

FLORA AND VEGETATION OF BEZDIN AREA

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Introduction

The Bezdin area has a surface of 977 ha, rivered by dead river branches and clogged canals, deeper originally. In this area, along with higher and dryer surfaces we found surfaces with year round stagnant water.



Clogged canal in Bezdin area

In the study area the Prundul Mare Nature Reserve is located, part of the Bezdin area and of the Mureş Floodplain Natural Park, on the left bank of the Mureş River, about 7 km downstream Pecica locality.

The forests between the dam and the river shore offers optimal conditions for nesting and feeding to some rare bird species, among which the Little Egret (*Egretta garzetta*), the Saker Falcon (*Falco cherrug*), the Lesser Spotted Eagle (*Aquila pomarina*), the Black Stork (*Ciconia nigra*), the Eurasian Eagle-owl (*Bubo bubo*), the Long-eared Owl (*Asio otus*). Within the nature reserve the Bezdin pond is to be found (actually an oxbow lake), on which lives the European White Waterlily (*Nymphaea alba* L.).

From the botany point of view the area is less known. The 1828 botanical studies of A. Rochel and those from 1858 of J. Heufel, in the east of Banat, make no reference to this area.

Later, L. Simonkai in his phytotaxonomic synthesis made in the 1880-1890 period on the flora and vegetation from the Arad surroundings, describes plant from Pecica and Semlac localities, getting though very close to the Bezdin area.

Other botanical studies were subsequently made by Al. Borza (1942-47), G. Bujoreanu (1942), and I.V. Oprea (1972) and by the team led by I. Moldovan (1972-1982).

Natural frame

The study area is located in the Arad Plain, geographic unit which presents altitudinal variations of low amplitude, between small hillocks which draw the old alluvial holms, reaching the negative shapes of the divagation and puddle cones or the plains formed by the former ponds, presently most of their surfaces being dried off.

The study area is limited at north and west by the Mureş River, to south-west and south by agricultural fields and pasture-lands belonging to Munar and Sanpetru German villages, and to east by the Pecica – Sanpetru German county road and the Sanpetru German village.



Image within the study area

The plain within the study area is of Holocene origin, having a progressive inclination from east to west, with altitudes beneath 100 m, with a pronounced divagation character, built on mires, clays, sands and loess like formations.

The following relief shape may be distinguished:

Depressions, low areas, old river beds and canals, cogged and deeply depressed, which preserve year round stagnant water;

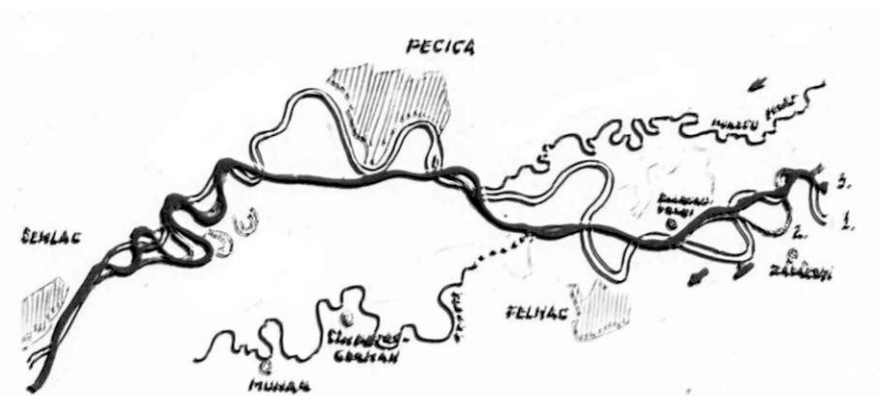
Low floodplain;

High floodplain;

The high floodplains have a dominant character and they are flooded in the dam – river shore area at medium high floods. The other relief shapes cover relatively small surfaces, island like, and they are flooded frequently or they are permanently covered with water.

The Arad Plain, and consequently the study area, is limited from east to west by the Mureş River, in the northern part of the study area. Due to the low energy of it's declivity of just 0,1 m/km, the Mureş river bed is well developed and meandered with many secondary branches. The Mureş River, in the Bezdin area, has no tributary, but it's discharge is variable, decreasing in summer to about 120 m²/s, and provoking in the other seasons 2-3 floods with a high flood regime of over 2000 m²/s.

The frequent raise of the water level above the flooding quote (410 cm) provoked often changes of the of the shores configurations and even of the meandering river bed, with many secondary branches. The Mureş River changed many times its river bed and shifted its course direction.



- || - The Mureş river course on the Lipszky map (1806) – 1.
- ▨ - The Mureş river course at the end of the XIXth century – 2.
- ▬ - The present Mureş river course – 3.
- j - Oxbow

Due to this reason, the floodplain situated at an altitude of 98-102 m, with a slight drop from east to west, it's rivered by a network of canals, clogged oxbows and depressionary area, where water is accumulating during floods or from rainfalls and remains as ponds during long periods of time. These ponds are filled in also by low level phreatic water, situated at only 1,40-2,50 m deep, the substrate being formed of blue clay which gets down to 6,5-14 m.

This thick stratum retains water with free level, making small ponds and oxbows, or mires where the water level is changing upon the Mureş River water level. These terrains alternate with depressionary and muddy areas with high humidity, along with dry and sunny surfaces, the entire system occupying an area of 78 ha, meaning 8% of the Bezdin area.

Flora and vegetation

The study area has a floodplain woody steppe character, with many interesting characters.

Of the total surface (977 ha), about 8% (meaning 78 ha) are:

- depressions, low lands, old river beds and canals, clogged and profoundly depressioned, in which the water coming from rainfalls, flooding and the phreatic strata is kept year round in small ponds and oxbows;

- high humidity areas (with periodically stagnant water);

- sunny and dry areas (dams, forest openings, road sides, ruderal areas etc.).

The other 92% of the area (899 ha) are floodplain forest (gallery forests).

In each subunit of this region a specific flora and vegetation has formed, upon the life condition of the respective subunit.

General characterization of the flora

The flora of small ponds and oxbows in the central zone is represented by hydrophilic plants. Some of the species are floating and they are not fixed, as: Floating Watermoss (*Salvinia natans*), Greater Bladderwort (*Utricularia vulgaris*), Frog bit (*Hydrocharis morsus ranae*), Common Duckweed (*Lemna minor*), Ivy-leaved Duckweed (*Lemna trisulca*), etc. Other species are emerged, fixed through rhizomes, as: European White Waterlily (*Nymphaea alba*), Yellow Pond Lily (*Nuphar luteum*), or by roots, as Broad-leaved Pondweed (*Potamogeton natans*). The fixed, submerged species are not missing either, as: Water Soldier (*Stratiotes aloides*), Rigid Hornwort (*Ceratophyllum demersum*) etc.



European White Waterlily, emerged species the Bezdin Pond Flora fixed through rhizomes in the Bezdin Pond



In the central area the hydrophilic plants, towards the edge of the pond emerged amphibious species

Towards the edge of the ponds amphibious species are to be found, represented by the Bur-reed (*Sparganium ramosum*), Flowering Rush (*Butomus umbellatus*), Arrowhead (*Sagittaria sagittifolia*), European Water Plantain (*Alisma plantago aquatica*), Water Hemlock (*Cicuta virosa*), Purple Loosestrife (*Lythrum salicaria*) etc.



Broad-leaved Pondweed, emergent species fixed through roots in the Bezdin Pond

In the edge line of Bezdin Pond and in mires plants as Common Reed (*Phragmites communis*), Bulrush (*Typha latifolia*), Greater Pond-sedge (*Carex riparia*), Yellow Flag Iris (*Iris pseudacorus*), Crack Willow (*Salix fragilis*), White Willow (*Salix alba*), Almond Willow (*Salix triandra*) etc, are developing.

The flora of muddy areas is represented by mesophilic species, as: Yellow Loosestrife (*Lysimachia vulgaris*), Trifid Bur-marigold (*Bidens tripartitus*), Water Knotweed (*Polygonum amphibium*), Marsh Dock (*Rumex limosus*), Common Nettle (*Urtica dioica*), Water Mint (*Menta aquatica*), Grey Willow (*Salix cinerea*), etc.



Yellow Flag Iris emerged species in the edge of Bezdin Pond and mires in the Bezdin area

In dry and sunny areas, on dams, the most frequent species are: Meadow Fescue (*Festuca pratensis*), Furrowed Fescue (*F. rupicola*), Smooth Brome (*Bromus inermis*), etc., and in sunny, forest openings, Wood Sedge (*Carex sylvatica*), Remote Sedge (*Carex remota*) etc.

The forest flora comprises woody species of treed and scrubs, creepers and herbaceous plants.

The most important tree species are: White Willow (*Salix alba*), Crack Willow (*Salix fragilis*), White and Black Poplar (*Populus alba* and *Populus nigra*), Elm (*Ulmus campestris*), Common Ash (*Fraxinus excelsior*), Pedunculate Oak (*Quercus robur*), Pubescent Oak (*Quercus pubescens*) etc.

The underwood level is represented shrub species as: European Cornel (*Cornus mas*), Common Dogwood (*Cornus sanguinea*), Common Hawthorn (*Crataegus monogyna*), Privet (*Ligustrum vulgare*), Common Hazel (*Corylus avellana*), Spindle (*Euonymus europaeus*), Alder Buckthorn (*Rhamnus frangula*), European Cranberrybush (*Viburnum opulus*), Black Elder (*Sambucus nigra*), Purple Willow (*Salix purpurea*), Grey Willow (*Salix cinerea*) etc., and creeper species as Wilde Grapevine (*Vitis silvestris*), Old Man's Beard (*Clematis vitalba*), Common Ivy (*Hedera helix*), Hops (*Humulus lupulus*), Wild Cucumber (*Echynocistis lobata*) etc.

The surface of natural forest is reduced, about 6% of the total surface, being located mostly in the Prundul Mare area, the other forest surfaces being total or partially artificial.

The herbaceous strata is composed of the following more important plant species: Cocksfoot Grass (*Dactylis glomerata*), Wild arum (*Arum maculatum*), Yellow Loosestrife (*Lysimachia vulgaris*), Wind Flower (*Anemone nemorosa*), Bird-in-a-bush (*Corydalis solida*), Spotted Dog (*Pulmonaria officinalis*), White

Dead Nettle (*Lamium album*), Solomon's Seal (*Polygonatum officinale*), Lily of the Valley (*Convallaria majalis*).

The flora study was based on taxonomical, phyto-geographical, biological and ecological criteria.

Phyto-taxonomic analysis

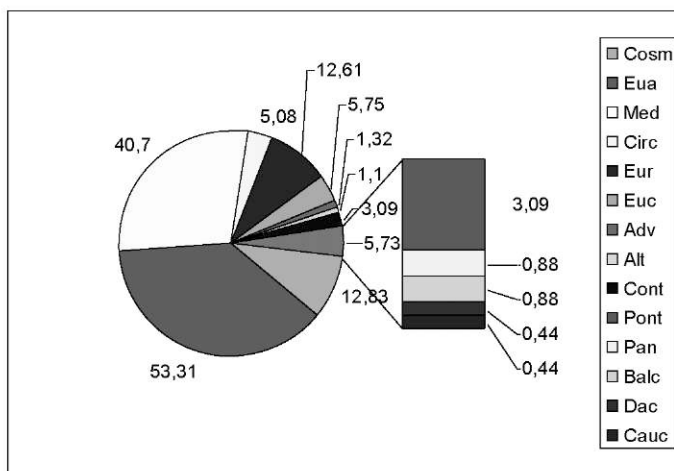
The phyto taxa conspectus of the studied area shows that the most spread species are the herbaceous plants characteristic to pastures and the ruderal plant species, reflecting hence the physiognomy of the regions predominant ecosystems.

It is worth mentioning that, from the total of 452 species identified in the study area about 7% are newly mentioned in the area. These taxa originate in the mountainous and sub-mountainous regions of the Mureş river valley, spread by the water and acclimatized to the conditions from the study area.

The analysis of floral elements (geoelements)

The Bezdin area, from the point of view of the geoelements, it is situated in the Holarctic region, Euro-Siberian sub-region, Central-European and East-Carpathic province, "Western Plain" district.

The range of floristic elements presents as following:



Analyzing this range we can see that the Eurasian element dominate (Eua=53,31 %), followed by the Mediterranean (Med= 40,70%), European (Eur=12,61%), cosmopolite (Cosm=12,83%), central European (Euc=5,75%), circumpolar (Circ=5,08%), adventive (Adv=1,32%), Atlantic (Atl=1,10%), continental (Cont=3,09%), pontic (Pont=3,09%), panonic (Pan=0,88%), balkanic (Balc =0,88%), Caucasian (Cauc=0,44%) and Dacian (D=0,44 %).

The dominance of Eurasian element (Eua = 53,31 %) indicate the appurtenance of the study area to the Euro-Siberian sub-region. The European elements in a wide sense are well represented (Eur = 12,61%), but we can see only a small number of Atlantic elements (Atl = 1,10%), which indicate the appurtenance of the inferior valley of the Mureş river to the central European floristic domain, within the Central-European and East-Carpathic province, "Western Plain" district.

The presence of circumpolar elements (Circ=5,08%), indicate the appurtenance to the Holarctic region.

The relatively high presence of southern origin species (Mediterranean elements), indicate a warm climate, favorising the growth and spread of thermophilic species.

The region is rich in cosmopolite (Cosm = 12,83%) and adventive elements (Adv = 1,32%), due to human influence on land use, confirming the former culturalization of the fields, and also the general ruderalisation of the regions vegetation.

The number of Dacian and balkanic elements is very low (D-B = 0,44% 0,88%).

Among the Eurasian elements, which can be found in remarkable quantities in many plant associations, we mention: *Populus alba*, *Populus tremula*, *Rhamnus chatarticus*, *Dactylis glomerata*, *Festuca pratensis*, *Asarum europeum*, *Viola silvatica*, *Astragalus glycyphyllos*, *Salvinia natans* etc.

European species are present mostly in forests and mesophilic areas. We hence remember the following species: *Anemone ranunculoides*, *Pulmonaria officinalis*, *Ajuga reptans*, *Corydalis cava*, *Polygonatum latifolium*, *Lamium galeobdolon*, *Prunus spinosa*, *Cornus sanguinea*, *Ligustrum vulgare*, *Coryllus avelana* etc.

