)

The association has a simplified and heterogeneous floristic composition. It derives its characteristic appearance from the dense occurrence of *Acorus calamus* that represents the characteristic species of this phytocenosis. Other plant species with greater density include: *Carex rostrata, Phalaris arudinacea* and *Equisietum fluviatile*. A rare phytocenosis. It is found scattered, on expanses mainly of 5-10 sq. m. It develops on flooded or swampy, slimy-gley bottoms of drainage canals.

Phytosociological records: 199. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Shallow water on the fringe of the slimy-gley bottom of the water channel. 200. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 199. 201. Stradch. Shallow water on the fringe of the slimy-gley fishpond bed.

25. *Sagittario-Sparganietum emersi* (Table 7, rec. 202-204)

The phytocenosis is characterized by the single or mixed domination by *Sagittaria sagittifolia* and *Sparganium emersum*. The former species is recognised as characteristic of this association while the latter is a characteristic species of the superior unit of this association: the alliance *Phragmition*. The other plant species that occur here practically do not play any part. A rare phytocenosis. It

is found in scattering in expanses of 5-6 sq. m. It develops on flooded, slimy-gley bottoms of drainage canals.

Phytosociological records: 202. Stradch, near the Vereshitsa river. Shallow water on the slimy-gley drainage canal bottom. 203. In the vicinity of Vereshitsa village, the Maidan forest range. Habitat as in rec. no. 202. 204. In the vicinity of Stradch village, in the Vereshitsa river valley. Habitat as in rec. no. 202.

26. *Eleocharitetum palustris* (Table 7, rec. 205-209)

This phytocenosis is characterized by a considerably simplified and heterogeneous floristic composition. It owes its basic appearance to the occurrence of *Eleocharis palustris*, the species recognised as characteristic of this phytocenosis. Other plants with the comparatively highest density include: *Lemna minor*, *Phalaris arundinacea* and *Alisma plantago-aquatica*. An infrequent phytocenosis. It develops on expanses of 4-10 sq. m. on swampy, slime-gley fringes of the drainage canal, lake, pond and riverbeds.

Phytosociological records: 205. Ivano Frankovo. The water-saturated, sandy-slimy fringe of the Yanovsky Stav lakebed. 206. Roztocze Reserve, the Zalivki forest range, section 40. The water-saturated, slimy-gley fringe of the water channel bottom. 207. In the vicinity of Vereshitsa village, the Maidan forest range. Shallow water on the slimy-gley fringe of the fishpond bed. 208. In the vicinity of Lelekhivka village from the east direction. The swampy, slimy-gley fringe of the Vereshitsa rivulet bed. 209. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Habitat as in record no. 206.

27. Community with *Veronica beccabunga* (Table 7, rec. 210)

It is characterized by the domination of *Veronica beccabunga*, with a high co-participation of *Lemna minor* and *Equisetum fluviatile*. The community was recorded only in one station.

Phytosociological record: 210. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Shallow water on the fringe of the slimy-gley Vereshitsa riverbed.

28. *Sparganio-Glycerietum fluitantis* (Table 7, rec. 211-213)

The association is characterized with a simplified and heterogeneous floristic composition. It derives its characteristic appearance from the dense occurrence of *Glyceria fluitans*. This plant represents the characteristic species of this association. A fairly rare rush-plant phytocenosis. It develops on expanses

covering ca. 10 sq. m. It occurs mainly in shallow waters, on the slimy-gley fringes of riverbeds and their tributaries.

Phytosociological records: 211. In the vicinity of Ivano Frankovo. Shallow water on the slimy-gley Vereshitsa riverbed. 212. In the vicinity of Vereshitsa village from the southeast direction. Shallow water on the fringe of the gley-peat Vereshitsa riverbed. 213. In the vicinity of Stavky near the Stavchanka river. Shallow water on the slimy-gley streambed.

29. *Iridetum pseudoacori* (Table 8, rec. 214-219)

The association is characterized by the distinct domination of its characteristic species: *Iris pseudoacorus*. In respect of its general phytosociological structure, the comparatively highest percentages fall on species characteristic of specific phytosociological units of the *Phragmitetea* class and the *Phragmitetalia* order as well as of the *Molinio-Arrhenatheretea* class and the *Molinietalia* order. An infrequent rush phytocenosis. It is found scattered, on expanses of 8-10 sq. m. It develops in shallow waters on the slimy-gley beds of fishponds and drainage canals.

