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Centuries of balance between humans and nature: a floristic study of the Milicz Ponds Reserve (SW Poland)

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Abstract. The Milicz Ponds Reserve (Stawy Milickie), located in Lower Silesia Province (southwestern Poland), is composed of 5 pond complexes, covering 53 km^2 in total. It is remarkable primarily for its bird fauna but it also harbours red-listed aquatic and wetland plants. Our field research conducted in 2011-2012 and 2021-2023 indicates that its vascular flora consists of 677 taxa (including 2 species with 2 subspecies each) from 97 families. We did not confirm the presence of additional 94 species reported in earlier studies. Rare and threatened species are predominantly found among helophytes, annual plants of moist sites, and hydrophytes, e.g. *Juncus tenegeia*, *Lemna turonifera*, *Lindernia procumbens*, *Najas minor*, *Pilularia globulifera*, *Potamogeton filiformis*, *Ranunculus baudotii*, *R. rionii*, *Samolus valerandi*, and *Scirpoides holoschoenus*. The Ruda Sułowska complex (1147 ha) is characterized by the richest flora (438 species), clearly surpassing the second-ranking Stawno complex (385 species), although the latter is over twice as large (2404 ha). The former complex contains more ponds, particularly small ones, covering 0.05-5.00 ha each. This suggests that, beside area, pond number is just as important as a factor influencing biodiversity. A similar pattern was also observed in the case of the smallest complexes, Jamnik and Potasznia (312 vs 319 ha, respectively), with the latter having a significantly higher number of ponds (6 vs 54), which also resulted in its much richer flora (218 vs 257 species), especially in respect of macrophytes (58 vs 93) and amphiphytes (51 vs 80). A larger number of ponds within a complex results in a longer shoreline and development of the associated ecotone habitats. Moreover, smaller ponds are also usually shallower and more susceptible to water level fluctuations, leading to the formation of silty habitats.

Key words: nature reserve, vascular plants, rare species, protected species, red-listed species, macrophytes, fishpond, Milicz Ponds, Poland

1. Introduction

The Barycz River, a 136-km-long right-bank tributary of the Oder with a 5547-km^2 catchment area, originates in the marshy Milicz Basin and flows through a shallow-gradient (c. 0.035%) marshy valley (Tokarczyk-Dorociak *et al.* 2016). Its name derives from the Slavic word bara, which means a swamp, bog or another waterlogged area. Within this valley lie the Milicz Ponds (Stawy Milickie), Europe's largest fishpond complex, covering 7500 hectares and encompassing c. 300 diverse water bodies. This area is a treasure trove of biodiversity and an important part of the region's cultural heritage.

Cistercian monks created the first ponds there in the 13th century. The most significant period of pond

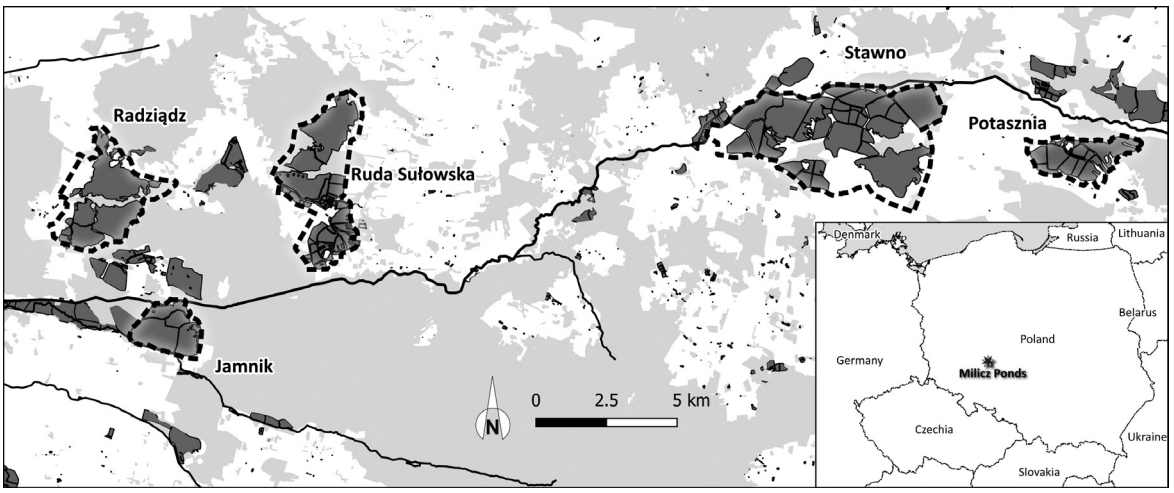

Fig. 1. Location and map of the Milicz Ponds Reserve
Explanations: dark grey – ponds, light grey – forests

development began in the early 16th century and lasted until the 19th century. At its peak in the second half of the 18th century, the ponds covered an area nearly twice as large as it is today (Lamparska *et al.* 2008). Traditional fishery management has been continued there for centuries, mainly carp breeding and farming. Dams and canal systems were constructed to optimize conditions for aquaculture, as a result of numerous modifications of natural water bodies, including old riverbeds, wet meadows, and marshes formed by glacial processes (Bohdanowicz n.d.). Some ponds were created in depressions left by the extraction of bog iron ore, which was historically used for iron smelting and as a building material. Centuries of such land use have shaped a unique landscape – a mosaic of ponds, dykes, forests, meadows, and wetlands. In this instance, human activity has directly contributed to the formation of natural features.