The best represented circumpolar species are: *Anemone nemorosa*, *Oxalis acetosella*, *Convalaria majalis*, *Poa pratensis*, etc.

The cosmopolite species examples are *Dryopteris filix-mas*, *Stellaria media*, *Poligonum aviculare*, *Agrostema githago*, *Capsella bursa-pastoris*, *Convolvulus arvensis*, *Xanthium spinosum*, *Datura stramonium* etc. They spread in parallel with areas dforestation, and others as *Phragmites communis*, *Typha latifolia*, *Lemna minor* etc., by accommodation to aquatic environment.

The Mediterranean and sub-mediterranean elements induce a characteristic note to the flora of the study area, through the following species: *Quercus cerris*, *Quercus robur*, *Cornus mas*, *Viola odorata*, *Geum urbanum*, *Lythospermum purpureo-coeruleum*, etc.

Adventive species as *Robinia pseudoacacia*, *Amorpha fruticosa*, *Oenothera biennis* etc., are endemic species on other continents and they spread in the study area due to human voluntary or involuntary activity.

The atlantico-mediterranean elements are represented by *Ligustrum vulgare* and *Primula acaulis*, and the Dacian-balkanic elements by *Oenanthe banatica*.

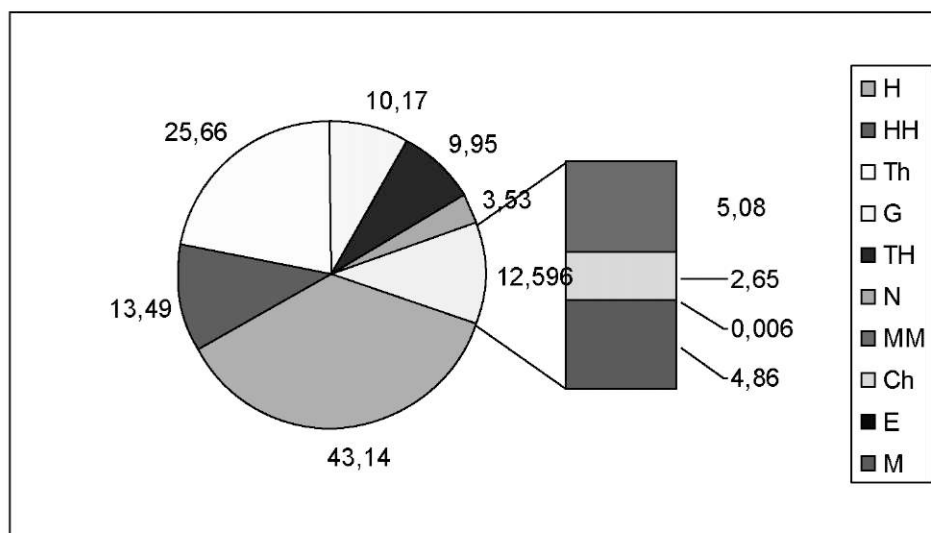
There are very few endemic species in the study area, and we were identifying the following Transylvanian-western endemic species: *Plantago major* and *Roripa keneri*.

Bioforms analysis

Function to their percent participation in the study area, we observe the following percentages:

- Hemicryptophytes (H = 43,14%),
- Annual Therophytes (Th =25,66 %),
- Biannual Therophytes (TH = 9,95%),
- Helohidatophytes (HH =13,49 %),
- Geophytes (G = 10,17%),
- Nanophanerophytes (N =3,53 %),
- Microphanerophytes (M = 4,86%),
- Megaphanerophytes (MM =5,08 %),
- Chamaephytes (Ch =2,65 %),
- Epiphytes (E = 0,006%).

The bioforms range presents as following:



The high percentage of Hemicryptophytes indicate the presence of pastures and ruderal species. The large number of Therophytes is due to anthropogenic influences, made in a dry climate of woody-steppe, close to the dry steppe climate. The presence of Annual Therophytes confirms a former culturalization of

the area, as also does the vegetations ruderalisation due to large agrophytocenosis nearby. In descending order follow the Helohidatophytes, Geophytes and the Chamaephytes, which indicate the herbaceous physiognomy of the plant cover in the study area. The presence of Nanophanerophytes and Megaphanerophytes is the proof that in the area exist natural woodlands, luxuriant with creepers, where primitive elements of the typical floodplain woody-steppe are still preserved.

The ecological analysis

In order to perform an ecological characterization of the flora, three factors of major importance were taken in regard: air humidity (U), temperature (T) and soil reactivity (R). For these factors the H. Ellenberg scale was used, adapted to our countries conditions by ŞT. Csűrös and collaborators, expressing quantitatively both the species need towards a factor and the presence of the respective factor in the area.

Analyzing the flora of the Bezdin area we observe the following:

Humidity factor (U)

The highest percentage is owned by the mesophilic species with 23,8%, which indicate the existence of favourable humidity conditions year round.

The considerably high percentage of mesohigrophytes and hygrophytes confirm the presence of ponds and of the floodplain climate, which favors the development of these plants.

The participation of xerophytes and xero-mesophytes is realized by the southern and pontic xerotherme species, reflecting the warm climate and sometimes even dry climate during summer months.

Temperature factor (T)

More than half species – 61,5% - are mesothermes, reflecting favourable temperature conditions.

The mildly thermophile species cu 21,5% indicate the participation in a considerable number of the southern, submediterranean and Mediterranean thermophilic species in the study area.

Soil reactivity factor (R)

The existence of low-acid neutrophile species in a percentage of 36,8% indicate the adaptation of the studied flora to low-acid to alkaline soils, made by alluvial formations and sedimentary substrata.

As a conclusion, we can mention that all the ecological indices of the area confirm the existence of very favourable living conditions (humidity, temperature, trophicity), for plant species.

General characterization of the vegetation

In general, the study area vegetation has a mosaic character, determined by the Mureş floodplain micro-relief (Bezdin area), missing high dislevelments, riverbed chaotically by secondary river beds, low areas with ponds and mires. This micro-relief favored the formation of a variety of floodplain biotopes, with specific biocenosis: aquatic, mires, mud's, pastures, dams, forest openings etc. Of the total surface of Bezdin area, 60% is occupied by woodlands, represented by derivate forests, consisting mostly of willows, ash and oak forests.



Bezdin Pond – view toward the bird watching tower

FLORA LIST EQUISETACEAE

1. *Equisetum arvense* L.; U3 T3 R0; G, Cosm – humid areas, dam edge
2. *Equisetum ramosissimum* Desf.; U2 T0 R0; G, Cosm - dam edge
3. *Equisetum palustre* L.; U5 T 2 R0; G, Cosm – small ponds and swamps edge

DRYOPTERIDACEAE

4. *Dryopteris filix-mas* (L.) Schott; U4 T3 R0; H, Cosm – dark areas from the arcade forest

MARSILIACEAE

5. *Marsilea quadrifolia* L.; U6 T3 R0; HH, Eua (Med) - small ponds and swamps edge

SALVINIACEAE

6. *Salvinia natans* (L.) All.; U6 T3 R3; HH, Eua - in stagnant water from small ponds, oxbows and swamps

CORYLACEAE

7. *Corylus avellana* L.; U3 T3 R3; M, Balc – in the arcade forest

BETULACEAE

8. *Alnus glutinosa* (L.) Gaertn.; U5 T3 R3; MM (M), Eua- oxbows edge and the Mureş River edge

FAGACEAE

9. *Quercus robur* L.; U3.5 T3 R0; MM, Eur- higher areas from floodplain forest
10. *Quercus cerris* L.; U2 T3.5 R3; MM (M), Med- higher areas from floodplain forest
11. *Quercus pubescens* Willd.; U1.5 T5 R5; MM (M), Med - higher areas from floodplain forest

MORACEAE

12. *Morus nigra* L.; U2 T3.5 R4; MM (M), Med (China) - in floodplain forest
13. *Morus alba* L.; U2 T3.5 R4; MM (M), Adv (Asia) - in floodplain forest

CANNABACEAE

14. *Humulus lupulus* L.; U3.5 T3 R4; H, Eua – near small ponds and oxbows and in the Prundul Mare forest

ULMACEAE

15. *Ulmus minor* Mill.; U3 T3 R4; MM, Eur – in floodplain forest
16. *Ulmus laevis* Pall.; U4 T3 R3; MM, Eur – in floodplain forest

JUGLANDACEAE

17. *Juglans nigra* L.; MM, Am, de N – in floodplain forest

SALICACEAE

18. *Populus alba* L.; U3.5 T3 R3; MM – M, Eua – humid areas in floodplain forest
19. *Populus nigra* L.; U4 T3 R4; MM – M, Eua - humid areas in floodplain forest
20. *Populus X canadensis* Moench; MM – M, Adv. (Am) - humid areas in floodplain forest
21. *Salix fragilis* L.; U5 T3 R4; MM – N, Eua (Md) - humid areas in floodplain forest
22. *Salix x rubens* Schrank; U4.5 T3.5 R3.5; MM – N, Eur, (Med) – Mureş River edge
23. *Salix alba* L.; U5 T3 R4; MM – N, Eua, (Med) - Mureş River edge and in the parks from Prundul Mare
24. *Salix triandra* L.; U5 T3 R0; N, Eua – swampy areas from floodplain forest
25. *Salix purpurea* L.; U5 T3 R4.5; N, Eua (Med) – humid areas from parks
26. *Salix cinerea* L.; U5 T3 R3; N, Eua, (Med) – in rush-beds and swampy areas

27. *Salix viminalis* L.; U5 T2 R4.5; N, Eua - swampy areas from floodplain forest

28. *Salix caprea* L.; U3 T3 R4; N, Eua - swampy areas from floodplain forest

URTICACEAE

29. *Urtica urens* L.; U3 T3 R4; Th, Cosm – roadsides, affluent in nitrogen and ruderal areas

30. *Urtica dioica* L.; U3 T3 R4; H, Cosm - roadsides, affluent in nitrogen and ruderal areas and in reed

LORANTHACEAE

31. *Loranthus europaeus* Jacq.; U3 T3.5 R0; Ch-N, Eur – semi parasitic on oak

32. *Viscum album* L.; U3.5 T3 R0; Ch (N), Eur – semi parasitic on oak

POLYGONACEAE

33. *Rumex maritimus* L.; U5 T3.5 R4.5; Th, Cosm – small pond edges, oxbows and swamps

34. *Rumex dentatus* L.; U4.5 T4.5 R4; Th – TH, Eua (Cont) - small pond edges, oxbows and swamps

35. *Rumex conglomeratus* Murray; U4 T4 R4; H, Circ - - small pond edges, oxbows and swamps

36. *Rumex stenophyllus* Ledeb.; H, Eua (Cont) - small pond edges, oxbows and swamps

37. *Reumex acetosa* L.; U3 T0 R0; H, Cosm – on dam and in openings from floodplain forest

38. *Rumex acetosella* L.; U2 T3 R2; H, Cosm – on dam and ruderal areas

39. *Polygonum amphibium* L.; U6 T3 R0; G – HH, Eur (Med) – oxbow edges, swamps and humid, muddy areas

40. *Polygonum lapathifolium* L.; U4 T0 R3; Th, Cosm – sandy areas in floodplain

41. *Polygonum persicaria* L.; U4.5 T3 R0; Th, Cosm – roadsides, diggings and floodplain

42. *Polygonum minus* Huds.; U4.5 T3 R4; Th, Cosm – humid areas in floodplain

43. *Polygonum aviculare* L.; U2.5 T0 R3; Th, Cosm – roadsides and ruderal areas

44. *Fallopia convolvulus* (L.) A&A.Löve; (*Polygonum convolvulus* L.) U2.5 T0 R3; Th, Eua (Med) – floodplain ponds

45. *Fallopia dumetorum* (L.) Holub; (*Polygonum dumetorum* L.) U T R; Th, Eua (Med) – humid areas from forest and bush

CHENOPODIACEAE

46. *Chenopodium hybridum* L.; U3 T3 R0; Th, Eua (Med) – floodplain ponds

47. *Chenopodium urbicum* L.; U3 T0 R3; Th, Eua (Med) - humid areas from forest and bush

48. *Chenopodium album* L.; U3 T3 R0; Th, Eua (Med) - ruderal areas
49. *Chenopodium polyspermum* L.; U3 T4 R0; Th, Eua (Med) - ruderal areas and floodplain
50. *Chenopodium vulvaria* L.; U3 T4 R4; Th, Eua (Med) - ruderal areas and roadsides
51. *Chenopodium rubrum* L.; U3.5 T0 R0; Th, Circ – humid areas in floodplain
52. *Chenopodium glaucum* L.; U3.5 T4 R0; Th, Eua – humid areas in floodplain
53. *Atriplex nitens* Schkuhr; Th, Eua - humid areas in floodplain
54. *Atriplex tatarica* L.; U2 T4 R0; Th, Eua (Med) - ruderal areas and roadsides

AMARANTHACEAE

55. *Amaranthus retroflexus* L.; U3 T3 R0; Th, Adv - ruderal areas and roadsides

CARYOPHYLLACEAE

56. *Silene vulgaris* (Moench) Garcke; U3 T3 R4; H (Ch), Eua (Med) – on dam
57. *Lychnis flos-cuculi* L.; U3.5 T2.5 R0; H, Eua (Med) – on dam and in forest openings
58. *Silene latifolia* Poir. subsp. *alba* (Mill.) Greuter & Burdet; (*Melandrium album* (Mill.) Garcke.) U3.5 T2 R3; H (Ch), Eua (Med) - ruderal areas, roadsides and on dam
59. *Silene viscosa* (L.) Pers.; (*Melandrium viscosum* (L.) Kelak.) U2.5 T3 R4; Th, Eua – dam basis
60. *Cucubalus baccifer* L.; U3.5 T3 R4; H, Eua – floodplain bush
61. *Gypsophyla muralis* L.; U2 T3 R2; Th, Eua – humid areas in floodplain
62. *Vaccaria hispanica* (Mill.) Rauschert; (*Vaccaria pyramidata* Medik.) U3 T3 R0; Th, Eua (Med) – on dam
63. *Dianthus armeria* L.; U2 T3 R3; Th, Eur - forestsides, forest openings and on dam
64. *Saponaria officinalis* L.; U3 T3 R0; H, Eua (Med) – Mureş River flood plain and on dam
65. *Myosoton aquaticum* (L.) Moench; (*Stellaria aquatica* (L.) Scop.) U4 T3 R0; Th – TH, Eua (Med) – humid areas in floodplain and willow parks
66. *Stellaria media* (L.) Vill.; U3 T0 R0; Th – TH, Cosm – in floodplain
67. *Stellaria holostea* L.; U3 T3 R3; H, Cosm – floodplain bush
68. *Stellaria graminea* L.; U2.5 T2 R3; H, Eua – humid areas in floodplain
69. *Cerastium pumilum* Curtis; U2 T3 R0; Th, Eur (Med) - on dam
70. *Arenaria serpyllifolia* L.; U2 T2.5 R0; Th, Eua (Med) – road sides and on dam