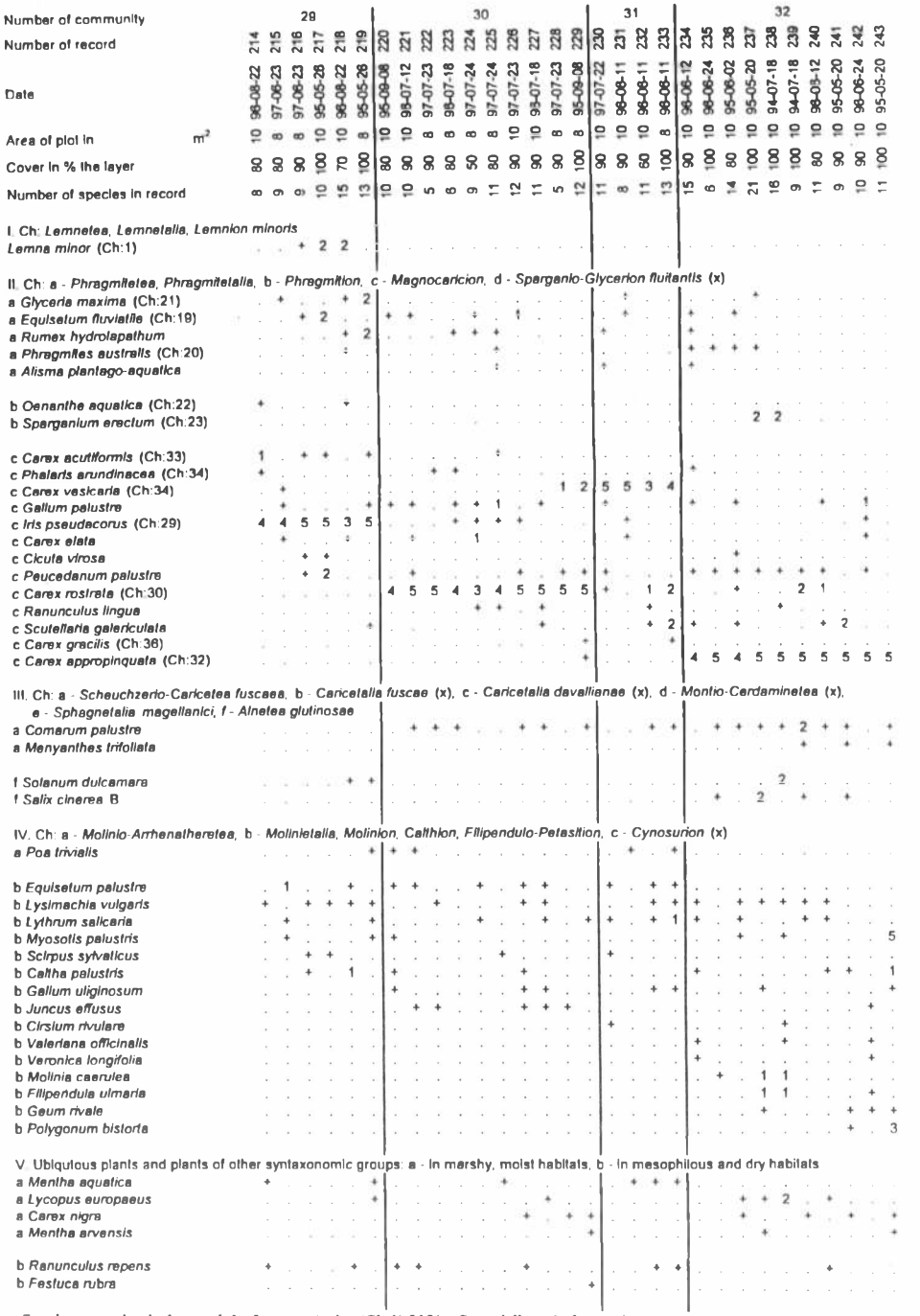
Phytosociological records: 214. Stradch, near Stradchanska Gora and the Vereshitsa river. Shallow water on the slimy-gley drainage canal bottom. 215. Stradch, near Stradchanska Gora and the Vereshitsa river. Habitat as in rec.no. 214. 216. In the vicinity of Stradch, the Vozmashi forest range, near the brickyard. Habitat as in rec. no. 214. 217. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 214. 218. In the vicinity of Lelekhivka village. Shallow water on the slimy-gley fringe of the fishpond bed. 219. In the vicinity of Lelekhivka village. Habitat as in rec. no. 218.