Five complexes of the ponds have been designated as a nature reserve, known as the Milicz Ponds Reserve (Fig. 1). It was established in 1973 (Ordinance of the Ministry... 1973) to protect its rich bird fauna. The reserve is a natural habitat for 137 breeding bird species, including many rare ones, and is a critical stopover site for over 50. It covers a vast area of 53 km^2, with ponds accounting for 67% of the total surface; the remaining land consists of forests and levees, interspersed with small patches of meadows and wastelands (Table 1).

Table 1. Ecological characteristics and plant diversity of 5 pond complexes in the Milicz Ponds Reserve

Characteristics		Pond complex				
		Jamnik	Potasznia	Radziądz	Stawno	Ruda Sułowska
Area [ha]	total	362	449	940	2404	1147
	ponds	312	319	563	1505	871
	forests	21	5	190	147	176
	remaining	29	126	187	752	100
Number of ponds in size classes	total	6	54	25	37	89
	<5.00 ha	1	44	16	8	66
	5.00-9.99 ha	1	1	4	1	5
	>9.99 ha	4	9	5	28	18
Number of taxa in selected groups	total species	242	289	389	456	507
	families	53	59	75	72	84
	alien species	50	63	82	89	90
	macrophyte species	53	69	86	76	116
	amphiphyte species	10	10	20	16	27
Number of red-listed species	total	68	72	106	116	137
	Europe	48	55	76	92	107
	Poland	15	20	30	22	30
	Lower Silesia	26	30	40	38	49
	Wielkopolska	17	21	30	26	33

The 5 complexes include 211 ponds that spread across the Barycz Valley, from the Żmigród Basin (Radziądz, Jamnik, and Ruda Sułowska complexes) to the Milicz Basin (Stawno and Potasznia complexes), all within the broader Milicz-Głogów Depression macroregion (Fig. 1) (Kondracki 2002). The reserve is located in the Milicz and Żmigród communes in the Lower Silesia Province and its conservation plan includes various commitments and restrictions related to fish farming. The implementation and maintenance of extensive management practices, even when not always cost-effective, are crucial for preserving the biodiversity of this area of high conservation value (Tokarczyk-Dorociak *et al.* 2016).

The largest ponds are Stary (300 ha, in the Radziądz complex), Mewi Duży (284 ha, in the Ruda Sułowska complex), and Grabownica (283 ha, in the Stawno complex). The production cycle of Milicz carp lasts 3 years and encompasses 5 stages: spawning, rearing carp fry, growth and wintering of autumn fry, table fish farming, and harvesting (Tokarczyk-Dorociak *et al.* 2016). Ponds are regularly tended (water discharge, draining and bottom ploughing, liming, and recharging).

The importance of the Barycz Valley and the Milicz Ponds as a biodiversity hotspot is also evidenced by other forms of protection afforded to this area. The Milicz Ponds are included in the Ramsar Convention's list of protected areas (Ramsar Convention on Wetlands n.d.) and the Living Lakes Network of unique aquatic habitats worldwide (Global Nature Fund n.d.). Additionally, within the Natura 2000 Network they are classified as the Special Protected Area "Barycz Valley" (Polish: "Dolina Baryczy"; PLB020001) and the Special Area of Conservation "Refuge on the Barycz River" (Polish: "Ostoja nad Baryczą"; PLH020041). Since 1996, the Milicz Ponds have also been a constituent of a larger protected area, the Barycz Valley Landscape Park. The Milicz Ponds have recently been included on the list of proposed national parks (Klub 2023).

Since their inception, fish farming in the ponds of the Barycz Valley has relied on natural and extensive methods, driven largely by the area's physiographic conditions. The expansive size of the ponds and the fertile land provided sufficient natural nutrients to support desired production levels without significant external input. The economic crisis in Poland in the late 20th century seems to be a fortunate coincidence, as it could have hindered investments intended to intensify fish farming in this region. Instead, fishermen relied on their deep understanding of natural processes, utilizing the environment's inherent potential. The Milicz Ponds exemplify a harmonious balance between economic activities – like fish farming – and environmental protection. This synergy has been achieved by adopting extensive fish-farming practices promoting biodiversity conservation.