71. *Herniaria glabra* L.; U2.5 T3.5 R3; Th - TH – H, Euc (Med) - roadsides and on dam, ruderal areas

EUPHORBIACEAE

72. *Euphorbia helioscopia* L.; U3 T3 R0; Th, Cosm – roadsides and diggings
73. *Euphorbia serrulata* Thuill.; (*Euphorbia stricta* L.) U4 T3 R3; Th, Eur, Cont – humid areas near oxbows and channels
74. *Euphorbia palustris* L.; U4.5 T3.5 R4.5; H – HH, Eua (Cont) – humid areas near oxbows and channels
75. *Euphorbia cyparissias* L.; U2 T3 R4; H (G), Eua (Med) – arid areas and roadsides
76. *Euphorbia salicifolia* Host; U2 T3.5 R3; H, Pont – on dam

RANUNCULACEAE

77. *Clematis recta* L.; U2.5 T3 R4; H, Euc (Pont - Mod) – in parks and floodplain bush
78. *Clematis vitalba* L.; U3 T3 R3; N-E, Euc (Med) - Prundul Marc forest
79. *Clematis integrifolia* L.; U3 T3.5 R5; H, Eua (Cont) – humid meadows
80. *Thalictrum flavum* L.; U4.5 T0 R4.5; H, Eua – humid areas in Prundul Marc
81. *Anemone nemorosa* L.; U3.5 T3 R0; G, Circ - Bezdin forest
82. *Anemone ranunculoides* L.; U3.5 T3 R4; G, Eur - Bezdin forest
83. *Ranunculus ficaria* L.; U3.5 T3 R3; H -G, Eua - Bezdin forest
84. *Ranunculus repens* L.; U4 T0 R0; H, Eua (Med) – roadsides and diggings
85. *Ranunculus acris* L.; U3.5 T0 R0; H – G, Eua – deep, humid areas in floodplain
86. *Ranunculus polyanthemus* L.; U2.5 T3 R3; H, Eur (Med) – forest openings and on dam
87. *Ranunculus sceleratus* L.; U4.5 T3 R4; Th, Circ – diggings and humid, muddy areas
88. *Ranunculus aquatilis* L.; U6 T4 R0; HH, Cosm – oxbow water, swamps and floodplain channels

ARISTOLOCHIACEAE

89. *Aristolochia clematitis* L.; U2.5 T3.5 R5; H (G), Med (Ec) – in floodplain forest parks
90. *Asarum europaeum* L.; U3.5 T3 R4; H (G), Eua – flood areas in Bezdin forest

NYMPHAEEACEAE

91. *Nymphaea alba* L.; U6 T0 R4; HH, Eur (Med) – stagnant water of reservation pond
92. *Nuphar luteum* Sm.; U6 T0 R3.5; HH, Eue (Med) - stagnant water of reservation pond

CERATOPHYLLACEAE

93. *Ceratophyllum demersum* L.; U6 T3 R0; HH, Cosm - oxbow water, swamps and floodplain channels

PAPAVERACEAE

94. *Papaver rhoeas* L.; U3 T3.5 R4; Th, Eua – roadsides and on dam
95. *Papaver dubium* L.; U2 T3.5 R3; Th, Med (Euc) – on dam and in Prundul Mare floodplain
96. *Chelidonium majus* L.; U3 T3 R4; H, Eua (Med) - forestsides
97. *Corydalis cava* (L.) Schweigg. & Körte; U3 T3 R0; G, Eur (Med) – humid areas in forest
98. *Corydalis solida* (L.) Clairv.; U3 T3 R4; G, Euc (Med) - humid areas in forest
99. *Fumaria schleicheri* Soy.-Will.; U2.5 T4 R4; Th, Eua (Med) – ruderal areas

CRUCIFERAE (BRASSICACEAE)

100. *Rorippa islandica* (Oeder) Borbás; U5 T3 R4; Th – TH, Cosm – humid, muddy areas in floodplain
101. *Rorippa sylvestris* (L.) Besser; U4 T3 R4; H (G), Eua (Med) – humid areas and in diggings
102. *Rorippa austriaca* (Crantz) Besser; U4 T3.5 R4; H (G), Pont – humid areas and in diggings
103. *Rorippa amphibia* (L.) Besser; U6 T3 R4; HH, Eua, (Med) – stagnant water in floodplain
104. *Barbarea vulgaris* R.Br.; U3.5 T3 R3; Th – H, Eua (Med) – humid areas, diggings and floodplain
105. *Cardamine pratensis* L. U5 T3 R0; H, Circ – humid areas in floodplain forest
106. *Sisymbrium orientale* L.; U2.5 T4 R3; Th – TH, Eua (Med) - roadsides
107. *Sisymbrium officinale* (L.) Scop.; Th, Eua (Med) - roadsides
108. *Descurainia sophia* (L.) Webb ex Prantl; (*Sisymbrium sophia* L.) U2.5 T4 R4; Th-TH, Eua (Med) - roadsides
109. *Alliaria petiolata* (M.Bieb.) Cavara & Grande; (*Alliaria officinalis* Andr.) U3 T3 R4; TH – H, Eua (Med) – roadsides and forest openings
110. *Sinapis arvensis* L.; Th, Cosm – roadsides and ruderal areas
111. *Alyssum alyssoides* (L.) L.; U1 T3 R0; Th – TH, Eua (Med) – sunny areas on dam
112. *Erophila verna* (L.) Chevall.; (*Draba verna* L.) U2.5 T3.5 R0; Th, Eua (Med) – on dam, roadsides and digging
113. *Capsella bursa-pastoris* (L.) Medik.; U3 T0 R0; Th – TH, Cosm (Med) - on dam, roadsides and digging
114. *Thlapsi arvense* L.; U2 T3 R4; Th-TH, Eua - on dam, roadsides and digging

115. *Thlapsi perfoliata* L.; U2.5 T3.5 R4.5; Th, Eua - on dam, roadsides and digging
116. *Cardaria draba* (L.) Desv.; (*Lepidium draba* L.) U2 T4 R5; H, Eua (Med) -
117. *Raphanus raphanistrum* L.; U2.5 T3 R0; Th, Eua - on dam, roadsides and digging

RESEDACEAE

118. *Reseda lutea* L.; U2 T3 R0; TH – H, Eua (Med) – roadsides and ruderal areas

VIOLACEAE

119. *Viola odorata* L.; U2.5 T3.5 R4; H, Alt-Med – in tunnel forest
120. *Viola reichenbachiana* Jord. ex Borcau; (*Viola silvestris* Lam.) U3 T2.5 R3; H, Eua (Med) - in tunnel forest
121. *Viola elatior* Fr.; U4 T4 R4.5; H, Eua (Cont) – humid areas from forest sides and on dam basis
122. *Viola pumila* Chaix; U3 T3 R4; H, Eua – humid areas from floodplain
123. *Viola arvensis* Murray; U3 T3 R0; Th, Cosm - ruderal areas

HYPERICACEAE

124. *Hypericum perforatum* L.; U3 T3 R0; H, Eua (Med) - forest sides, roadsides and paths
125. *Hypericum tetrapterum* Fr.; (*Hypericum acutum* Mch.) U4 T3 R4; H, Eua - around swamps, oxbows and channels

SAXIFRAGACEAE

126. *Chrysosplenium alternifolium* L.; U4 T2 R4; H, Eua – humid areas from floodplain

ROSACEAE

127. *Prunus spinosa* L.; U2 T3 R3; M, Eua (Med) – forest sides and lawns
128. *Fragaria vesca* L.; U3 T2.5 R0; H, Eua – on dam and forest openings
129. *Geum urbanum* L.; U3 T3 R4; H, Eua (Med) – in tunnel forest
130. *Potentilla supina* L.; U4 T3 R0; Th – H, Eua (Med) - in Mureş floodplain
131. *Potentilla anserina* L.; U4 T3 R4; H, Cosm - in Mureş floodplain
132. *Potentilla reptans* L.; U3.5 T4 R4; H, Cosm – stagnant waters edge in floodplain
133. *Crataegus monogyna* Jacq.; U2.5 T3.5 R3; N, Eua (Med) – floodplain forests
134. *Pyrus pyraeaster* Burgsd.; U2 T3 R4; MM, Eur (Med) - floodplain forests
135. *Malus sylvestris* Mill.; U3.5 T3 R4; MM, Eur (Med) - floodplain forests
136. *Rosa canina* L.; U2 T3 R3; N, Eua (Med) – forest sides and lawns
137. *Rubus caesius* L.; U4.5 T3 R4; H-Ch, Eua (Med) – floodplain forests

LEGUMINOSAE

138. *Melilotus officinalis* (L.) Pall.; U2.5 T3.5 R0; TH, Eua (Med) - roadsides
139. *Trifolium fragiferum* L.; U3 T3 R5; H, Eua – humid areas in floodplain
140. *Trifolium hybridum* L.; U3.5 T3 R4; H, Eur - humid areas in floodplain and stagnant waters edge
141. *Trifolium repens* L.; U3.5 T0 R0; H, Cosm - humid areas in floodplain and stagnant waters edge
142. *Lotus corniculatus* L.; U2.5 T0 R0; H, Eua (Med) – on dam and forest openings
143. *Galega officinalis* L.; U4.5 T3 R4; H, Pont – Med – stagnant waters edge in floodplain
144. *Amorpha fruticosa* L.; U3 T4 R0; N, Adv –in floodplain, on Mureş side
145. *Glycyrrhiza echinata* L.; U4 T4 R0; H, Pont – Med -in Mureş floodplain
146. *Vicia dumetorum* L.; U3 T3 R4.5; H, Euc (Med) – on dam and in forests
147. *Vicia pisiformis* L.; U2 T3 R4.5; H, Euc - on dam and in forests
148. *Vicia grandiflora* Scop.; U3 T3 R0; Th, Pont – Cauc- Balc – on dam
149. *Vicia sativa* L.; U0 T3 R0; Th, Med – on dam
150. *Lathyrus vernus* (L.) Bernh.; U3 T3 R3; H, Eua – on dam and along Mureş
151. *Lathyrus tuberosus* L.; U2 T4 R4; H, Eua (Med) – on dam
152. *Lathyrus palustris* L.; U5 T2 R5; H, Circ – humid areas in Bezdin forest
153. *Robinia pseudacacia* L.; U2.5 T4 R0; MM, Adv – in floodplain forest

LYTHRACEAE

154. *Lythrum salicaria* L.; U4 T2.5 R0; H – HH, Eur – Mureş side and stagnant waters edge

ONAGRACEAE

155. *Epilobium hirsutum* L.; U4 T3 R3.5; H – HH, Eua (Med) – in rush-beds
156. *Epilobium parviflorum* Schreb.; U5 T3 R4.5; H, Eua – in rush-beds
157. *Epilobium montanum* L.; U3 T0 R3.5; H, Eua (Med) - near Bezdin pond
158. *Epilobium adnatum* Griseb.; H, Eua (Med) – near pond waters, swamps, channels, etc.
159. *Oenothera biennis* L.; U2 T4 R0; TH, Adv – Mureş side
160. *Circaea lutetiana* L.; U3.5 T3 R4; G, Eua (Med) – humid areas from tunnel forest

TRAPACAE

161. *Trapa natans* L.; U6 T4 R3.5; HH, Eua (Med) - in stagnant waters from small ponds and oxbows from floodplain

HALORAGACEAE

162. *Myriophyllum verticillatum* L.; U6 T3.5 R3.5; HH, Euc - in stagnant waters from small ponds and oxbows from floodplain

MALVACEAE

163. *Malva sylvestris* L.; U3 T3 R0; Th, TH, H, Cosm – roadsides and ruderal areas
164. *Malva neglecta* Wallr.; U3 T3 R0; Th, TH, H, Eua (Med) - roadsides and ruderal areas
165. *Althaea officinalis* L.; U3 T4 R4; H, Eua (Cont) – flood areas from floodplain
166. *Lavatera thuringiaca* L.; U2.5 T3 R0; H, Eua (Cont) – forest sides and bush

OXALIDACEAE

167. *Oxalis acetosella* L.; U4 T3 R3; H-G, Circ – flood areas in floodplain
168. *Oxalis stricta* L.; U3.5 T0 R0; H, Adv – flood areas in floodplain

GERANIACEAE

169. *Geranium robertianum* L.; U3.5 T3 R3; Th-Th, Cosm – humid areas in floodplain forest
170. *Geranium palustre* L.; U4 T3 R4.5; H, Eua – stagnant waters in floodplain

TILIACEAE

171. *Tilia cordata* Mill.; U3 T3 R3; MM, Eur – floodplain forests

ACERACEAE

172. *Acer campestre* L.; U2.5 T3 R3; M-MM, Eur - floodplain forests
173. *Acer tataricum* L.; U2.5 T3.5 R4; M-MM, Eur (Cont) - floodplain forests

CELASTRACEAE

174. *Euonymus europaeus* L.; U3 T3 R3; M, Eur (Med) - floodplain forests
175. *Euonymus verrucosus* Scop.; U2.5 T3 R4; M, Eur - floodplain forests

RHAMNACEAE

176. *Rhamnus catharticus* L.; U2 T3 R4; M, Eua (Med) - floodplain forests
177. *Frangula alnus* Mill.; U4 T3 R3; (*Rhamnus frangula* L.) M, Eua (Med) - floodplain forests