30. *Caricetum rostratae* (Table 8, rec. 220-229)

The association derives its characteristic appearance from the dense occurrence of *Carex rostrata*. Out of other recorded species usually occurring in lower stability classes, *Carex vesicaria, C. elata, Equisetum fluviatile* and *Galium palustre* obtain the comparatively greater cover. One of more common rush phytocenoses, developing on expanses ranging 8-10 sq. m. It develops on the flooded, slimy-gley fringes of drainage canals and riverbeds.

Phytosociological records: 220. Roztocze Reserve, the Zalivki forest range, section 41. Shallow water on the fringe of the slimy-gley drainage canal bottom. 221. In the vicinity of Stradch, near the Vereshitsa river. Habitat as in rec. no. 220. 222. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Shallow water on the fringe of the slimy-gley Vereshitsa riverbed. 223. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat a in rec. no. 222. 224. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 220. 225. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 220. 226. In the

Table 8. – 29 – association *Iridetum pseudoacori*, 30 – association *Caricetum rostratae*, 31 – association *Caricetum vesicariae*, 32 – association *Caricetum appropinquatae*



Species occurring in 1 record: I - *Lemna trisulca* (Ch:1) 218/+, *Spirodella polyrhiza* (Ch:1) 218/1. IIa - *Typha latifolia* (Ch:18) 237/+, IIb - *Typha angustifolia* (Ch:17) 217/+, IIc - *Poa palustris* 230/+, IId - *Veronica beccabunga* (D:27) 218/+, *Scrophularia umbrosa* 234/+. IIIb - *Ranunculus flammula* 214/1, *Viola palustris* 237/+, IIIc - *Carex flava* 229/+, IIId - *Cardamine amara* 217/+, IIIe - *Eriophorum vaginatum* 233/+, IIIf - *Dryopteris cristata* 237/+, *Salix rosmarinifolia* B 237/+. IVa - *Rumex acetosa* 220/+, IVb - *Caltha palustris subsp. cornuta* 215/+, *Lotus uliginosus* 225/+, *Galium boreale* 237/+, *Cirsium palustre* 238/+, *Epilobium palustre* 238/+, *Juncus conglomeratus* 238/+, IVc - Trifolium repens 243/+. Va - *Alnus glutinosa* B 237/+, *Betula pubescens* B 237/+, Vb - *Potentilla erecta* 229/+, *Urtica dioica* 231/+.

vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 222. 227. Stradch, near Stradchanska Gora and the Vereshitsa river. Habitat as in rec. no. 220. 228. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Shallow water on the fringe of the slimy-gley fishpond bed. 229. Roztoche Reserve, the Zalivki forest range, section 40. A local depression on the swampy, gley-peat substratum.

31. *Caricetum vesicariae* (Table 8, rec. 230-233)

The association represents a heterogeneous and floristically poor rush phytocenosis. It is distinguished primarily for the distinct domination of *Carex vesicaria*, the species characteristic of this phytocenosis. Out of other plants, in the few expanses of the association, greater cover is attained by species characteristic of different associations and accompanying species: *Carex rostrata, Scutellaria galericulata* and *Lythrum salicaria*. One of rarer rush phytocenoses, found on expanses usually of 8-10 sq. m. It develops mainly on local depressions with peat-gley or swampy soils.

Phytosociological records: 230. Roztocze Reserve, the Zalivki forest range, section 41. A local depression on the swampy, peat-gley substratum. 231. In the vicinity of Stradch, in the Vereshitsa river valley. Habitat as in rec. no. 230. 232. Roztocze Reserve, the Zalivki forest range, section 40, in the Vereshitsa river valley. Habitat as in rec. no. 230. 233. Roztocze Reserve, the Zalivki forest range, section 40. Habitat as in rec. no. 230.

32. *Caricetum appropinquatae* (Table 8, rec. 234-243)

The association is distinguished primarily for the very dense occurrence of *Carex appropinquata*, the species recognised as characteristic of this phytocenosis. Out of the other and comparatively numerous plant species growing in it, greater degrees of cover are sometimes attained by *Myosotis palustris, Polygonum bistorta, Sparganium rectum* and *Carex rostrata*. One of more common phytocenoses. It develops on expanses of ca. 10 sq. m. It occurs mainly in swampy, slimy-gley habitats.