In Poland, man-made water bodies play an important role in the natural landscape. They operate within semi-natural settings or are found in areas affected by different human activities, such as farming or urban-industrial development. These factors influence the limnic processes in lentic waters, such as water circulation, fluctuations in water level, thermal processes, oxygen availability, and changes in water quality (Rzętała 2021). Due to the absence of major industrial activities and the sparse population in the catchment area of the Barycz River, the ponds benefit from good water quality. Nevertheless, the natural environment is susceptible to changes caused by various factors, including human activity. Eutrophication is the primary threat to aquatic ecosystems, often due to intensive farming (Carpenter *et al.* 1998). A significant load of nutrients discharged to the environment leads to ecological consequences, manifested in flora (Kostrowicki & Wójcik 1972; Edvardsen & Økland 2006; Roo-Zielińska *et al.* 2007). The quality and amount of supplied water change the character of the habitat and affect the chances of survival of related species. Aquatic flora is highly responsive to environmental changes, and particularly the stenotopic species (adapted to a narrow range of environmental conditions) are considered to be the most threatened (Stanners & Bourdeau 1995). Freshwater habitats are among global biodiversity's most diverse yet threatened components (Dudgeon *et al*. 2006; Sala & Jackson 2006). The accumulation of macrophytes and tree cover along pond dikes can significantly deteriorate oxygen conditions, which may have practical implications for fish farming management (Jawecki *et al*. 2013).

This study aimed to (1) assess the floristic composition of the Milicz Ponds Reserve; (2) analyse its diversity; (3) compare the findings with earlier botanical studies conducted in the area, and (4) investigate how the structure of individual complexes might influence their floristic composition.

2. Materials and methods

Field research was conducted in 2011-2012 and 2021-2023. Data were collected from ponds (both filled with water and drained), levees, pond edges, and adjacent habitats, such as forests and meadows. A separate floristic list was compiled for each of the 5 examined pond complexes. Within each complex, we also considered features such as the number of ponds, pond size distribution, and the proportion of forested and non-forested areas. The above information was extracted from OpenStreetMap data (OpenStreetMap contributors 2024) accessible under the Open Database License (ODbL). The analyses and maps were generated using QGIS ver. 3.28.1 (QGIS Development Team 2023). However, we did not measure the physicochemical

properties of water and did not compile species lists for individual ponds.

We used slightly modified Raunkiaer's (1934) classification of plant life forms: phanerophytes subdivided into megaphanerophytes (M, i.e. trees) and nanophanerophytes (N, i.e. shrubs); chamaephytes (Ch); hemicryptophytes (H) of dry areas (Hd), moist areas (Hm) or transitional ones (Hd/m); cryptophytes subdivided into geophytes (G), helophytes (Hel), non-rooted hydrophytes = pleustophytes (Hy-1, floating on the water surface or in the pelagic zone), and rooted hydrophytes = rhizophytes (Hy-2, rooted or anchored in the substrate); and therophytes (T), i.e. annual plants on dry (Td), moist (Tm) or transitional sites (Td/m). Parasites and hemiparasites are additionally marked as "pp", while climbers as "li".

We define macrophytes as plants that include helophytes, pleustophytes, rhizophytes, and amphiphytes. The term "amphiphyte" is somewhat ambiguous, generally referring to plants that can thrive in both terrestrial and aquatic (or semi-aquatic) habitats, often occurring in zones with highly fluctuating water levels. In Raunkiaer's classification, they primarily correspond to Td/m and Hd/m, although some hydrophytes (Hy) and helophytes (Hel) can also be classified as amphiphytes.

For each taxon, its geo-historical spectrum is given (Rutkowski 1998; Czarna 2009), abbreviated as: Sn (spontaneophyte) – native, occurring naturally in a given area without human influence, Ap (apophyte) – native but expanding its range or abundance due to human activity, although not directly introduced by humans; Ar (archaeophyte) – alien, introduced before the year 1500, typically through early agricultural or trade activities; Kn (kenophyte) – alien, introduced after 1500, usually as a result of modern globalization; D (diaphyte) – introduced but not fully naturalized, often occurring temporarily; × (synanthropic hybrid) – a hybrid that has arisen due to human influence, typically between native and non-native species or between cultivated and wild plants.

3. Results

Based on field research conducted in this study, we recorded 677 taxa of vascular plants from 97 families. Taking into account also previous floristic data (Anioł-Kwiatkowska *et al.* 1995), we compiled a comprehensive list of 771 plant species recorded to date in the Milicz Ponds Reserve (Supplementary Material I). They include 18 hybrid species and 2 species represented by 2 subspecies each. They belong to 104 families, and the most numerously represented are the Asteraceae (82 species, 10.7% of the total), Poaceae (74, 9.6%), Rosaceae (43, 5.6%), Cyperaceae (42, 5.5%), Brassicaceae (34, 4.4%), Caryophyllaceae (32, 4.2%), Fabaceae (31, 4.0%), Scrophulariaceae (28, 3.6%), Apiaceae (27, 3.5%), Lamiaceae and Polygonaceae (26, 3.4% each), Ranunculaceae (22, 2.9%) Salicaceae (17, 2.2%), and Juncaceae (15, 2.0%). More than half of families (54) are represented by only 1-2 species.