VITACEAE

178. *Vitis vinifera* L. subsp. *sylvestris* (C.C.Gmel.) Hegi; (*Vitis sylvestris* Gmel.) M – E, Med (Pont) - floodplain forests
179. *Parthenocissus quinquefolia* (L.) Planch.; N, Adv - floodplain forests

ARALIACEAE

180. *Hedera helix* L.; N – E, Alt - Med - floodplain forests

CORNACEAE

181. *Cornus mas* L.; U2 T3.5 R4; M, Pont - Med - floodplain forests
182. *Cornus sanguinea* L.; U 3T3 R4; M, Ec - floodplain forests

UMBELLIFERAE

183. *Eryngium planum* L.; U2 T3 R4; H, Eua – along dam basis

184. *Aegopodium podagraria* L.; U3.5 T3 R3; H (G), Eua – humid areas in floodplain forest
185. *Pimpinella saxifraga* L.; U2.5 T0 R3; H, Eua (Med) - humid areas in floodplain forest
186. *Siium latifolium* L.; U6 T0 R4; HH, Eua – humid areas in tunnel forest
187. *Oenanthe aquatica* (L.) Poir.; U6 T3 R0; HH, Eua (Med) – in small ponds, oxbows and swamps
188. *Oenanthe banatica* Heuff.; U4 T3.5 R0; H, Dac-Balc - in small ponds, oxbows and swamps
189. *Aethusa cynapium* L.; U3.5 T3 R0; Th –TH - humid areas in tunnel forest
190. *Angelica sylvestris* L.; U4 T3 R3; H, Eua - in small ponds, oxbows and swamps
191. *Pastinaca sativa* L.; U3 T4 R4; TH – H – roadsides and on dam
192. *Chaerophyllum bulbosum* L.; U4 T3.5 R4.5; TH – H – forest-sides and bush
193. *Conium maculatum* L.; U3 T3 R3; Th – TH, Eua (Med) – forest-sides and diggings
194. *Cicuta virosa* L.; U5 T0 R3; HH, Eua – in rush-beds and diggings

PRIMULACEAE

195. *Primula veris* L.; (*Primula officinalis* (L.) Hill) U3 T2 R5; H, Atl-Med – along dam
196. *Primula vulgaris* Huds.; (*Primula acaulis* (L.) Hill) U3 T3 R3; H, Eua – humid areas in floodplain
197. *Hottonia palustris* L.; U6 T3.5 R3; HH, Eur - between reed in Bezdin pond
198. *Lysimachia nummularia* L.; U4 T3 R3; Ch, Eur (Med) – humid, muddy areas in floodplain
199. *Lysimachia punctata* L.; U3.5 T3.5 R3; H, Eur – humid areas in floodplain
200. *Lysimachia vulgaris* L.; U5 T2 R0; HH-HH, Eua (Med) - humid areas in floodplain and along dam basis

CONVOLVULACEAE

201. *Convolvulus arvensis* L.; U2.5 T3.5 R3.5; H – G, Cosm – on dam
202. *Cuscuta europaea* L.; U4 T0 R0; Th, Eua (Med) – parasite on nettle and hop in floodplain

ASCLEPIADACEAE

203. *Vincetoxicum hirundinaria* Medik.; (*Vincetoxicum officinale* Moench (*Cynanchum vincetoxicum* Pers.)) U2 T4 R4; H, Eua (Med) – small ponds, oxbows and channels edge

BORAGINACEAE

204. *Heliotropium europaeum* L.; U2 T4 R0; Th, Med (Eur) – roadsides and on dam
205. *Lappula squarrosa* (Retz.) Dumort. subsp. *squarrosa*; (*Lappula myosotis* Moench) U1.5 T3.5 R4; Th-TH, Eua - roadsides and on dam
206. *Cynoglossum officinale* L.; U3 T3 R3; Th, Eua - roadsides and on dam
207. *Symphytum officinale* L.; U4 T3 R0; H, Eur – humid areas, oxbows and channels edge
208. *Cerintho minor* L.; U3 T3 R0; TH (Th, H), Pont – Med - roadsides
209. *Echium vulgare* L.; U2 T3 R4; Th, Eua – roadsides and on dam
210. *Pulmonaria officinalis* L.; U3.5 T3 R3; H, Euc – humid forest openings in floodplain
211. *Pulmonaria mollissima* A.Kern.; U2.5 T3 R4; H, Euc – humid forest openings in floodplain
212. *Lithodora rosmarinifolia* (Ten.) I.M.Johnst.; (*Lithospermum purpureocaeruleum* L.) U2.5 T4 R4.5; H-G, Euc-Med – tunnel forest sides and bush
213. *Myosotis scorpioides* L.; (*Myosotis palustris* (L.) Hill) U5 T3 R4; TH-H, Eua – near stagnant waters in floodplain
214. *Myosotis sparsiflora* J.G.Mikan ex Pohl; U3.5 T3 R4; Th- Eua (Cont) – humid areas in floodplain

SOLANACEAE

215. *Solanum nigrum* L.; U3 T4 R0; Th, Cosm - ruderal areas
216. *Solanum dulcamara* L.; U4.5 T3 R4; Ch, Eua (Med) – openings in tunnel forest and small ponds edge
217. *Physalis alkekengi* L.; U3 T3 R4; H, Med (Euc) – forestsides, roadsides and diggings
218. *Hyoscyamus niger* L.; U3 T3 R4; H (Th - TH), Eua (Med) - roadsides
219. *Datura stramonium* L.; U3.5 T4 R4; Th, Cosm – roadsides and ruderal areas

SCROPHULARIACEAE

220. *Verbascum phlomoides* L.; U2.5 T3.5 R4; TH, Eua (Med) - roadsides
221. *Verbascum chaixii* Vill. subsp. *austriacum* (Schott ex Roem. & Schult.) Hayek; (*Verbascum austriacum* Schott ex Roem. & Schult.) U2 T3 R4; TH – H, Eua – roadsides and forest
222. *Verbascum blattaria* L.; U2.5 T3.5 R3; H, Eua (Med) - roadsides and forest
223. *Verbascum phoeniceum* L.; U2 T4 R4; H, Eua (Cont) – forest openings
224. *Scrophularia nodosa* L.; H, Eua – floodplain openings
225. *Scrophularia scopolii* Hoppe; U4 T3 R0; H, Eua – humid areas in forest and floodplain bush

226. *Gratiola officinalis* L.; U4.5 T3 R4; H, Eua – humid areas around small ponds, oxbows and channels
227. *Linaria vulgaris* Mill.; U2 T3 R3; H, Eua (Med) – on dam
228. *Veronica anagallis-aquatica* L.; U4.5 T0 R4; H – HH, Eur – near channels, deep, humid areas in floodplain
229. *Veronica chamaedris* L.; U3 T0 R0; H (Ch), Eua – forest sides and on dam
230. *Veronica beccabunga* L.; U5 T3 R4; H – HH, Eua (Med) – humid, low areas from floodplain and diggings
231. *Veronica prostrata* L.; U2 T4 R3; Ch, Eua (Med) – on dam
232. *Veronica spuria* auct., non L.; (*Veronica spuria* L.) U0 T3 R4; H, Eua - humid areas around small ponds, oxbows and channels in floodplain
233. *Veronica spicata* L. subsp. *orchidea* (Crantz) Hayek; (*Veronica orchidea* Crantz) U1 T4 R4; H, Euc – forest sides and openings
234. *Veronica arvensis* L.; U2.5 T3 R3; Th, Eua (Med) – on dam
235. *Limosella aquatica* L.; U4.5 T3 R0; Th, Cosm – humid, muddy areas in floodplain
236. *Melampyrum cristatum* L.; U2 T3 R5; Th, Eua – forest openings and bush

SCROPHULARIACEAE

237. *Lathraea squamaria* L.; U3 T3 R3; G, Eua – parasite on black poplar roots plop in flood areas of tunnel forest

LENTIBULARIACEAE

238. *Utricularia vulgaris* L.; U6 T0 R3.5; HH, Circ -in Bezdin pond

LABIATAE

239. *Salvia austriaca* Jacq.; U2 T3.5 R4; H, Pont – on dam
240. *Salvia pratensis* L.; U2.5 T3 R5; H, Eur (Med) – on dam
241. *Salvia nemorosa* L.; U2.5 T4 R3; H, Eue – on dam
242. *Salvia verticillata* L.; U2 T4 R0; H, Eur (Med) - roadsides
243. *Salvia glutinosa* L.; U3.5 T3 R4; H, Eur (Med) – humid areas in floodplain forest
244. *Mentha pulegium* L.; U4.5 T3 R5; H, Eua – humid, swampy areas, in floodplain
245. *Mentha arvensis* L.; U3 T3 R0; H-G, Circ - humid, swampy areas, in floodplain
246. *Mentha aquatica* L.; U5 T3 R0; HH – H, Eur (Med) – small ponds, oxbows and swamps edge
247. *Lycopus europaeus* L.; U5 T3 R0; HH, Eua (Med) – swamps and diggings
248. *Lycopus exaltatus* L.; U5 T3 R0; HH, Eua - swamps and diggings
249. *Lamium maculatum* L.; U3.5 T3 R4; H, Ch, (Eua) – humid area in floodplain forest

250. *Lamium album* L.; U3 T3 R0; H, Eua – forest-sides and on dam
 251. *Lamiastrum galeobdolon* (L.) Ehrend. & Polatschek; H (Ch), Eur (Med) - humid area in floodplain forest
 252. *Galeopsis speciosa* Mill.; U3 T2 R0; Th, Eua - humid area in floodplain forest
 253. *Stachys sylvatica* L.; U3 T2 R0; H, Eua – dark areas in floodplain forest
 254. *Stachys palustris* L.; U4 T3 R4; H, Circ – humid areas, small ponds, oxbows and swamps edge
 255. *Stachys recta* L.; U2 T5 R5; H, Pont - Med – openings in floodplain forest and on dam basis
 256. *Stachys officinalis* (L.) Trevis.; U3 T3 R0; H, Eua (Med) – forest openings
 257. *Marrubium vulgare* L.; U1 T4 R4; H, Eua - roadsides
 258. *Leonurus cardiaca* L.; U3 T3 R0; H, Med – Eur – roadsides and ruderal areas
 259. *Scutellaria galericulata* L.; U4 T3 R4; H, Eua – humid areas and rush-beds
 260. *Scutellaria hastifolia* L.; U5 T3 R3; H, Eur – humid areas in floodplain
 261. *Prunella vulgaris* L.; U3 T3 R0; H, Eua – forest-sides and openings
 262. *Ajuga reptans* L.; U3.5 T2.5 R0; H (Ch), Eur (Med) - forest-sides and openings and on dam
 263. *Ajuga genevensis* L.; U2 T3 R4; H, Eur - forest-sides and openings and on dam
 264. *Teucrium scordium* L.; U4.5 T4 R4.5; H, Eua (Med) -channels, oxbows and swamps edge

PLANTAGINACEAE

265. *Plantago tenuiflora* Waldst. & Kit.; (*Plantago minor* Fr.); H, Eua (Med) - roadsides
 266. *Plantago media* L.; U2.5 T0 R4.5; H, Eua – roadsides and along dam
 267. *Plantago lanceolata* L.; U3 T0 R0; H, Eua - roadsides and along dam

GENTIANACEAE

268. *Centaurium erythraea* Rafn; (*Centaurium minus* auct.) U3 T3 R2; Th, Euc (Med) – on dam
 269. *Centaurium pulchellum* (Sw.) Druce; U3 T3.5 R4; Th, Eua (Med) – humid areas in floodplain

MENYANTHACEAE

270. *Nymphoides peltata* (S.G.Gmel.) Kuntze; U6 T3 R4; HH, Eua (Med) – in Bezdin pond

OLEACEAE

271. *Ligustrum vulgare* L.; U2.5 T3 R3; N, Atl – Med – dry forest areas and bush
 272. *Frasinus excelsior* L.; U3 T3 R4; MM, Eur – higher areas in floodplain

RUBIACEAE

273. *Galium rubioides* L.; U2 T3 R4; H, Euc – forest opening and on dam
274. *Galium palustre* L.; U5 T3 R0; H, Circ – humid areas in floodplain and swamps
275. *Galium mollugo* L.; U3 T2.5 R3; H, Eua – in forest openings and bush
276. *Galium verum* L.; U2.5 T2.5 R0; H, Eua - in forest openings and bush
277. *Galium aparine* L.; U3 T3 R3; H, Eua – in bush and forest openings
278. *Cruciata laevipes* Opiz; (*Galium cruciata* (L.) Scop.) U2.5 T3 R3; Eua – forest openings in floodplain

CAPRIFOLIACEAE

279. *Sambucus nigra* L.; U3 T3 R3; MM – M, Eur (Med) – forest sides and on dam basis
280. *Sambucus ebulus* L.; U3 T3 R3; H, Eua (Med) - forest sides and on dam basis
281. *Viburnum opulus* L.; U4 T4 R4; M, Circ - forest sides and on dam basis
282. *Viburnum lantana* L.; U2.5 T2.5 R4; M, Euc - Med - forest sides and on dam basis

VALERIANACEAE

283. *Valeriana officinalis* L.; U2 T2 R2; H, Eua (Med) – humid areas, on dam, near Bezdin pond

DIPSACACEAE

284. *Dipsacus laciniatus* L.; U4 T3.5 R4; Th, Eua (Med) - roadsides, paths and diggings
285. *Dipsacus fullonum* L.; (*Dipsacus sylvestris* Huds.) U3.5 T3.5 R4; Th, Med (Euc) - roadsides, paths and diggings
286. *Dipsacus pilosus* L.; U4 T3.5 R4; Th, Eur – humid areas in Prundul Mare
287. *Knautia arvensis* (L.) Coult.; U2.5 T3 R0; Eur – on dam and roadsides
288. *Scabiosa ochroleuca* L.; U2 T4 R4; H, Eua (Cont) – on dam

CUCURBITACEAE

289. *Echinocystis lobata* (Michx.) Torr. & A.Gray; U4 T0 R4; Th, Adv – in parks from Mureş sides

CAMPANULACEAE

290. *Campanula trachelium* L.; U3 T3 R3; H, Eua (Med) – bush and lawns in floodplain
291. *Campanula patula* L.; U3 T2.5 R3; TH, Eur (Med) – along dam and in bush