Phytosociological records: 234. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. The swampy, slimy-gley fringe of the Vereshitsa river. 235. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 234. 236. Roztocze Reserve, the Zalivki forest range, section 41. habitat as in rec. no. 234. 237. Roztocze Reserve, the Zalivki forest range, section 41. A local ground depression on the swampy, gley-peat substratum. 238. Roztocze Reserve, the Zalivki forest range, section 41. Habitat as in rec. no. 237. 239. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 234. 240. In the vicinity of Ivano Frankovo, the Korelova Gora forest reserve. Habitat as in rec. no. 234. 241. In the vicinity of Stavky village. The swampy, slimy-gley fringe of the Stavchanka riverbed. 242. In the vicinity of Ivano Frankovo. Habitat as in rec. No. 234. 243. Roztocze Reserve, the Zalivki forest range, section 40. Habitat as in rec. no. 237.

33. *Caricetum acutiformis* (Table 9, rec. 244-23)

The association is distinguished primarily for the dense occurrence in it of its characteristic species: *Carex acutiformis*. In some expanses of this association worth noting are the fairly abundant occurrences of, among others, *Lemna minor, Typha latifolia, Carex rostrata* and *C. nigra*. One of frequently occurring rush phytocenoses. It is found in numerous, scattered places, in expanses of 8-10 sq. m. often smaller or far larger. It develops on the swampy , gley-peat fringes of local depressions, drainage canals and rivers.

Phytosociological records: 244. Roztocze Reserve, the Zalivki forest range, section 41. The swampy, slimy-gley fringe of the drainage canal bottom. 245. Roztocze Reserve, near Yanovsky Stav lake. Habitat as in rec. no. 244. 246. between Stradch and Ivano Frankovo, the Vereshitsa river valley. Habitat as in rec. no. 244. 247. Stradch, near Stradchanska Gora, in the Vereshitsa river valley. Habitat as in rec. no. 244. 248. In the vicinity of Vereshitsa village, from the southeast direction, in the Vereshitsa river valley. The swampy, slimy-gley bed of the Vereshitsa river arm. 249. Stradch from the southwest direction, near the Stradchanska Gora, in the Vereshitsa river valley. The fringe of the swampy, slimy-gley pond bottom. 250. Roztocze Reserve, near Yanovsky Stav lake. Habitat as in rec. no. 244. 251. Roztocze Reserve, near Yanovsky Stav lake. Habitat as in rec. no. 244. 252. Ivano Frankovo from the south direction. The swampy, slimy-gley fringe of Yanovsky Stav lake. 253. In the vicinity of Ivano Frankovo, in the Vereshitsa river valley, the Korelova Gora forest range. Habitat as in rec. 244.

34. *Phalarindetum arundinaceae* (Table 9, rec. 254-263)

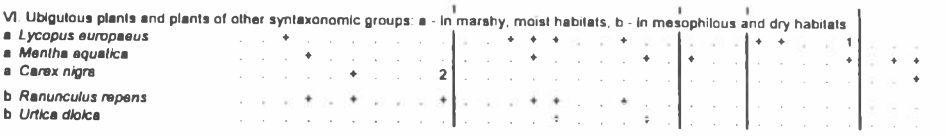
The association owes its characteristic appearance to the dense occurrence of *Phalaris arundinacea*. This plant species is recognised as characteristic of this phytocenosis. Other species that attain greater degrees of cover in some expanses of the association include: *Carex acutiformis, Equisetum palustre* and *Phragmites australis*. One of more frequent phytocenoses. It is found in numerous scattered places, in expanses of 10 sq. m. often smaller or larger. It develops on swampy habitats, slimy-gleyey or peaty. This takes place mainly on the fringe of drainage canal and local depression bottoms.

Phytosociological records: 254. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. The swampy, slimy-gley fringe of the Vereshitsa riverbed. 255. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Habitat as in rec. no. 254. 256. Roztocze Reserve, the Zalivki forest range, section 41. The swampy, slimy-gley drainage canal bottom. 257. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 254. 258. In the vicinity of Ivano Frankovo, the Zalivki forest range, section 41. Habitat as in rec. no. 256. 259. In the vicinity of Ivano Frankovo, the Korelova Gora forest range, the Vereshitsa river valley. Habitat as in rec. no. 256. 260. Roztocze Reserve, the Zalivki forest range, section 41. A swampy, peat-gley local depression. 261. In the vicinity of Ivano Frankovo, the Gorbki forest range. Habitat a in rec.no. 256. 262. In the vicinity of Ivano Frankovo, near the Gorbki forest range. Shallow water on the fringe of the slimy-gley Vereshitsa riverbed. 263. Roztocze Reserve, the Zalivki forest range, section 41. Habitat as in rec. no. 256.