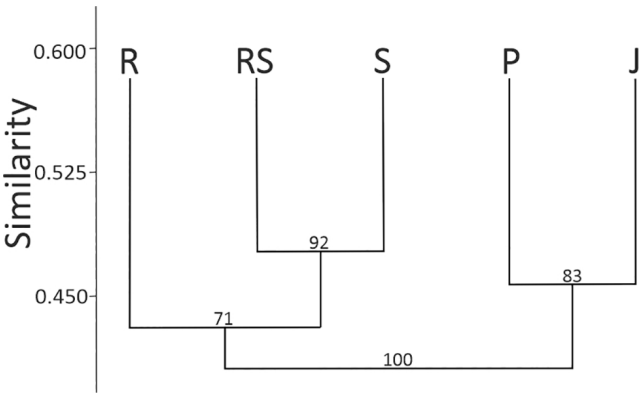

Fig. 2. UPGMA dendrogram based on the Jaccard similarity index (presence/absence data), illustrating floristic similarity among the 5 pond complexes in the Milicz Ponds Reserve

Explanations: J – Jamnik, P – Potasznia, R – Radziądz, RS – Ruda Sułowska, S – Stawno

The greatest number of species was recorded in the Ruda Sułowska complex (507 species), while the lowest was in the Jamnik complex (242 species) (Table 1). Floristically, the Ruda Sułowska and Stawno pond complexes are most similar to each other, characterized by the highest number of species. The Radziądz complex is grouped with them, while the Jamnik and Potasznia complexes, with the lowest numbers of species, form a separate group (Fig. 2). Comparing the floristic composition of these complexes, we can observe that the greatest differences between them concern not only the sheer number of species, but primarily of the species unique to a given complex (Fig. 3). The Jamnik and Potasznia complexes, the poorest in terms of flora, exhibit the smallest representation of the rarest taxa, and are predominated by the most frequently occurring ones (Fig. 4).

A comprehensive list of macrophytes among the recorded taxa (Supplementary Material I) highlights the species used in aquatic ecosystem assessment systems, such as the River Habitat Survey (RHS) method. Changes in macrophyte structure (e.g. the decline of sensitive species or the proliferation of invasive species) can indicate ecosystem degradation, climate change, or the impact of human activities. In the Milicz Ponds Reserve, macrophytes form a significant group, comprising 141 species. The proportion of macrophytes in the flora of the individual pond complexes is similar, ranging from 17.3% (Stawno, 79 species) to 20.1% (Ruda Sułowska, 102 species), but the Jamnik complex has the lowest number of macrophyte species (53) (Table 1).

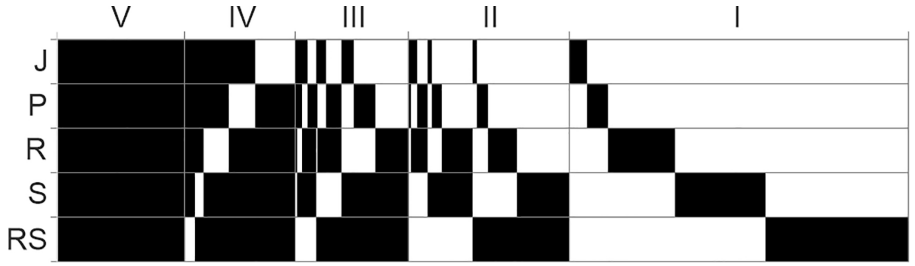

Fig. 3. A matrix plot showing the presence (black) or absence (white) of species in individual pond complexes; J – Jamnik, P – Potasznia, R – Radziądz, RS – Ruda Sułowska, and S – Stawno. Species are grouped into 5 frequency classes (columns), ranging from those recorded in only one pond complex (I), through those occurring in 2 (II), 3 (III) or 4 complexes (IV), to species present in all 5 pond complexes (V) in the Milicz Ponds Reserve

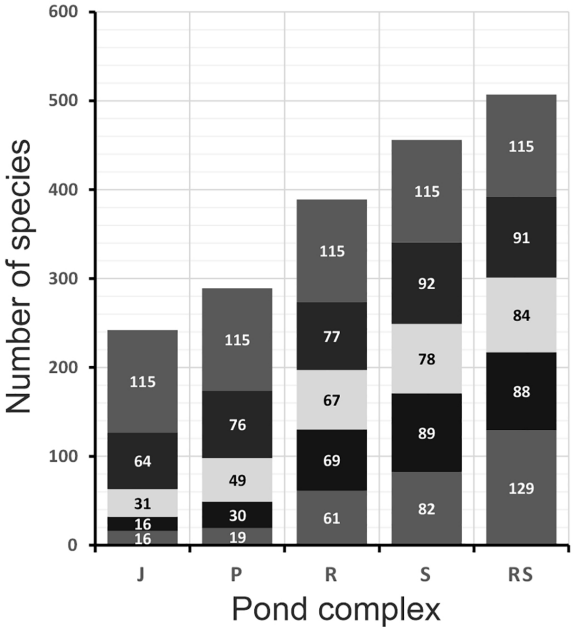

Fig. 4. Number of species in 5 frequency classes within the floras of individual pond complexes: from species occurring in only one complex (bottom), through those present in 2, 3, and 4 complexes (middle), to species found in all 5 complexes (top) in the Milicz Ponds Reserve

Explanations: J – Jamnik, P – Potasznia, R – Radziądz, RS – Ruda Sułowska, S – Stawno

A total of 36 species are classified as amphiphytes; their proportion in individual pond complexes ranges from 3.5% (Potasznia, 10 species) to 5.3% (Ruda Sułowska, 27 species).