COMPOSITAE

292. *Eupatorium cannabinum* L.; U4 T3 R3; H, Eua (Med) - near stagnant water in floodplain and in rush-bed
293. *Tussilago farfara* L.; U0 T3 R4; G (H), Eua (Med) – on dam

294. *Aster sedifolius* L.; subsp. *sedifolius*; (*Aster punctatus* Waldst. & Kit.) U4 T3 R2; H, Eua (Cont) – humid forest openings in floodplain
295. *Bellis perennis* L.; U3 T2 R0; H, Eur – in forest openings, roadsides and on dam
296. *Conyza canadensis* (L.) Cronquist; (*Lirigeron canadensis* L.) U2.5 T0 R0; Th – TH, Cosm – roadsides, paths and diggings
297. *Imula salicina* L.; U2.5 T3 R3; H, Eua (Med) – forest sides and openings in floodplain
298. *Imula britannica* L.; U3 T3 R0; TH – H, Eua – humid areas on dam basis
299. *Pulicaria vulgaris* Gaertn.; U4 T3 R3; Th, Eua – muddy areas in floodplain
300. *Pulicaria dysenterica* (L.) Bernh.; U3.5 T3 R4; H, Euc – around swamps, oxbows and channels in floodplain
301. *Bidens tripartita* L.; U4.5 T3 R0; Th, Eua (Med) – humid, swampy, muddy areas in floodplain
302. *Bidens cernuus* L.; U5 T0 R0; Th, Eua – humid areas around oxbows, channels and swamps in floodplain
303. *Carpesium cernuum* L.; U3.5 T3.5 R5; Th, Eua (Med) – dark areas in floodplain forest
304. *Filago pyramidata* L.; (*Filago germanica* Huds.) U3 T3 R0; Th, Eua (Med) – dark areas in floodplain forest
305. *Logfia arvensis* (L.) Holub; (*Filago arvensis* L.) U1 T3 R0; Th, Eua (Med) – ruderal areas
306. *Filaginella uliginosa* (L.) Opiz; (*Gnaphalium uliginosum* L.) U5 T3 R4; Th, Eua – muddy areas in floodplain
307. *Gnaphalium luteo-album* L.; U4 T3.5 R3; Th, Cosm – muddy, humid areas in floodplain
308. *Artemisia absinthium* L.; U2 T3 R4; H, Eua (Med) – in Prundul Mare area and deforested areas
309. *Artemisia vulgaris* L.; U2.5 T3 R4; H, Cir – in floodplain
310. *Artemisia pontica* L.; U2.5 T4 R4.5; H (Ch), Eua (Med) – diggings edge and deforested areas
311. *Tanacetum vulgare* L.; (*Chrysanthemum vulgare* (L.) Bernh., non (Lam.) Gaterau) U3 T3 R4; Ch, Eua (Med) – around stagnant waters in floodplain
312. *Leucanthemum vulgare* Lam.; (*Chrysanthemum leucanthemum* L.) U3 T0 R0; H, Eua – on dam
313. *Leucanthemella serotina* (L.) Tzvelev; (*Chrysanthemum serotinum* L.) U3 T0 R0; H, Pont – Pann – in willow parks and rush-beds
314. *Matricaria perforata* Mérat; (*Matricaria inodora* L.) U0 T0 R3.5; Th – TH, Eua – in deforested areas

315. *Chamomilla recutita* (L.) Rauschert; U2.5 T3.5 R5; Th, Eua – roadsides and ruderal areas
316. *Anthemis cotula* L.; U2.5 T4 R0; Th, Cosm - ruderal areas
317. *Anthemis arvensis* L.; U3 T3 R0; Th, Eur- ruderal areas
318. *Achillea millefolium* L.; U3 T0 R0; H, Cosm – on dam
319. *Senecio vulgaris* L.; U3 T3 R0; Th – TH, Eua - ruderal areas
320. *Senecio jacobaea* L.; U2.5 T3 R3; H, Eua (Med) – humid areas in floodplain forest
321. *Senecio doria* L.; U3 T0 R3.5; H, Eua – humid openings in floodplain forest
322. *Senecio paludosus* L.; U4.5 T3.5 R0; HH, Eua – oxbows, swamps and channels edge
323. *Echinops sphaerocephalus* L.; U2 T3 R3; H, Eua (Med) – forest-sides and stagnant waters edge in floodplain
324. *Cirsium vulgare* (Savi) Tcn.; U3 T3 R0; TH, Eua – ruderal areas and roadsides
325. *Cirsium brachycephalum* Jur; U4 T3 R0; TH – H, Pann – channels edge and rush-bed
326. *Cirsium canum* (L.) All.; U4.5 T3 R4.5; G, Eua (Cont) – humid lawns
327. *Carduus acanthoides* L.; U2 T3 R0; TH, Eua (Med) – roadsides, diggings and ruderal areas
328. *Carduus crispus* L.; U4 T4 R0; TH, Eua (Med) – oxbows, small ponds and channels edge
329. *Carduus nutans* L.; U1.5 T3 R3; TH, Eua (Med) – ruderal areas and roadsides
330. *Onopordum acanthium* L.; U2.5 T4 R4; TH, Eua (Med) - – ruderal areas and roadsides
331. *Arctium lappa* L.; U3.5 T3 R4; TH, Eua (Med) - ruderal areas and roadsides
332. *Arctium minus* Bernh.; U3 T3 R4.5; TH, Eua (Med) – ruderal areas and roadsides
333. *Actium tomentosum* Mill.; U3 T0 R5; TH, Eua – forest-sides in floodplain
334. *Serratula tinctoria* L.; U3.5 T3 R0; H, Eur (Med) - forest openings in floodplain
335. *Centaurea jacea* L.; U1.5 T4 R4; H, Eua – humid areas in floodplain forest
336. *Centaurea nigrescens* Willd.; U3.5 T3 R3; H, Euc - humid areas in floodplain forest
337. *Centaurea calcitrapa* L.; U1.5 T4 R0; TH (Th), Eua (Med) - roadsides
338. *Xanthium spinosum* L.; U2.5 T4 R3; Th, Cosm - ruderal areas and roadsides

339. *Xanthium strumarium* L.; U3.5 T3.5 R4; Th, Eua - ruderal areas and roadsides
340. *Lapsana communis* L.; U2.5 T3 R3; Th, Eua (Med) - forest sides in floodplain
341. *Cichorium intybus* L.; U3 T0 R3; H (TH), Eua (Med) - ruderal areas and roadsides
342. *Leontodon autumnalis* L.; U3 T0 R0; H, Eua – on dam
343. *Leontodon hispidus* L.; U2.5 T0 R0; H, Eua – in forest openings and on dam
344. *Tragopogon dubius* Scop. subsp. *major* (Jacq.) Vollm.; (*Tragopogon major* Jacq.) U2.5 T3.5 R0; Th-TH, Euc-Med – roadsides and on dam
345. *Tragopogon pratensis* L. subsp. *orientalis* (L.) Kelak.; (*Tragopogon orientalis* L.) U3 T2 R3; TH - H(G), Eua (Med) – roadsides and on dam
346. *Scorzonera cana* (C.A.Mey.) O.Hoffm.; U2 T4 R4.5; H, TH, Pont-Med - roadsides
347. *Chondrilla juncea* L.; U1.5 T3.5 R4; H, Eua - ruderal areas and roadsides
348. *Taraxacum officinale* Weber; U3 T0 R0; H, Eua – on dam, forest openings, roadsides
349. *Lactuca saligna* L.; U1.5 T4 R4; Th – TH, Euc - ruderal areas and roadsides
350. *Lactuca serriola* L.; U1.5 T3.5 R0; TH, Eua - ruderal areas and roadsides
351. *Sonchus oleraceus* L.; U3 T0 R0; Th, Eua (Med) - ruderal areas
352. *Sonchus asper* (L.) Hill; U3 T0 R0; Th, Eua (Med) - ruderal areas
353. *Sonchus arvensis* L.; U3 T0 R0; H, Eua (Med) – humid, swampy areas in floodplain and roadsides
354. *Crepis foetida* L. subsp. *rhoeadifolia* (M.Bieb.) Kelak.; (*Crepis rhoeadifolia* M.Bieb.) U2 T3.5 R3; Th, Eua – Mureş sides, roadsides
355. *Crepis setosa* Haller f. U2 T3 R3; Th, Euc - ruderal areas and roadsides
356. *Hieracium pilosella* L.; U2 T0 R2; H, Eur (Med) – forest openings in floodplain
357. *Hieracium bauhini* Schult.; U1.5 T3 R3.5; H, Eur – forest openings in floodplain

ALISMATACEAE

358. *Alisma plantago-aquatica* L.; U6 T0 R0; HH, Cosm – small ponds, oxbows and swamps
359. *Alisma lanceolatum* With.; U6 T0 R4; HH, Eua - small ponds, oxbows and swamps
360. *Sagittaria sagittifolia* L.; U6 T3 R4; HH, Eua (Med) - small ponds, oxbows and swamps

BUTOMACEAE

361. *Butomus umbellatus* L.; U6 T3 R0; HH, Eua (Med) - small ponds, oxbows and swamps

HYDROCHARITACEAE

362. *Hydrocharis morsus-ranae* L.; U6 T3.5 R3.5; HH, Eua (Med) - small ponds, oxbows and swamp
363. *Stratiotes aloides* L.; U6 T4 R4; HH, Eua - - small ponds, oxbows and swamps

POTAMOGETONACEAE

364. *Potamogeton natans* L.; U6 T2.5 R4; HH, Circ -small ponds, oxbows and swamps
365. *Potamogeton crispus* L.; U6 T3.5 R4; HH, Cosm - small ponds, oxbows and swamps
366. *Potamogeton pectinatus* L.; U6 T3 R4.5; HH, Cosm - small ponds, oxbows and swamps

NAJADACEAE

367. *Najas minor* All.; U6 T4.5 R4.5; HH, Eua - small ponds, oxbows and swamps

LILIACEAE

368. *Colchicum autumnale* L.; U3.5 T3 R4; G, Euc – in openings from Masa Tăcerii
369. *Gagea pratensis* (Pers.) Dumort.; U2 T3 R3; G, Eur – in forest openings from floodplain
370. *Allium oleraceum* L.; U3 T3 R0; G, Eur – humid areas in floodplain
371. *Allium vineale* L.; U2 T3 R4; G, Euc – on dam
372. *Allium scorodoprasum* L.; U2 T3 R4; G, Eur – on dam and in forest openings
373. *Scilla bifolia* L.; U3.5 T3 R4; G, Eur – forests in floodplain
374. *Ornithogalum umbellatum* L.; U0 T3.5 R4; G, Med - Euc – forestside and on dam
375. *Polygonatum latifolium* (Jacq.) Desf.; U3 T3.5 R4; G, Eur (Med) – forests in floodplain
376. *Polygonatum officinale* All.; U2 T3 R4; G, Eua - forests in floodplain
377. *Convallaria majalis* L.; U2.5 T3 R3; G, Eur - forests in floodplain

AMARYLLIDACEAE

378. *Galanthus nivalis* L.; U3.5 T3 R4; G, Circ - forests in floodplain

IRIDACEAE

379. *Iris pseudacorus* L.; U5.5 T0 R0; G (HH), Eur (Med) - small ponds, oxbows, water channels and deep water areas on dam basis

ORCHIDACEAE

380. *Epipactis palustris* (L.) Crantz; U4.5 T3 R4.5; G, Eua – in rush-bed

381. *Platanthera bifolia* (L.) Rich.; U3.5 T0 R3; G, Eua (Med) – humid areas in floodplain
382. *Listera ovata* (L.) R. Br.; U4 T3 R3; G, Eua (Med) – swampy, humid areas in floodplain forest
383. *Orchis laxiflora* Lam. subsp. *palustris* (Jacq.) Bonnier & Layens; (*Orchis palustris* Jacq.) U4 T3 R0; G, Pont- Pann – swampy, humid areas in floodplain forest

JUNCACEAE

384. *Juncus gerardi* Loisel.; U4.5 T3 R5; G, Circ – in rush-bed from swamps, small ponds and oxbows.
385. *Juncus bufonius* L.; U4.5 T0 R3; Th, Cosm - swampy, humid areas in floodplain

CYPERACEAE

386. *Cyperus fuscus* L.; U6 T3 R4; Th, Eua (Med) - swampy, humid areas in floodplain
387. *Cyperus flavescens* L.; U4.5 T0 R4; Th, Cosm – in oxbows, swamps and humid areas
388. *Cyperus glomeratus* L.; U5 T3 R4; HH, Eua (Med) – swamps edge, oxbows and channels in floodplain
389. *Eleocharis palustris* (L.) Roem. & Schult.; U5 T0 R4; G (HH), Cosm – small ponds, oxbows and channels edge
390. *Eleocharis acicularis* (L.) Roem. & Schult.; U5.5 T0 R0; Th, Circ – muddy areas and sandy beaches in floodplain
391. *Scirpus lacustris* L. subsp. *tabernaemontani* (C.C.Gmel.) Syme; U6 T3 R4; G (HH), Cosm – in oxbows, small ponds and swamps in floodplain and near Bezdin Monastery
392. *Scirpus lacustris* L. subsp. *lacustris*; U6 T3 R4; HH, Eua (Med) - in oxbows, small ponds and swamps in floodplain and near Bezdin Monastery
393. *Scirpus maritimus* L. subsp. *maritimus*; (*Bolboschoenus maritimus* (L.) Palla) U4.5 T3 R5; HH, Cosm – water and rush-bed edges
394. *Carex vulpina* L.; U4 T3 R4; HH – H, Eua (Med) – in deep, humid areas and around swamps in floodplain
395. *Carex muricata* L.; H, Eua (Med) – in deforested areas and forest openings in floodplain
396. *Carex praecox* Schreb.; U2 T3 R3; G, Eua – on dam
397. *Carex leporina* auct., non L.; H, Circ - forest sides and herbal forest openings in floodplain
398. *Carex remota* L. U4.5 T3 R3; H, Circ - herbal forest openings in floodplain
399. *Carex riparia* Curtis; U5 T4 R4; HH, Eua (Med)- swamps, small ponds, oxbows edges