Table 9. – 33 – association *Caricetum acutiformis*, 34 – association *Phalaridetum arundinaceae*, 35 – association *Caricetum ripariae*, 36 – association *Caricetum gracilis*, 37 – association *Thelypteridi-Phragmitetum*

Number of community		33											34										35			36							37		
Number of record		244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274
Date		96-05-31	97-07-23	97-08-11	97-07-23	97-08-11	94-07-17	96-05-31	97-07-23	97-08-11	96-07-17	95-08-01	96-07-17	97-07-16	95-08-01	96-06-18	96-07-17	97-06-12	96-07-17	96-06-18	97-06-12	97-07-23	96-07-30	95-07-01	95-07-18	96-06-16	95-07-21	96-06-16	95-05-14	96-08-18	96-06-12	96-06-12
Area of plot in	m^2	8	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	12	12	10	10	10	6	10	10	10	10	10	10	10	16	12
Cover in % the layer		100	100	100	80	80	80	80	80	80	100	100	100	100	100	100	100	90	90	80	90	90	40	80	100	100	100	80	100	80	100	100
Number of species in record		3	7	11	8	9	15	18	9	7	9	12	11	10	19	17	9	6	10	9	13	6	8	5	5	9	14	8	8	4	8	20
I. Ch *Lemnetea, Lemnetalia, Lemnion minoris*																																			
Spirodella polyrhiza (Ch:1)		+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lemna minor (Ch:1)		2	2	4	+	+	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.
II. Ch: a-*Potamogetonetea, Potamogetonetalia* (x), b-*Nymphaeion* (x), c-*Ranunculion fluitantis*																																			
c *Berula erecta* (Ch:15)		.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
III. Ch: a- *Phragmitetea, Phragmitetalia*, b-*Phragmition*, c-*Magnocaricion*, d-*Sparganio-Glycerion fluitantis*																																			
a *Equisetum fluviatile* (Ch:19)		.	+	.	.	.	.	1	.	.	.	.	.	.	+	1	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	+	2		
a *Typha latifolia* (Ch:18)		.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	
a *Rumex hydrolapathum*		.	.	.	.	+	.	+	.	.	.	.	+	.	+	+	+	.	.	.	+	+	.	.	.	.	+	.	.	.	.	.	.	.	
a *Glyceria maxima* (Ch:21)		.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	1	.	.	.	.	.	
a *Phragmites australis* (Ch:20)		.	.	.	.	.	.	+	+	+	.	2	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	3	+	
a *Alisma plantago-aquatica*		.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
b *Typha angustifolia* (Ch:17)		.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	
c *Carex acutiformis* (Ch:33)		5	5	4	5	3	4	4	5	5	4	5	2	1	.	.	.	.	.	.	.	.	+	2	.	.	.	.	.	.	.	+	.	
c *Iris pseudacorus* (Ch:29)		.	.	+	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	
c *Carex elata*		.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	
c *Cicuta virosa*		.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+		
c *Ranunculus lingua*		.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	+		
c *Peucedanum palustre*		.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	+	.	.	.	+	+	.	.	+	.	.	+		
c *Galium palustre*		.	.	.	.	1	.	+	.	+	+	.	+	.	.	+	.	+	+	+	+	.	.	.	.	.	+	+	.	.	.	+		
c *Phalaris arundinacea* (Ch:34)		.	.	.	.	.	.	+	+	.	.	5	5	5	5	4	5	5	5	5	5	.	.	.	.	.	+	+	.	.	.	.		
c *Carex rostrata* (Ch:30)		.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+		
c *Scutellaria galericulata*		.	.	.	.	.	.	.	.	+	.	.	+	.	.	+	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	2		
c *Carex riparia* (Ch:35)		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	3	5	.	+	.	.	.	.	.	.			
c *Carex gracilis* (Ch:36)		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	5	5	5	5	5	.	.	2			
d *Scrophularia umbrosa*		.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.			
IV. Ch: a-*Scheuchzerio-Caricetea fuscae*, b-*Caricetalia fuscae*, c-*Alnetea glutinosae*																																			
a *Juncus articulatus*		.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.			
a *Comarum palustre*		.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	+	+	.	+	.	+			
b *Ranunculus flammula*		.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.			
c *Thelypteris palustris* (D:37)		.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	5	4			
c *Solanum dulcamara*		.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.			
c *Salix cinerea* B		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.			
V. Ch: a-*Molinio-Arrhenatheretea*, b-*Molinietalia, Molinion, Calthion, Filipendulo-Petasition*																																			
a *Poa trivialis*		.	.	.	+	.	.	+	+	.	.	.	.	.	.	.	+	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.			
a *Symphytum officinale*		.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.			
a *Rumex acetosa*		.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.			
b *Lysimachia vulgaris*		.	.	+	.	+	.	.	.	.	+	.	+	+	.	.	+	+	+	+	+	.	.	.	.	+	+	.	1	.	.	.			
b *Lythrum salicaria*		.	.	+	.	.	.	+	.	.	.	.	.	.	+	+	+	+	+	.	.	.	.	.	+	+	+	.	+	.	.	1			
b *Myosotis palustris*		.	.	.	+	.	.	+	+	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	+			
b *Galium uliginosum*		.	.	.	.	+	.	.	.	.	.	.	.	.	1	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.			
b *Coronaria lychnis*		.	.	.	.	.	+	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.			
b *Deschampsia caespitosa*		.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.			
b *Cirsium rivulare*		.	.	.	.	.	+	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+			
b *Equisetum palustre*		.	.	.	.	.	+	.	.	.	+	2	.	+	2	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.			
b *Caltha palustris*		.	.	.	.	.	+	+	.	.	.	.	.	+	.	.	.	.	.	+	+	+	+	+	.	.	.	.	.	.	.	.			
b *Juncus effusus*		.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.			
b *Geum rivale*		.	.	.	.	.	.	+	.	.	.	+	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.			
b *Valeriana officinalis*		.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+			
b *Scirpus sylvaticus*		.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.			
b *Filipendula ulmaria*		.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	.	+	.	.	.	.	+	+	.	.	.	.	.			