In terms of life forms, hemicryptophytes prevail (40.9%), followed by therophytes (25.4%), cryptophytes (15.2%), phanerophytes (11.9%), hydrophytes (5.2%), and chamaephytes (1.4%). Among species associated with wet or moist habitats (constituting 29.4% of the total flora), helophytes dominate (30.0%), followed by hemicryptophytes (25.6%), hydrophytes (17.6%), and therophytes (10.6%).

Due to the anthropogenic nature of the ponds, the recorded plant species are of various origin (Table 1; Supplementary Material I). They are primarily native (spontaneophytes and apophytes) but alien species account for about 19.6% of the flora of the reserve. The proportion of alien species in the flora of individual complexes was similar, ranging from 17.8% (Ruda Sułowska) to 21.8% (Potasznia). Although native species dominate among macrophytes, 10 species (7.1%) are of alien origin.

Red-listed species are important indicators of ecosystem health and play a key role in the protection of natural resources. The flora of the reserve includes 204 species that appear on at least one red list (Table 1; Supplementary Material II). The proportion of red-listed species remains similar across the various pond complexes (25-28%), reflecting their total species richness. We analysed the conservation status of species found in the reserve at several administrative levels: Lower Silesia Province (Kącki *et al.* 2007), Wielkopolska region (Jackowiak *et al.* 2007), Poland (Kaźmierczakowa & Zarzycki 2001; Zarzycki & Szeląg 2006; Kaźmierczakowa *et al.* 2016), and Europe (Bilz *et al.* 2011). Among the species listed in the Red Lists for Poland (Zarzycki & Szeląg 2006; Kaźmierczakowa *et al.* 2016), our findings document the decline of 5 taxa classified as critically endangered (CR): Crassula aquatica, Pilularia globulifera, Ranunculus peltatus, R. baudotii, and Samolus valerandi. Additionally, one taxon is classified as declining beyond its main area of occurrence (E), while 24 taxa are vulnerable (VU), one is vulnerable beyond its range (V), and one is rare (R). According to the Polish Red Book (Kaźmierczakowa *et al.* 2001), the reserve also harbours 4 species regarded as critically endangered: *Najas minor*, *Pilularia globulifera*, *Potamogeton filiformis*, and *Ranunculus baudotii*; 5 endangered species: *Elatine hydropiper, E. triandra, E. hexandra, Lindernia procumbens*, and *Lythrum hyssopifolium*; and a vulnerable one, *Nymphoides peltata*. Notably, macrophytes predominate in the group of rare and threatened species occurring in the study area. When analysing life forms among the rare and declining species, we found that in Lower Silesia and Wielkopolska, as well as in Poland as a whole, the most numerous were therophytes of moist sites (18, 13,

and 9 species, respectively), and helophytes (10, 13, and 5 species, respectively). Referring to the European red list, the largest groups in the study area were helophytes (51 species) and hydrophytes (33 species).

In the reserve, 26 species are under legal protection (Ordinance of the Ministry... 2014). Among them, 13 are strictly protected (macrophytes distinguished by asterisks): *Coleanthus subtilis**, *Crassula aquatica**, *Lindernia procumbens**, *Lythrum hyssopifolia**, *Najas minor**, *Nymphoides peltata**, *Osmunda regalis*, *Ophioglossum vulgatum*, *Pilularia globulifera**, *Ranunculus baudotii**, *Salvinia natans**, *Samolus valerandi**, and *Utricularia australis**; and 13 are partly protected: *Centaurium erythraea*, *C. pulchellum*, *Dactylorhiza incarnata*, *D. majalis*, *Elatine hexandra**, *E. hydropiper**, *E. triandra**, *Epipactis helleborine*, *Listera ovata*, *Lycopodium clavatum*, *Nymphaea alba**, *Platanthera chlorantha*, and *Ranunculus trichophyllus**. These include 19 spontaneophytes, 2 apophytes, and a supposed kenophyte, *Coleanthus subtilis*. Among them, 15 species are macrophytes, accounting for 58% of protected species in the reserve. In terms of life forms among protected species, hydrophytes are the most numerous (12 species), followed by geophytes (6) and therophytes of transitional habitats (3).

4. Discussion

The biodiversity of pond complexes contributes substantially to ecological functioning at the regional scale by maintaining habitat continuity and supporting ecological networks (Broyer & Curtet 2012; Gołdyn *et al.* 2012). Owing to their high environmental heterogeneity, small size, and dense spatial arrangement, ponds form an exceptional natural laboratory for examining the key ecological processes (De Meester *et al.* 2005). The plant diversity of ponds is comparable to that of larger wetlands (Bosiacka & Pieńkowski 2012). However, many authors (Oertli *et al.* 2002; Biggs *et al.* 2005; Davies *et al.* 2008; Neill *et al.* 2009) have observed that the flora of ponds is frequently much richer and more valuable in terms of rare and uncommon species. This apparent disparity, where smaller aquatic systems hold greater botanical richness, likely stems from several key ecological factors (e.g. pond size distribution, density across the landscape, catchment area, connectivity with other wetland areas, water purity, and avifauna) as well as management factors (e.g. the type and intensity of fishery management, and forms of nature conservation).