400. *Carex vesicaria* L.; U5 T3 R4; HH(HH), Circ - swamps, diggings and deep water areas in floodplain
 401. *Carex hirta* L.; U0 T3 R0; H, Eua (Med) – deep areas and diggings in floodplain
 402. *Carex sylvatica* Huds.; U3.5 T3 R4; H, Eur (Med) – lawns in floodplain
 403. *Carex distans* L.; U4 T3 R4; H, Eua (Med) – humid areas on dam basis

GRAMINEAE

404. *Bromus hordeaceus* L. subsp. *hordeaceus*; (*Bromus mollis* L.) U0 T3 R0; Th, Eua (Med) – lawns and ruderal areas
 405. *Bromus arvensis* L.; U2.5 T3 R0; Th Eua (Med) – roadsides and on dam
 406. *Bromus inermis* Leyss.; U2.5 T4 R4; H, Eua (Med) – floodplain
 407. *Bromus tectorum* L.; U1.5 T3.5 R0; Th, Eua (Med) - ruderal areas
 408. *Vulpia myuros* (L.) C.C.Gmel.; U1 T3.5 R2; Th, Eua (Cosm) - ruderal areas
 409. *Festuca valesiaca* Schleich. ex Gaudin; U1 T5 R4; H, Eua (Cont) – on dam
 410. *Festuca pseudovina* Hack. ex Wiesb.; U2 T4 R5; H, Cosm – on dam
 411. *Festuca pratensis* Huds.; U3.5 T2 R0; H, Eua – on dam, forest sides and openings in floodplain
 412. *Festuca arundinacea* Schreb.; U4 T3 R4; H, Eua (Med) – around oxbows, channels and small ponds in floodplain
 413. *Festuca rupicola* Heuff.; U1.5 T4 R4; H, Eua – on dam and forest openings in floodplain
 414. *Glyceria maxima* (Hart.) Holm.; (*Glyceria aquatica* (L.) Whalen., none (L.) Japers & Cypress) U5 T3 R4; HH (HH), Circ – oxbows, water draining channels and swamps
 415. *Glyceria fluitans* (L.) R. Br.; U5 T3 R0; HH, Cosm - oxbows, water diggings channels and swamps
 416. *Poa annua* L.; U3.5 T0 R0; H, Eua (Med) – roadsides and on dam
 417. *Poa trivialis* L.; U4 T0 R0; H, Eua - in Mureş floodplain
 418. *Poa pratensis* L.; U3 T0 R0; H, Cosm – on dam and lawns
 419. *Dactylis glomerata* L.; U3 T0 R4; H, Eua – on dam, forest openings and roadsides
 420. *Melica altissima* L.; U2 T4 R4; H, Eua – in oak forests
 421. *Lolium perenne* L.; U3 T3 R0; H, Eua (Med) – roadside and on dam
 422. *Lolium multiflorum* Lam.; U4 T3 R4; Th - TH - H, Atl – Med – on dam
 423. *Elymus hispidus* (Opiz) Melderis; (*Agropyron intermedium* (Host) P.Beauv.) U2 T4.5 R4; G, Eua (Cont) – lawns and bush in floodplain
 424. *Elymus caninus* (L.) L.; (*Agropyron caninum* (L.) P.Beauv.) U3.5 T0 R4; H, Eua (Med) – in tunnel forests
 425. *Hordeum murinum* L.; U2.5 T4 R0; Th, Eua – on dam, roadsides and ruderal areas

426. *Phragmites australis* (Cav.) Trin. ex Steud.; U6 T0 R4; HH, Cosm – swamps, channels and oxbows edges
427. *Eragrostis pilosa* (L.) P.Beauv.; U3 T3.5 R0; Th, Euc (Med) - in Mureş floodplain
428. *Eragrostis minor* Host; U3 T4 R0; Th, Euc (Med) – in sandy areas
429. *Beckmannia eruciformis*; U4.5 T3 R4; Host. Th, Euc (Med) – swamps edge in floodplain
430. *Pholiurus pannonicus* (Host) Trin.; U0 T4 R4.5; Th, Pont-Pann-Balc - swamps edge in floodplain
431. *Holcus lanatus* L.; U3.5 T3 R0; H, Cosm - roadsides, paths and diggings edge
432. *Arrhenatherum elatius* (L.) P.Beauv. ex J.Presl & C.Presl; U3 T3 R4.5; H, Eua – roadsides and on dam
433. *Calamagrostis pseudophragmites* (Haller f.) Koeler; U5 T3 R5; H, Eua - Mureş sides
434. *Calamagrostis epigejos* (L.) Roth; U2 T3 R0; H, Eua – in bush and deep, humid areas in floodplain
435. *Agrostis canina* L.; U3.5 T3 R3; H, Cosm – low, humid areas in floodplain
436. *Agrostis stolonifera* L.; (*Agrostis alba* auct., non L.) U4 T0 R0; H, Circ - low, humid areas in floodplain
437. *Phleum pratense* L.; U3.5 T0 R0; H, Eua – on dam
438. *Alopecurus geniculatus* L.; U5 T0 R4; H, Eua – law, humid areas edge and swamps edge
439. *Crypsis schoenoides* (L.) Lam.; (*Heleochoa schoenoides* (L.) Host) U0 T4 R4.5; Th, Eua – humid areas in floodplain
440. *Crypsis alopecuroides* (Piller & Mitterp.) Schrad.; (*Heleochoa alopecuroides* (Piller & Mitterp.) Host ex Roem.) U0 T4 R4.5; Th, Eua - humid areas in floodplain
441. *Leersia oryzoides* (L.) Sw.; HH, Circ – humid areas and rush-bed
442. *Digitaria sanguinalis* (L.) Scop.; U1.5 T0 R4; Th, Cosm – roadsides and ruderal areas
443. *Typhoides arundinaceae* Mnch.; U5 T3 R0; HH, Circ – stagnant water edge

ARACEAE

444. *Arum maculatum* L.; U3.5 T3 R4; G, Euc (Med) – humid, dark areas in tunnel forest

LEMNACEAE

445. *Lemna trisulca* L.; U6 T3 R4; HH, Cosm – in oxbows, swamps, channels water
446. *Lemna minor* L.; U6 T3 R0; HH, Cosm - in oxbows, swamps, channels water

447. *Lemna gibba* L.; U3 T3 R3; HH, Cosm - in oxbows, swamps, channels water

448. *Spirodela polyrhiza* (L.) Schleid.; U6 T3.5 R0; HH, Cosm - in oxbows, swamps, channels water

449. *Wolffia arrhiza* (L.) Horkel ex Wimm.; U6 T0 R4; HH, Cosm - in oxbows, swamps, channels water

SPARGANIACEAE

450. *Sparganium erectum* L.; U6 T3 R0; HH, Eua (Med) – in rush-bed from stagnant water

TYPHACEAE

451. *Typha latifolia* L.; U6 T3.5 R0; HH, Cosm - – oxbows, small ponds, channels and stagnant waters in floodplain

452. *Typha angustifolia* L.; U6 T4 R0; G (HH), Circ – oxbows, small ponds, channels and stagnant waters in floodplain

Enumeration of the microrelief units and biocenoses (sites)

FROM THE MUREŞ FLOODPLAIN (BEZDIN'AREA)

Crt. no.	Micro-relief type	Micro-relief characteristics	Biocenosis types in the micro-relief
1	Depressions in the floodplain region	Depressions, low areas, oxbows with water and clogged. ponds, mires, mud's	Aquatic and swampy biocenosis
2	Low floodplain with depressions	Muddy genetic soil with clay texture, cubasic (highly saturated), low alkaline with a normal nitric content, lacking P and K, profound edaphic volume	Floodplain forest biocenosis
3	Phreatic low floodplain, humid and frequently flooded	Alluvial genetic soil with muddy texture, cubasic (heavily saturated), low alkaline with a normal nitric content, lacking P and K, very profound edaphic volume	Floodplain forest biocenosis
4	Low floodplain – yearly flooded in long periods	Muddy genetic soil with muddy-clay texture, cubasic (heavily saturated), poor acid-poor alkaline with high nitric content, very low P content, low K content, profound and very profound edaphic volume	Floodplain forest biocenosis

5	Low floodplain with depressions and rarely flooded	Brown clay genetic soil (typical brown clay) of clay-muddy texture, eubasic (heavily saturated), low alkaline with rich nitric content, low P and K content, profound and very profound edaphic volume	Floodplain forest biocenosis
6	High floodplain, scarcely humid phreatic, not flooded or rarely and shortly flooded	Typical brown clay soil with muddy-fluffy texture, eubasic (heavily saturated), low alkaline with rich nitric content, low P and K content, profound edaphic volume	Floodplain forest biocenosis

CLASSIFICATION OF THE PLANTS ASSOCIATIONS

1. HERBACEOUS PLANTS	1.1 Ponds	1.1.1. Floating ponds vegetation	1.1.1.1. <i>LEMNA MINOR</i> <i>UTRICULARIA VULGARIS</i> (LEMNO - UTRICULARIETUM) association
			1.1.1.2. <i>HYDROCHARIS MORSUS-RANAE</i> - <i>STRATIOTES ALOIDES</i> (HYDROCHARI - STRATIOTETUM)
		1.1.2. Fixed submerged vegetation of the ponds	1.1.2.1. <i>MYRIOPHYLLUM SPICATUM</i> - <i>POTAMOGETON NATANS</i> (MYRIOPHYLLO - POTAMOGETUM)
		1.1.3. Fixed emerged vegetation of the ponds	1.1.3.1. <i>NYMPHAEA ALBA</i> - <i>NYMPHAEA LUTEUM</i> (NYMPHAEETUM ALBO - LUTEAE)
		1.1.4. Common Reed and Bulrush	1.1.4.1. <i>SCIRPUS LACUSTRIS</i> - <i>PHIRAGMITES COMMUNIS</i> (SCIRPO - PHRAGMITETUM)
	1.2. Mires	1.2.1. Mires with Greater Pond Sedge	1.2.1.1. <i>CAREX RIPARIA</i> (CARICETUM RIPARIAE)
	1.3. Floodplain meadows	1.3.1. Humid meadows	1.3.1.1. <i>CAREX VULPINA</i> (CARICETUM VULPINEAE)
			1.3.1.2. <i>AGROSTIS ALBA</i> (AGROSTETUM ALBAE)

		1.3.2. Mesophilic meadows	1.3.2.1. <i>ARRHENATHERUM ELATIUS</i> (ARRHENATHERETUM ELATIORIS)
			1.3.2.2. <i>FESTUCA PSEUDOVIINA</i> (FESTUCETUM PSEUDOVIINAE)
		1.3.3. Xerophilic meadows	1.3.3.1. <i>FESTUCA RUPICOLA</i> - <i>BRACHYPODIUM PINNATUM</i> (FESTUCETO - BRCHYPODIETUM)
			1.3.3.2. <i>ACHILLEA MILLEFOLIUM</i> - <i>FESTUCA PSEUDOVIINA</i> (ACHILLEO - FESTUCETUM PSEUDOVIINAE)
2. WOODY PLANTS	2.1. Forests	2.1.1. Floodplain forests	2.1.1.1. <i>SALIX CINEREA</i> (SALICETUM CINEREAEE)
			2.1.1.2. <i>SALIX PURPUREA</i> (SALICETUM PURPUREAE)
			2.1.1.3. <i>SALIX TRIANDRA</i> (SALICETUM TRIANDRAE)
			2.1.1.4. <i>SALIX ALBA</i> - <i>SALIX FRAGILIS</i> (SALICETUM ALBAE - FRAGILIS)
			2.1.1.5. <i>POPULUS ALBA</i> , <i>POPULUS NIGRA</i> - <i>SALIX ALBA</i> , <i>SALIX FRAGILIS</i> (POPULETO - SALICETUM)
			2.1.1.6. <i>QUERCUS ROBUR</i> - <i>FRAXINUS ANGUSTIFOLIA</i> ssp. <i>PANNONICA</i> - <i>ULMUS LAEVIS</i> (QUERCO - ULMETUM)
			2.1.1.7. <i>ROBINIA PSEUDACACIA</i> (ROBINIETUM PSEUDACACIAE)
			2.1.1.8. <i>PRUNUS SPINOSA</i> - <i>CRATAEGUS MONOGYNA</i> (PRUNOSPINOSAE - CRATAEGETUM)

Bezdin Forest, hard wood forest and muddy floodplain with Greater Pond Sedge

The forest made of hard wood species, surrounding the dead river branch which constitutes the Bezdin Pond, is about 100 years old. The structural species is the Pedunculate Oak (*Quercus robur* +2).

Other species: *Pyrus achras*, *Ulmus laevis*, *Acer campestre*, *Carex prairie*, *Convallaria majalis*, *Cornus sanguinea*, *Inula salicina*, *Rhamnus catharticus*, *Populus alba*, *Vincetoxicum hirundinaria*, *Vitis riparia*.

On the edge of the dead river branch one may observe mixed the Sedge species and the muddy floodplain species.

Collected samples (5 × 5 m). *Salix alba* +, *Iris pseudacorus* + -2, *Alopecurus pratensis* +, *Ajuga genevensis* +, *Bidens tripartita* +, *Butomus umbellatus* +, *Carex gracilis* + -4, *Carex hirta* + -1, *Clematis integrifolia* +, *Chrysanthemum vulgare* +, *Daucus carota* +, *Eleocharis palustris* + -1, *Euphorbia palustris* +, *Lathyrus sylvestris* +, *Lythrum salicaria* +, *Lythrum virgatum* +, *Lycopus exaltatus* +, *Festuca pratensis* +, *Galium palustre* +, *Galega officinalis* +, *Glycyrrhiza echinata*, *Inula britannica* +, *Mentha aquatica* +, *Stachys palustris* +, *Senecio paludosus* +, *Alisma plantago-aquatica* +, *Scutellaria galericulata* + -1, *Sium latifolium*, *Stachys palustris* +, *Ranunculus cassubicus* +, *Ranunculus repens* +, *Symphytum officinale* +, *Lysimachia nummularia* +, *Teucrium scordium* +, *Thalictrum lucidum* +, *Xanthium spinosum* +.