Table 9 continued



Species occurring in 1 record: I - *Salvinia natans* (Ch:2) 257/+, IIa - *Elodea canadensis* (Ch:4) 245/+. IIb - *Hydrocharis morsus-ranae* (Ch:12) 245/+, *Polygonum amphibium* (Ch:8) 245/+. IIIb - *Schoenoplectus lacustris* (Ch:16) 251/1, *Sparganium erectum* (Ch:23) 257/+, *Oenanthe aquatica* (Ch:22) 265/+. IIIc - *Lysimachia thyrsiflora* 255/+, *Carex appropinquata* (Ch:32) 256/+, *Poa palustris* 260/+. IIId - *Glyceria plicata* 257/+, *G. fluitans* (Ch:28) 259/+. Va - *Trifolium pratense* 249/+, *Alopecurus pratensis* 250/+. Vb - *Molinia caerulea* 249/+, *Lotus uliginosus* 249/+, *Juncus conglomeratus* 254/+, *Veronica longifolia* 274/+. VIa - *Stellaria palustris* 255/+, *Polemonium coeruleum* 274/+. VIb - *Arctium lappa* 254/+, *Eupatorium cannabinum* 254/+, *Cirsium arvense* 254/+, *Melandrium album* 254/+, *Potentilla reptans* 255/+, *P. erecta* 257/1, *P. anserina* 258/+, *Impatiens parviflora* 257/+, *Rumex obtusifolius* 257/+, *Polygonum persicaria* 274/+.

35. *Caricetum ripariae* (Table 9, rec. 264-266)

The association is distinguished primarily for the dense of occurrence of *Carex riparia*. This plant is recognised as characteristic of the phytocenosis. Out of other plants, only *Carex acutiformis* attains greater density. One of less frequent rush-plant phytocenoses. It develops most often on expanses of 6-10 sq. m. It is found on the swampy, slimy-gley and peat bottom fringes of mainly drainage canals, less often of rivers.

Phytosociological records: 264. Roztocze Reserve, near Yanovsky Stav lake. The swampy, slimy-gley fringe of the drainage canal bottom. 265. In the vicinity of Lelekhivka village. The swampy, slimy-gley fringe of the fishpond bottom. 266. In the vicinity of Vereshitsa village. The swampy, slimy-gley finger of the Vereshitsa river arm's bed.

36. *Caricetum gracilis* (Table 9, rec. 267-271)

The association derives its characteristic appearance from the dense occurrence of *Carex gracilis*. It is a species recognised as characteristic of this association. The numerical strength of other plant species in this phytocenosis is generally negligible. A fairly frequent rush-plant association. It occurs in scattering, in expanses of varying size up to 10 sq. m. It develops on the swampy, slimy-gley and peat fringes of riverbeds and drainage canal bottoms.

Phytosociological records: 267. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. The swampy, slimy-gley fringe of the Vereshitsa riverbed. 268. Roztocze Reserve, the Zalivki forest range, section 41. The swampy, slimy-gley fringe of the drainage canal bottom. 269. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. no. 267. 270. Roztocze Reserve, the Zalivki forest range, section41. Habitat as in rec. no. 268. 271. In the vicinity of Ivano Frankovo, the Korelova Gora forest range. Habitat as in rec. No. 267.