The analysis of the study complexes provides empirical support for the influence of pond structure on biodiversity. The Ruda Sułowska complex prevails in terms of floristic richness over the second-richest Stawno complex (507 vs 456 species, respectively), even though the ponds in the latter cover a significantly larger area (1505 vs. 871 hectares), and its total area is over twice as large (Table 1). However, the Ruda Sułowska complex surpasses the Stawno complex in terms of the number of ponds (89 vs 37). This pattern is further confirmed by comparing the 2 smallest complexes, Jamnik and Potasznia, which have very similar pond areas (312 vs 319 ha). The Potasznia complex has a significantly higher number of ponds (54 vs 6), which consequently results in its richer flora (289 vs 242 species) and higher number of macrophytes (69 vs 53). These findings demonstrate that floristic richness is not solely influenced by the total surface area of the complex, but that the number of ponds is equally important, particularly with respect to those in the 0.05-5 ha size class (Table 1).

A plausible explanation for the greater number of macrophytes seems to be the longer cumulative shoreline. The perimeter of multiple small ponds significantly exceeds that of a single large pond of equivalent area, so small ponds provide an expanded ecotone zone for marginal and aquatic vegetation. In the case of amphiphytes (plants adapted to both aquatic and terrestrial environments), it can be assumed that smaller ponds are also shallower, making them more susceptible to natural water level fluctuations and drying out. The frequent transition between aquatic, semi-aquatic, and terrestrial zones offers a broader range of ecological niches within a limited area, accommodating diverse plant communities. This intermediate disturbance regime promotes the germination of seed bank species, which are often rare, thereby preventing competitive exclusion by dominant perennial species. However, the findings also reinforce the need for a holistic conservation strategy. While the density of small ponds drives overall species numbers, studies on pond biodiversity demonstrate the need to protect both large and small water bodies because large ponds can harbour unique species missing from the smaller ponds (Oertli *et al.* 2002; Williams *et al.* 2004; Bosiacka & Pieńkowski 2012).

Although our research did not directly compare the flora of drained and undrained ponds, we recorded particularly high species richness of amphiphytes in recently drained ponds during our field surveys. Periodic pond drainage is a key human activity in traditional pond management. Annual (natural or controlled) fluctuations in water levels can significantly impact the composition of plant species, particularly during the growing season. It can be expected that a prolonged lowering of the water level will gradually eliminate free-floating species while favouring species rooted in the substrate. Management practices exert a profound influence on these processes. Conversely, complexes with a higher proportion of undrained ponds are dominated by a greater prevalence of macrophyte species. This aligns with the findings of Keddy and Reznicek (1986), who observed that in ponds left drained for extended periods or untended,

amphiphytes are gradually replaced by hydrophytes. Furthermore, a lack of active management or prolonged drainage can destabilize the ecosystem. In the long term, this can further lead to the proliferation of perennial emergent and meadow vegetation, ultimately resulting in terrestrialization, i.e. ecological succession towards a terrestrial habitat (Waldon 2012).

Aquatic and wetland habitats are often spatially isolated, functionally resembling islands. In these systems, water circulation acts as a vector, redistributing seeds and vegetative fragments both within and between ponds (hydrochory). These ecological corridors increase the effective habitat size and support ecological recovery by promoting recruitment and recolonization of degraded areas (Nicolet *et al.* 2004; Biggs *et al.* 2005). Beyond the influence of groundwater flow (hydrological connectivity), also migrating organisms (such as waterbirds) are a crucial component of biotic connectivity. While water circulation strengthens internal connectivity (within a catchment), daily movements and seasonal migrations of waterfowl are the primary drivers of external connectivity (between catchments and distant regions). Waterbirds are now recognized as key vectors of long-distance dispersal for a wide spectrum of aquatic and semi-aquatic plants, transporting seeds and vegetative propagules internally, via the digestive tract (endozoochory), or externally, as they can adhere to their feathers, feet or bills (epizoochory) (e.g. Coughlan *et al.* 2015; Soons *et al.* 2016; Lovas-Kiss *et al.* 2020; van Leeuwen 2022; Green *et al.* 2023). Animals play also a major role in moving diaspores between different types of aquatic habitats (fishponds, oxbow lakes, rivers, floodplains) and between terrestrial and aquatic habitats, effectively connecting otherwise isolated local populations of aquatic plants (Green *et al.* 2023). This avian vector thereby supports metapopulation dynamics and promotes genetic exchange across fragmented aquatic landscapes (Amezaga *et al.* 2002).