Bezdin area, along the dead Mureş river branch, loess steppe with heavy grazing

Sample (25 × 25 m). *Pyrus achras* +, *Prunus spinosa* + -3, *Crataegus monogyna* + *Rosa corymbifera* +, *Agropyron repens* + -1, *Agrimonia eupatoria* +, *Achillea millefolium* +, *Achillea ochroleuca* +, *Allium vineale* +, *Artemisia*

campestris |, *Astragalus cicer* |, *Bromus inermis* + -1, *Bothriochloa ischaemum* + -2, *Dypsacus laciniatus* -, *Centaurea indurata* -, *Centaurea jacea* |, *Chrysanthemum leucanthemum* |, *Cirsium arvense* -, *Consolida regalis* -, *Convolvulus arvensis* +, *Coronilla varia* -, *Eryngium campestre* + -3, *Euphorbia cyparissias* |, *Festuca rupicola* | -3, *Fragaria collina* -, *Galium verum* |, *Knautia arvensis*, *Lathyrus tuberosus* -, *Lathyrus sylvestris* -, *Lotus angustissimus* |, *Lotus corniculatus* |, *Chamomilla recutita* |, *Medicago lupulina* -, *Medicago sativa* |, *Peucedanum alsaticum* |, *Pimpinella saxifraga* |, *Plantago media* |, *Poa angustifolia* -, *Potentilla argentea* |, *Potentilla heptaphylla* -, *Ranunculus steveni* -, *Rhinanthus angustifolius* | -1, *Salvia nemorosa* + -1, *Salvia pratensis* +, *Salvia verticillata* +, *Stachys germanica* +, *Stellaria graminea* |, *Thalictrum minus* |, *Thymus pannonicus* |, *Trifolium diffusum* +, *Odontites rubra* +, *Ononis arvensis*, *Ornithogalum pyramidale* +, *Verbascum blattaria* |, *Verbena officinalis* -, *Veronica chamaedrys* +.

Sample taken from the reed and Bulrush area along the Bezdin Monastery.

Bolboschoenus maritimus + -2, *Carex gracilis* 1-3, *Cirsium arvense* +, *Dypsacus laciniatus* + 1, *Euphorbia palustris* + -1, *Euphorbia platyphyllos* +, *Glycyrrhiza maxima* + -3, *Lycopus europeus* +, *Lythrum virgatum* + -1, *Lythrum salicaria* + -2, *Oenanthe aquatica* + -1, *Ranunculus repens* +, *Rumex pulcher* +, *Rumex crispus* -, *Salvinia natans* |, *Stachys palustris* |, *Mentha longifolia* |, *Mentha breviformis* -, *Prunella vulgaris* +, *Poa angustifolia* + -1, *Potentilla reptans* |, *Ranunculus repens* |, *Rorippa amphibia* |, *Sium latifolium* |, *Schoenoplectus tabernaemontani* + -1, *Symphytum officinale* + -1, *Xanthium spinosum* +.

On small spots we observed: *Puccinellia limosa*, *Puccinellia distans*

LEMNO – UTRICULARIETUM

Lemma minor
Lemma trisulca
Lemma gibba
Utricularia vulgaris
Salvinia natans

HYDROCHARI – STRATIOTETUM

Hydrocharis morsus-ranae
Stratiotes aloides

MYRIOPHYLLO – POTAMOGETUM

Myriophyllum spicatum
Myriophyllum verticillatum
Potamogeton natans
Potamogeton crispus
Potamogeton pectinatus
Najas minor
Hottonia palustris

NYMPHAEETUM ALBO – LUTEAE

Nymphaea alba
Nuphar lutea
Nymphoides peltata
Trapa natans

SCIRPO – PHRAGMITETUM

Scirpus lacustris
Scirpus lacustris subsp. *tabernaemontani*
Phragmites australis
Typha latifolia
Typha angustifolia
Glyceria maxima
Scirpus maritimus subsp. *maritimus*
Alisma plantago aquatica
Oenanthe aquatica
Oenanthe banatica
Iris pseudacorus
Sagittaria sagittifolia
Sparganium erectum
Iycopus europaeus

CARICETUM RIPARIAE

Carex riparia
Carex vulpina
Carex vesicaria
Equisetum palustre
Lathyrus palustris
Symphytum officinale
Agrostis stolonifera
Cirsium canum

CARICETUM VULPINEAE

Carex vulpina
Carex sylvatica
Carex remota

AGROSTIETUM ALBAE

Agrostis stolonifera
Carex vulpina
Carex riparia
Festuca pratensis

ARRHENATHERIETUM ELATIORIS

Arrhenatherium elatius
Poa pratensis
Festuca pratensis
Knautia arvensis
Leucanthemum vulgare
Campanula patula

FESTUCETUM – PSEUDOVINAE

Festuca pseudovina
Festuca pratensis
Poa pratensis
Knautia arvensis
Leucanthemum vulgare

FESTUCETO – BRACHYPODIETUM

Festuca rupicola
Brachypodium pinnatum
Lotus corniculatus
Vicia sativa
Pimpinella saxifraga
Heliotropium europaeum
Salvia pratensis
Salvia nemorosa
Stachys recta
Ajuga reptans
Veronica chamaedrys
Rhinanthus angustifolius
Capsella bursa-pastoris
Cardaria draba
Viola elatior
Bellis perennis
Leucanthemum vulgare
Lapsana communis
Cichorium intybus
Tragopogon dubius subsp. *major*
Taraxacum officinale
Primula veris

Ornithogalum umbellatum
Rumex acetosa
Bromus arvensis
Dactylis glomerata
Lolium perenne
Hordeum murinum
Phleum pratense

ACHILLEOFEFSTUCFTUM
PSEUDOVINAE

Achillea millefolium
Festuca pseudovina
Vicia sativa
Heliotropium europaeum
Salvia pratensis
Salvia nemorosa
Sambucus ebulus
Ajuga reptans
Veronica chamaedrys
Veronica prostrata
Rhinanthus angustifolius
Plantago media
Plantago lanceolata
Capsella bursa-pastoris
Cardaria draba
Lapsana communis
Cichorium intybus
Taraxacum officinale
Lychmis flos-cuculi
Saponaria officinalis
Ornithogalum umbellatum
Rumex acetosa
Bromus arvensis
Dactylis glomerata
Hordeum murinum
Phleum pratense

SALICETUM CINERFAE

Salix cinerea
Phragmites australis
Typha latifolia
Typha angustifolia
Carex riparia
Butomus umbellatus
Alisma plantago aquatica
Iris pseudacorus
Lythrum salicaria
Epilobium hirsutum
Eupatorium cannabinum
Equisetum palustre
Galium palustre

Geranium palustre
Mentha aquatica
Stachys palustris

SALICETUM PURPUREAE

Salix purpurea
Eupatorium cannabinum
Epilobium hirsutum
Galium palustre
Stachys palustris
Geranium palustre
Lythrum salicaria
Lysimachia vulgaris
Cardamine pratensis
Angelica sylvestris
Cirsium brachycephalum
Lamium maculatum
Ranunculus repens
Potentilla anserina
Trifolium hybridum

SALICETUM TRIANDRAE

Salix triandra
Salix purpurea
Salix fragilis
Salix alba
Rubus caesius
Agrostis stolonifera
Artemisia vulgaris
Tanacetum vulgare
Potentilla anserina
Lysimachia vulgaris
Saponaria officinalis
Cardamine pratensis
Angelica sylvestris
Lamium maculatum
Cirsium brachycephalum
Bidens tripartita
Urtica dioica
Symphytum officinale
Mentha aquatica
Phragmites australis

SALICETUM ALBAE – FRAGILIS

TREES LEVEL :

Salix alba
Salix fragilis
Populus nigra

B. SCRUBS LEVEL :

Salix triandra
Salix purpurea

Amorpha fruticosa
Rhamnus catharticus
Frangula alnus
Viburnum opulus
Euonymus europaeus
Euonymus verrucosus
 C. CREEPERS:
Cuscuta europaea
Rubus caesius
Echynocistis lobata
Solanum dulcamara
Clematis vitalba
Humulus lupulus
Vitis vinifera subsp. sylvestris
Parthenocissus quinquefolia
 D. HERBACEOUS PLANTS:
Agrostis stolonifera
Artemisia vulgaris
Urtica dioica
Tanacetum vulgare
Potentilla anserina
Bidens tripartita
Lysimachia vulgaris
Asarum europaeum
Chrysosplenium alternifolium

POPULETO – SALICETUM

TREES LEVEL :

Populus alba
Populus nigra
Salix alba
Salix fragilis
Alnus glutinosa

B. SCRUBS LEVEL :

Salix triandra
Salix purpurea
Rhamnus catharticus
Frangula alnus
Viburnum opulus
Viburnum lantana
Euonymus europaeus
Euonymus verrucosus
Crataegus oxyacantha
Crataegus monogyna
Corylus avellana
Cornus sanguinea
Sambucus nigra
 C. CREEPERS :
Rubus caesius
Echynocistis lobata

Solanum dulcamara
Clematis vitalba
Humulus lupulus
Vitis vinifera subsp. sylvestris
Parthenocissus quinquefolia
 D. HERBACEOUS PLANTS :

Saponaria officinalis
Cardamine pratensis
Epilobium hirsutum
Angelica sylvestris
Valeriana officinalis
Lysimachia vulgaris
Galanthus nivalis
Scilla bifolia
Asarum europaeum
Anemone nemorosa
Anemone ranunculoides
Ranunculus ficaria
Corydalis cava
Corydalis solida
Lathyrus vernus
Euphorbia cyparissias
Pulmonaria officinalis
Pulmonaria mollis
Lamium galeobdolon
Polygonatum odoratum
Polygonatum latifolium
Viola reichenbachiana
Viola elatior
Galium aparine
Stellaria holostea
Arum maculatum
Geum urbanum
Geranium robertianum
Galeopsis speciosa
Scrophularia nodosa
Dipsacus silvestris
Dipsacus pilosus
Myosotis sparsiflora
Convallaria majalis
Hypericum perforatum
Euphorbia plathyphylla
Vincetoxicum hircundinaria
Physalis alkekengi
Aristolochia clematitis

QUERCUS – ULMETUM

TREES LEVEL:

Quercus robur
Quercus cerris
Quercus pubescens

Fraxinus excelsior
Fraxinus angustifolia ssp. *pannonica*
Ulmus laevis
Acer campestre
 B. SCRUBS LEVEL:
Salix cinera
Salix triandra
Viburnum opulus
Acer tataricum
Corylus avellana
Cornus sanguinea
Crataegus oxyacantha
Crataegus monogyna
Sambucus nigra
Prunus spinosa
 C. CREEPERS:
Echynocistis lobata
Clematis vitalba
Humulus lupulus
Vitis vinifera subsp. *sylvestris*
 D. HERBACEOUS PLANTS:
Lythrum salicaria
Eupatorium cannabinum
Cardamine pratensis
Valeriana officinalis
Lysimachia vulgaris
Geranium palustre
Galium palustre
Mentha aquatica
Stachys palustris
Equisetum palustre
Galanthus nivalis
Scilla bifolia
Asarum europaeum
Anemone nemorosa
Anemona ranunculoides
Ranunculus ficaria
Corydalis cava
Corydalis solida
Lathyrus vernus
Euphorbia cyparissias
Pulmonaria officinalis
Pulmonaria mollis
Lamium galeobdolon
Convallaria majalis
Polygonatum odoratum
Polygonatum latifolium
Arum maculatum
Stellaria holostea
Galium aparine
Viola reichenbachiana

Geum urbanum
Geranium robertianum
Myosotis sparsiflora
Galeopsis speciosa
Scrophularia nodosa
Dipsacus silvestris
Dipsacus pilosus
Hypericum perforatum
Euphorbia plathyphyllia
Ficetoxicum hircundinaria
Physalis alkekengi
Aristolochia clematitis

ROBINIETUM PSEUDACACIAE
 (ROBINIETUM PSEUDACACIAE)

TREES LEVEL:
Robinia pseudacacia
Fraxinus excelsior
Quercus robur
Populus nigra
 SCRUBS LEVEL:
Salix cinerea
Sambucus ebulus
Crataegus monogyna
Prunus spinosa
Rubus caesius
 HERBACEOUS PLANTS LEVEL:
Achillea millefolium
Geum urbanum
Lysimachia nummularia
Ononis arvensis
Plantago lanceolata
Plantago media
Eryngium campestre
Euphorbia cyparissias
Geranium dissectum
Arctium lappa
Urtica dioica
Hordeum murinum
Elymus repens
Cichorium intybus
Glechoma hederacea
Lolium perenne
Ranunculus polyanthemos
Xanthium spinosum
Taraxacum officinale

PRUNO SPINOSAE – CRATAEGETUM

TREES LEVEL:
Prunus spinosa
Crataegus monogyna

Populus alba

Populus nigra

Quercus robur

Ulmus laevis

Ulmus glabra

Fraxinus excelsior

SCRUBS LEVEL:

Cornus sanguinea

Rosa canina

Rubus caesius

C. HERBACEOUS PLANTS:

Dactylis glomerata

Poa pratensis

Achillea millefolium

Daucus carota

Echinochloa crus galli

Elymus repens

Cichorium intybus

Sonchus oleraceus

Xanthium strumarium

Taraxacum officinale

Chenopodium album

Linaria vulgaris

Plantago major

Plantago media

Plantago lanceolata

Ranunculus polyanthemus

Setaria verticillata

Setaria viridis

Inula britannica

POND ASSOCIATION

LEMNETUM MINORIS (OBERD 1957) MÜLLER ET GÖRS 1966

B	G	SPECIES	1	2	3	4
Hh	Cosm	<i>Lemna minor</i>	2	4	3	2
Hh	Cosm	<i>Lemna trisulca</i>	1	+	+	1
Hh	Cosm	<i>Lemna gibba</i>	1	1	+	+
HH	Eua	<i>Salvinia natans</i>	+	+	+	+
HH	Cp	<i>Utricularia vulgaris</i>	+	+	1	1

Not fixed, floating, hydrophilic plants

Reunites the Duckweed cenosis which populate the surface of stagnant waters, 30-80 cm deep waters, frequent in the edge area of Bezdin Pond and in mires surfaces. Constitute generally mono-association cenosis, in which often enter floating individuals of other aquatic not-fixed, paludous species.