37. *Thelypteridi-Phgragmitetum* (Table 9, rec. 272-274)

The association is distinguished for the dense occurrence of *Thelypteris palustris*. This plant is recognised as a species characteristic of this phytocenosis. Other plant species that have greater density degrees in some expanses of the association include: *Phragmites australis, Equisetum fluviatile, Carex gracilis* and *Scutellaria galericulata*. An infrequent phytocenosis. It occurs in scattering, in expanses most often ranging from 12-16 sq. m. It develops on swampy, slimy-gley and peat habitats, usually at the bottom of local depressions and drainage canals.

Phytosociological records: 272. Roztocze Reserve, the Zalivki forest range, section 41. The swampy, slimy-gley drainage canal bottom. 273. In the vicinity of Lelekhivka village, the Gorbki forest range, in the alder forest. A swampy, slimy-gley local depression. 274. Roztocze Reserve, the Zalivki forest range, section 40. Habitat as in rec. no. 273.

THE SUMMING UP OF RESULTS

The presented geobotanical profile of the aquatic and riverside plants in the region of the Lvov Roztocze belongs to the few studies of this kind published so far in Ukraine. In the studied area a total of 36 associations and one community of aquatic and riverside plants were recorded. They belong to three classes, three orders and eight alliances of communities. Out of those 37 phytocenoses, seven were already published as studies of the Lvov Roztocze in the border region of the currently investigated area (11). This applies basically to rush-plant phytocenoses occurring both on the fringes of water habitats and away from them, in swampy and peaty sites etc.: *Typhetum latifoliae, Phragmitetum communis, Glycerietum maximae, Iredetum pseudoacori, Caricetum acutiformis, C. gracilis* and *C. appropinquatae*.

In respect of their habitats and general phytosociological structure, the characterized aquatic and riverside phytocenoses do not considerably differ from phytocenoses of this type described from e.g. the Lublin macro-region, Roztocze or other parts of Poland (5, 12, 19). In the area of the Polish-Ukrainian borderland the comparatively most interesting phytocenoses are only: the association *Spirodelo-Salvinietum natantis* and the community with Veronica beccabunga. The other described phytocenoses of aquatic and riverside plants belong to the generally common in Poland (5, 10, 19) and perhaps even in the whole of Ukraine (4, 9). The investigated phytocenoses are generally characterized by a simplified species composition and their comparatively small internal diversification into subordinate phytosociological units. Nor were floristically more interesting, ecological or geobotanical elements recorded in these phytocenoses. The discovered stations of *Polemonium coeruleum* and *Nymphaea candida* (16) belong to regionally rarer plants.

The studied phytocenoses of aquatic and riverside plants are primarily characterized by specific dominant plant species at the same time recognised as the so-called characteristic or distinctive elements. By far the most of these diagnostic (characteristic and distinctive) species are found in diversified frequency ratios and numerical strengths in different phytosociological-ecological groups of phytocenoses (Tables 1-9). Many of those plants recognised as diagnostic for specific basic phytosociological units (association, community) also make up subsidiary community forms in different basic phytocenoses (variants, facies). The examples of such plants are: *Lemna minor, L. trisulca, Spirodela polyrrhiza, Phragmites australis, Typha latifolia, Carex acutiformis, C. rostrata, Glyceria maxima*. These species serve as examples for a discussion of the well-known problem concerning so-called phytosociological fidelity (2, 10, 19).