However, ornithochory also poses a significant biosecurity threat. The introduction of diaspores of new plant species may inadvertently facilitate the establishment of potentially invasive taxa (e.g. Welling *et al.* 1988; Schneider 1994; Anioł-Kwiatkowska *et al.* 1995; Neill *et al.* 2009; Coughlan *et al.* 2015). In effect, many water bodies have been colonized by aquatic plants originating from distant geographical regions (Alexander & D'Antonio 2003). This is particularly true for areas where management cessation or prolonged drainage has resulted in reduced interspecific competition from native plants, such as in temporarily dewatered pond bottoms. Moreover, alterations of hydrological conditions (e.g. prolonged periods of drying or water-level fluctuations) may trigger invasive behaviour in alien plant species already present within a wetland ecosystem. Such shifts in water availability can modify interspecific competition, nutrient dynamics, and regeneration niches, thereby favouring opportunistic alien taxa over native vegetation. The establishment and spread of non-native species can be particularly disruptive in wetland ecosystems, where ecological functioning and the delivery of ecosystem services depend on delicate hydrological and biogeochemical processes (Howard 1999). Numerous studies have shown that wetlands are among the ecosystems most vulnerable to invasions, so they are often disproportionately strongly affected, as compared to terrestrial habitats. Invasive plants can alter nutrient cycling, suppress native macrophytes, modify soil oxygen regimes, reduce habitat heterogeneity, and disrupt trophic interactions (Zedler & Kercher 2004; Strayer 2010; Vilà *et al.* 2011). These findings underscore the need to consider hydrological stability and water-level management as crucial components of conservation strategies aimed at preventing the spread of invasive species in wetland reserves. Consequently, this risk must be carefully considered and integrated into strategic management plans for wetland conservation.

Within the study area, several non-native plant species associated specifically with wetland habitats have been recorded. The majority of them are already naturalized in Europe. Some spread primarily along watercourses (*Echinocystis lobata*, *Reynoutria japonica*, *Rudbeckia laciniata*, and *Helianthus tuberosus*), while others prefer standing waters and occur along the margins of ponds and other water bodies (e.g. *Acorus calamus*, *Bidens connata*, *B. frondosa*, and *B. radiata*), or as submerged or floating plants (e.g. *Elodea canadensis*, *Lemna minuta*, and *L. turionifera*).

Particular attention should be given to species that appear to be in early stages of colonization, as such taxa may expand their distribution in the near future and therefore warrant systematic monitoring. An illustrative example is the red-listed *Coleanthus subtilis*, whose primary distribution centre is located in North America (Catling 2009). In Europe, this species has been documented in various scattered locations within its central and northern regions, spanning across 7 countries (Tutin 1980). The species was initially discovered within the study area in 2008, specifically in the Stawno complex (Dajdok 2009). Subsequent studies by Czarna *et al.* (2013) identified additional localities within the Ruda Sułowska complex, which is located approximately 16 km from the original site. The appearance of this species in new localities is likely associated with water discharge and the creation of suitable ecological niches. These newly identified localities, along with the locality in Borowo near Wrocław (Fabiszewski & Cebrat 2003), indicate that this species continues to colonize drained ponds in Poland. Fishery management plays a pivotal role in the conservation of species associated with temporarily exposed pond

bottoms, as it facilitates the development of drawdown vegetation on muddy substrates. This was clearly demonstrated in 2021, when vegetation with *Coleanthus subtilis* failed to develop in the Ruda Sułowska and Stawno pond complexes because these sites remained continuously inundated throughout the entire growing season (Leśniański *et al.* 2022). A similar pattern of expansion has been observed in another primarily North American species, *Veronica peregrina*, which has already become established in Poland (Pogan 1961; Zając & Zając 2001). This observation also holds true within the Milicz Ponds Reserve, where *V. peregrina* has been discovered in all 5 pond complexes, consistently forming large patches in drained ponds or along their exposed edges. The first record of its presence in Poland dates back to 1990 (Zając & Zając 1990). Currently, *V. peregrina* is classified as a kenophyte (Zając *et al.* 1998) and is even considered to be an invasive plant in wetland ecosystems (Kącki & Dajdok 2009). Another amphiphyte, *Veronica anagalloides*, was recorded in all pond complexes. The taxonomic status of this species within the Polish flora has long been uncertain, and it is not listed in the most recent edition of *Flora Europaea* (Walters & Webb 2010). Zając and Zając (1990) highlighted the need for a taxonomic revision of Polish specimens. Nevertheless, the species was recorded in central Wielkopolska by Pogan (1961), and its occurrence in Poland was subsequently accepted by Mirek *et al*. (2002).

During our field research, we confirmed the presence of 432 species previously reported from this area (Anioł-Kwiatkowska *et al.* 1995), but we also recorded 245 taxa new to the area, and failed to confirm the presence of 94 species previously mentioned in this location (Supplementary Material I). These new records include 52 macrophytes (37% of all macrophyte species). Furthermore, 42 of these newly recorded macrophytes are classified as rare or threatened. Among the newly recorded species, as many as 94 are red-listed.