Among bioforms, the hydro-helophytes dominate, and the phytogeographic (geophytes) character of the association is divided as follows: most of the elements are cosmopolites, and the rest of the elements are Eurasian and circumpolar.

MEADOW ASSOCIATION

ARRHENATHERION ELATIORIS (Br.-Bl. 1925) W. KOCH 1926

B	G	SPECIES	1	2	3	4
H	Ec (Md)	<i>Arrhenatherium elatius</i>	3-5	1	+	1
H	Cp	<i>Poa pratensis</i>	+	+	+	+
H	Eua	<i>Festuca pratensis</i>	-	+	+	-
H	E	<i>Knautia arvensis</i>	+	-	+	-
H	Eua	<i>Chrysanthemum leucanthemum</i>	+	+	+	+

Th	E	<i>Campanula patula</i>	+1	+	+	+1
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Reunites the meadows from the humid soils of the sunny forest openings and the hay meadows from the protective dam. The separation in a particular class by J. Braun-Blanquet (1951) gets gradually justifying arguments as more and more phytocenotic studies are pursued.

The soil is rich in minerals, with a pH of 6,5-7. Is making well developed meadows, usually with three levels. From the floristic point of view, is characterized by the presence of mesophilic species, forming hay meadows with high hay production.

FOREST ASSOCIATION

RUBO-SALICION TRIANDRAE (MÜLLER ET GÖRS. 1958 em. PASSARGE 1968)

B	G	SPECIES	1	2	3	4
Ph	Eua	<i>Salix triandra</i>	1	2	1-3	2
Ph	Ec	<i>Salix purpurea</i>	+	1-2	2	1-2
Ph	Eua	<i>Salix fragilis</i>	+	+	+	+
Ph	Eua	<i>Salix alba</i>	+	+	+	+
H	Eua	<i>Rubus caesius</i>	1-3	2	2	1
H	Cp	<i>Agrostis alba</i>	+	+	+	+
H	Cp	<i>Artemisia vulgaris</i>	+	+	+	+
H	Eua (Md)	<i>Chrysanthemum vulgare</i>	+	+	+	+
H	Eua	<i>Potentilla anserina</i>	+	+	+	+
Ch	Eua	<i>Lysimachia vulgaris</i>	+	+	+	+
H	Eua	<i>Saponaria officinalis</i>	+	+	+	+
Th	Eua	<i>Cardamine pratensis</i>	+	+	+	+
H	Eu (Md)	<i>Lamium maculatum</i>	-	+	+	-
Th	Eua	<i>Bidens tripartita</i>	+	+	+	+
H	Cosm	<i>Urtica dioica</i>	+1	1	1	+
H	C	<i>Symphytum officinale</i>	+1	+1	+1	+1

This riverside coppice association is installed on developed alluvial soil, facultatively flooded. The characteristic of this association are evidenced by the quantitative ratio among the structural species, by the fact that all the cenosis of these associations present a distinct three levels differentiation.

The willow stands are installed on the water bodies edges as straps with a heterogeneous floristic composition. Hence, the association's foundation is imprinted by the Eurasian elements.

The woody species of this association are economically capitalized.

The vegetations sindynamic

The evolution and the succession of plant associations was made in close relationship with the soil and climatic factors, and with the action of natural and anthropo-zoogenic factors.

In the Bezdin Pond a specific aquatic and paludous vegetation may be found, with rare species for Arad County, as the European White Waterlily (*Nymphaea alba*), Greater Bladderwort (*Utricularia vulgaris*), Floating Watermoss (*Salvinia natans*). In the Prundul Mare area natural gallery forests with luxuriant vegetation may be found, as a last refuge of the plants characterizing the woody-steppe of the floodplain in the Mureş Plain.



Fringed Water-lily association on Bezdin Pond

The acceleration of the cogging process by accumulation and deposition on the bottom of the water body of organic matters resulted from hydrophytes decomposition (yearly deposition of 4-5mm of organic matter), as the processes of aerobic and anaerobic decomposition modify the water chemistry and insure favourable conditions for the further evolution of aquatic vegetation, which will form the emerged paludous hidato-halophilic vegetation (reeds and bulrush).

In the case of reeds, an intensification of the transpiration and photosynthesis processes is happening, which will lead to the growth of organic matters deposited on the bottom of the water body and the reduction of the water level. Hence, hydro-technic amelioration works are needed to preserve the water in ponds and oxbows. This phenomenon accelerated in the last decade, and due to this the eutrophication danger is present, in some places even the danger of

hypertrophication and consequently the danger of disturbing the biological equilibrium of the stagnant waters. These phenomena, connected with other as the water deficit due to lack of flooding and rainfalls, water pollution, water draining, deforestation etc., endanger the perpetuation of some rare, vulnerable species, for which the study area represents the unique territory from this part of the country where the primitive flora elements are preserved, typical for floodplain woody-steppes.

Studying the flora and vegetation of the Bezdin area we observed a hopeful phenomena, that a series of species appeared, which are nor endemic, but they are mountainous and sub-mountainous elements which accommodated to the living conditions existent in the area, enriching the flora of the region.

As conclusion, we can show that the various abiotic conditions (soil, humidity, light, temperature, soil reactivity, the degree of provision of nutritive elements), correlated with the variety of the micro-relief, justify the formation in the region of over 20 principal plant associations.

LIST OF RARE SPECIES

Nr. crt.	Species name	Endangering factors	Observations
1	<i>Nymphaea alba</i> - European White Waterlily Bezdin Pond	Water deficiency due to the lack of flooding. water pollution, pond eutrophication. draining	Between 1880-1890 they were found in many areas of Arad County (Ceala, Mureșul Mort). Today Bezdin Pond is the last refuge
2	<i>Nymphoides peltata</i> – Yellow Floatingheart Bezdin Pond		
3	<i>Nuphar luteum</i> - Yellow Pond-lily Bezdin Pond		
4	<i>Salvinia natans</i> – Floating Watermoss Bezdin Pond	Water deficiency due to the lack of flooding. water pollution, pond eutrophication. draining	Very rare species noted in the red book I.U.C.N.
5	<i>Senecio paludosus</i> – Ragwort Rush-beds in Bezdin Pond	Pollution. eutrophication	



The clogging and eutrophication phenomena in some parts of the Bezdin Pond

LIST OF VULNERABLE AND ENDANGERED SPECIES

Crt. no.	Species name	Biotope	Endangering factors
1	<i>Butomus umbellatus</i> - Flowering-rush	Ponds, channels, swamps	cogging, eutrophication, draining
2	<i>Epipactis palustris</i> - Marsh Helleborine	Ponds, channels, swamps	cogging, eutrophication, draining
3	<i>Euphorbia palustris</i> - Marsh Spurge	Ponds, channels, swamps	cogging, eutrophication, draining
4	<i>Lythrum salicaria</i> - Purple Loosestrife	Ponds, channels, swamps	cogging, eutrophication, draining
5	<i>Nymphaea alba</i> - White Lotus	Bezdin Pond	cogging, eutrophication, draining
6	<i>Nymphoides peltata</i> - Yellow Floatingheart	Bezdin Pond	cogging, eutrophication, draining
7	<i>Nuphar luteum</i> - Yellow Pond-lily	Bezdin Pond and channels near Bezdin Monastery	cogging, eutrophication, draining
8	<i>Platanthera bifolia</i> - Lesser Butterfly-orchid	Humid areas in floodplain	deforesting
9	<i>Potamogeton natans</i> - Floating Pondweed	Bezdin Pond and channels	cogging, eutrophication, draining
10	<i>Sagittaria sagittifolia</i> - Hawaii arrowhead	Bezdin Pond and channels	cogging, eutrophication, draining
11	<i>Salvinia natans</i> - Salvinia	Bezdin Pond	cogging, eutrophication, draining

12	<i>Stachys palustris</i> - Marsh Woundwort	Ponds, channels, swamps	cogging, eutrophication, draining
13	<i>Senecio paludosus</i> - Ragwort	Bezdin Pond	cogging, eutrophication, draining
14	<i>Utricularia vulgaris</i> - Common Bladderwort	Bezdin Pond	cogging, eutrophication, draining

*LIST OF MONTANOUS AND SUBMOUTANOUS SPECIES ACCOMMODATED
IN THE STUDY AREA*

Crt. no.	Species name	Biotope	Origin
1	<i>Anemone nemorosa</i> – Wind Flower	Flood areas in floodplain forests	Montannous element
2	<i>Anemone ranunculoides</i> – Yellow Anemone	Flood areas in floodplain forests	Montannous element
3	<i>Asarum europeum</i> – European Wild Ginger	Flood areas in floodplain forests	Mountainous element
4	<i>Chrysosplenium alternifolium</i> - Golden Saxifrage	Flood areas in floodplain forests	Mountainous element
5	<i>Cicuta virosa</i> – Water Hemlock	Rush-beds in floodplain	Mountainous element
6	<i>Colchicum autumnale</i> - Autumn Crocus	"Masa Tăccrii" forest opening edge	Mountainous element
7	<i>Corydalis cava</i> - Hollow-root	Flood areas in floodplain forests	Mountainous element
8	<i>Corydalis solida</i> – Yellow Corydalis	Flood areas in floodplain forests	Mountainous element
9	<i>Dryopteris filix-mas</i> – Male Fern	Flood areas in floodplain forests	Mountainous element
10	<i>Epilobium montanum</i> – Broad- leaved Willowherb	Flood areas in floodplain forests	Mountainous element
11	<i>Galanthus nivalis</i> – Snowdrop	Flood areas in floodplain forests	Mountainous element
12	<i>Geranium robertianum</i> - Herb Robert	Flood areas in floodplain forests	Mountainous element
13	<i>Lamium galeobdolon</i> – Yellow Archangel	Flood areas in floodplain forests	Mountainous element
14	<i>Lathraea squamaria</i> – Common Toothwort	Flood areas in floodplain forests	Mountainous element
15	<i>Oxalis acetosella</i> – Wood-sorrel	Flood areas in floodplain forests	Mountainous element
16	<i>Platanthera bifolia</i> - Lesser Butterfly-orchid flower	Flood areas in floodplain forests	Mountainous element
17	<i>Polygonatum latifolium</i> – Salomon's Seal	Flood areas in floodplain forests	Mountainous element

18	<i>Primula acaulis</i> - Common Primrose	Flood areas in floodplain forests	Mountainous element
19	<i>Primula officinalis</i> - Cowslip Flowers	Flood areas in floodplain forests	Mountainous element
20	<i>Pulmonaria officinalis</i> - Spotted Dog	Flood areas in floodplain forests	Mountainous element
21	<i>Pulmonaria mollis</i> - Common Lungwort	Flood areas in floodplain forests	Mountainous element
22	<i>Ranunculus ficaria</i> - Figwort	Flood areas in floodplain forests	Mountainous element
23	<i>Scilla bifolia</i> - Alpine Squill	Flood areas in floodplain forests	Mountainous element
24	<i>Stachys sylvatica</i> - Hedge Woundwort	Flood areas in floodplain forests	Mountainous element
25	<i>Stellaria holostea</i> - Greater Stitchwort	Flood areas in floodplain forests	Mountainous element
26	<i>Veronica orchidea</i> - Veronica-orchid	Flood areas in floodplain forests	Mountainous element
27	<i>Viola reichenbachiana</i> - Wood Violet	Flood areas in floodplain forests	Mountainous element
28	<i>Amorpha fruticosa</i> - Desert False Indigo	Floodplain, especially on Mureş River sides	element from America
29	<i>Echinocystis lobata</i> - Wild Cucumber	Parks on Mureş River sides	element from America
30	<i>Erigeron canadensis</i> - Canadian Horseweed	Roadsides, paths, diggings	element from America
31	<i>Oenothera biennis</i> - Evening-primrose	Floodplain, especially on Mureş River sides	element from America
32	<i>Populus canadensis</i> - Hybrid Black Poplar	Floodplain forests	element from America
33	<i>Robinia pseudoacacia</i> - Black Locust	Floodplain forests	element from America
34	<i>Xanthium spinosus</i> - Thorny Amaranth	Roadsides and ruderal areas	element from America

References

- Ardelean A., 2007, "Flora și vegetația județului Arad" – The flora and vegetation of Arad County Ed. Academiei Române, București.
- Ardelean A, 1999 – "Flora și vegetația din Valea Crișului Alb" – The flora and vegetation from the White Cris Valley, Vasile Goldiș University Press, ARAD.
- Ardelean A., 1977 - "Ocrotirea naturii în județul Arad" – Nature protection in Arad county, Arad
- Ardelean A., Mohan Gh., 2008 – "Flora medicinală a României" – The pharmaceutical flora of Romania, Ed. ALL, București

- Ardelean A., Mohan GH. Nedelcu G., 1997 – “Plantele medicinale din Banat” – The pharmaceutical plants of Banat, Ed. Mirton Timișoara
- Csűrös I., 1973, “Az erdélyi mezőség élővilágáról” – About the living world of Ardeal rural areas, Tud. Könyvkiadó, București.
- Heuffel J., 1858. Enumeratio plantarum in Banatu Temesiensis, Vindobonae, Typis Caroli Ueberueter.
- Hortobágyi T., Simon T., 1981. “Növényföldrajz, társulástan és ökológia” – Mapping, associations and ecology of plants, Tankönyvkiadó, Budapest.
- Moldovan I., 1973, “Trecutul și prezentul nufărului alb (*Nymphaea alba*) în județul Arad” – Past and present of the European White Waterlily (*Nymphaea alba*) in Arad county, Cunoaștere și acțiune, Arad.
- Pârvu C., 1980, “Ecosistemele din România” – Ecosystems of Romania, Ed. Ceres, București.
- Sanda V. și colect., 1983. “Caracterizarea ecologică și fitocenologică a speciilor spontane din flora României” – Ecological and phytocenological characterization of the spontaneous species of Romania's flora, Studii și comunicări 25, supliment, Muzeul Brukenthal, Sibiu.
- Simonkai, L., 1983, “Arad vármegye és Arad város flórája” – The flora of Arad city and Arad county, Monogr. Bizottság, Arad.
- Amenajamentul U.P. I BEZDIN – The forestry management plan for the 1. Bezdin production unit, Ocolul Silvic Ceala, colectiv I.C.A.S. Timișoara, 1982.