REFERENCES

1. Andrejewa H. I.: Geologiczeskaja karta Lwowskoj oblasti. 1 : 200 000. Lwiw 1986.
2. Braun-Blanquet I.: Pflanzensoziologie. 2. Aufl., Wien 1951.
3. Buraczyński I.: Roztocze. Zakład Geografii Regionalnej UMCS, Lublin 1997.
4. Dubyna D. V.: Klasyfikacja wiszczoj wodnoj roślinnosti Ukrainy: stan ła perspektiwi. Ukrainskij Fitocenołogiznij Zbitnik. Seria A, Fitosocjołogia 3, 6-14 (1966).
5. Fijałkowski D., Chojnacka-Fijałkowska E.: Zbiorowiska z klas *Phragmitetea, Molinio-Arrhenathеretea* i *Scheuchzerio-Caricetea fuscae* w makroregionie lubelskim. PWN, Warszawa 1990.
6. Geobotaniczne rajonuwanija Ukrainskoj RSR. Naukova Dumka, Kijew 1977.
7. Gerenczuk K. I. (red.): Priroda Lwiwskoj Obłasti. Wyd. Lwiw. Instytuta, Lwiw 1985.
8. Kondracki I.: Geografia regionalna Polski. PWN, Warszawa 1998.
9. Malinowskij K. A. (red.): Prodromus rastitelnosti Ukrainy. Naukova Dumka, Kijw 1991.
10. Matuszkiewicz W.: Przewodnik do oznaczania zbiorowisk roślinnych Polski. PWN, Warszawa 1984.
11. Mirek Z., Piękoś-Mirkowa N., Zając M.: Vascular plants of Poland, a checklist. Polish Botanical Studies. Guidebook Series. W. Szafer Institute of Botany. 15. Kraków 1995.
12. Popiołek Z., Izdebski K.: Zbiorowiska nieleśne. [in:] Izdebski K. et al. Zbiorowiska roślinne Roztoczańskiego Parku Narodowego na tle warunków siedliskowych. Wydawn. PPN, Lublin 1992.
13. Popiołek Z.: Charakterystyka geobotaniczna roślinności torfowiskowo-łąkowej rezerwatu Roztocze na ukraińskiej części Roztocza Południowego. Ann. Univ. Mariae Curie-Skłodowska, sectio C **50**, 39-54 (1995).
14. Priroda Ukrainskoj RSSR. Rastitelny mir. Naukova Dumka. Kijw 1985.
15. Prospekt organizacyi i rozwitija lesnogo chozjajstwa gosza powiednika „Roztoczija". Gosudarstwiennyj Komitet Lesnogo Chozjajstwa SSSR, Lwiw 1987.
16. Soroka M. J.: Sudinni roslini Derżawnowo zapowidnika „Rostoczija", Lwiw, 1990.
17. Szafer W.: Podstawy geobotanicznego podziału Polski. [in:] Szata roślinna Polski. Eds W. Szafer, K. Zarzycki. 2nd ed., vol. 2. Warszawa 1972.
18. Szczerbań M. I.: Klimat (Ukraina i Mołdawia). Nauka, Moskwa 1972.
19. Tomaszewicz H.: Roślinność wodna i szuwarowa Polski. Wydawn. UW, Warszawa 1979.
20. Zerow D. K. et al. (eds.): Wiznacznik roslin Ukraini. Akad. Nauk Ukrainskoj RCR, Inst. Bot., Kijw 1965.

Fig. 2. Stradch, S part. Water and waterside plant communities in an unused fishpond
Photo by F. Święs

Fig. 3. Stradch, SW part. A fishpond being overgrown with rushes in the Vereshitsa river valley
Photo by F. Święs

Fig. 4. Ivano-Frankovo, SE part. Expansion of rush plant communities in an unused fishpond
Photo by F. Święs

Fig. 5. Ivano-Frankovo, NE part, the fringe of the Vereshitsa riverbed. A fragment of association *Spirodelo-Salvinietum* natantis
Photo by F. Święs

STRESZCZENIE

Scharakteryzowano pod względem fitosocjologicznym i ekologicznym fitocenozy wodne i nadwodne występujące na Ukrainie w górnej części doliny rzeki Wereszczycy w rejonie Roztocza Lwowskiego. Odnosi się to do 36 zespołów i 1 bliżej fitosocjologicznie nie określonego zbiorowiska. Fitocenozy te należą do 3 klas, 3 rzędów i 8 związków zespołów.

Wśród ogółu rozpatrywanych fitocenoz nie stwierdzono wyjątkowych ich postaci z uwagi np. na rozmieszczenie geograficzne czy też strukturę florystyczną. Do bardziej interesujących fitocenoz należą jedynie: zespół *Spirodelo-Salvinietum natantis* i zbiorowisko z *Veronica beccabunga*. W przypadku flory roślin naczyniowych najbardziej interesującymi gatunkami w zbadanych fitocenozach są przede wszystkim: *Polemonium coeruleum* i *Nymphaea candida*.

Zbadane fitocenozy roślinności wodnej i nadwodnej na ogół cechują się dość znacznie uproszczoną strukturą florystyczną i słabym wewnętrznym zróżnicowaniem na podrzędne jednostki fitosocjologiczne. Wyodrębniają się one przede wszystkim pod względem dominowania określonych gatunków roślin uznawanych jednocześnie za główne dla nich elementy diagnostyczne (charakterystyczne, wyróżniające).