How can the considerable discrepancy between previous and current research be explained? First, the research method employed did not include comprehensive observational surveys at every site, suggesting that some species, particularly rare ones, may have been overlooked. More intensive and thorough fieldwork would likely confirm their presence. Second, the boundaries of the study areas may have been defined somewhat differently in each case, potentially affecting the results. Third, our study focused primarily on wet habitats, which may partially account for the absence of several relatively common forest and meadow species, as well as others adapted to drier conditions. Fourth, in the case of amphiphytes, many species were presumably not recorded during the 1991 surveys (Anioł-Kwiatkowska *et al.* 1995) because drainage cycles were not implemented at that time (or were used only to a limited extent), thereby reducing the occurrence of temporarily exposed habitats essential for their detection. Finally, with regard to the rarer species, their local extinction cannot be ruled out. Aquatic ecosystems, especially fishponds, remain vulnerable to human activities, even within protected areas.

Overall, the Milicz Ponds constitute a vital node within a broader network of aquatic habitats, enhancing the stability and resilience of plant and animal metapopulations across a functionally integrated wetland landscape. The long-term conservation of their biodiversity depends critically on maintaining appropriate hydrological conditions, safeguarding water quality, and mitigating pressures arising from land-use change, pollution, and invasive species. In this context, systematic monitoring, adaptive management, and continued scientific research remain essential to securing the ecological integrity of this exceptional wetland complex.

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Supplementary Material I

List of vascular plants recorded in the Milicz Ponds reserve

Explanations
The order of the description is as follows (in brackets): life-form, geo-historical category, and, after the bullet point (•), occurrence in specific pond complexes. Species marked with an asterisk (*) were not previously recorded in this area (Anioł-Kwiatkowska *et al.* 1995), while those marked with a cross (†) had been reported, but their presence was not confirmed by us during field observations.
Life forms: phanerophytes, subdivided into megaphanerophytes (**M**, i.e., trees) and nanophanerophytes (**N**, i.e., shrubs), chamaephytes (**Ch**), hemicryptophytes (**H**) in dry areas (**Hd**), moist areas (**Hm**), or transitional (**Hd/m**), cryptophytes, subdivided into geophytes (**G**), helophytes (**Hel**), non-rooted hydrophytes – pleustophytes (**Hy-1**, floating on the water surface or in the pelagic zone), rooted hydrophytes – rhizophytes (**Hy-2**, rooted or anchored in the substrate); and therophytes (**T**), i. e., annual plants on dry (**Td**), moist (**Tm**) or transitional (**Td/m**) sites. Parasites and hemiparasites are additionally marked as **pp**, while climbers are as **li**
Underlining denotes species classified as macrophytes, with amphiphytes distinguished by double underlining
Geo-historical categories: spontaneophyte (**Sn**), apophyte (**Ap**), archaeophyte (**Ar**), kenophyte (**Kn**), diaphyte (**D**), synanthropic hybrid (×)
Pond complexes: **J** – Jamnik, **P** – Potasznia, **R** – Radziądz, **RS** – Ruda Sułowska, **S** – Stawno

Lycopodiaceae: *Lycopodium clavatum* L. (Ch,Sn•RS); *Lycopodium annotinum* L. (Ch,Sn•P,R)†; **Equisetaceae:** *Equisetum arvense* L. (G,Ap•J,P,RS,S); *Equisetum fluviatile* L. (Hel,Sn•P,RS,S); *Equisetum hyemale* L. (Hd,Ap•S); *Equisetum ×litorale* Kühlew. ex Rupr. (Hel,Ap×Sn•P,RS,S)*; *Equisetum palustre* L. (Hm,Ap•P,R,RS,S); *Equisetum pratense* Ehrh. (G,Sn•P)*; *Equisetum sylvaticum* L. (G,S•RS); **Ophioglossaceae:** *Ophioglossum vulgatum* L. (G,Sn•RS); **Osmundaceae:** *Osmunda regalis* L. (Hm,Sn•RS,S); **Dennstaedtiaceae:** *Pteridium aquilinum* (L.) Kuhn (G,Ap/Sn•R,RS,S); **Thelypteridiaceae:** *Thelypteris palustris* Schott (G,Sn•R,RS,); **Athyriaceae:** *Athyrium filix-femina* (L.) Roth (Hd,Sn•J,P,RS,S); **Dryopteridaceae:** *Dryopteris carthusiana* (Vill.) H. P. Fuchs (Hd,Ap/Sn•J,P,R,S); *Dryopteris cristata* (L.) A. Gray (Hm,Sn•RS)*; *Dryopteris dilatata* (Hoffm.) A. Gray (Hd,Sn•R,RS,S); *Dryopteris filix-mas* (L.) Schott (Hd,Ap/Sn•J,P,RS,S); **Polypodiaceae:** *Polypodium vulgare* L. (Hd,Sn•RS,S); **Marsyliaceae:** *Pilularia globulifera* L. (Hd/m,Sn•RS)*; **Salviniaceae:** *Salvinia natans* (L.) All. (Hy-1,Sn•RS,S); **Pinaceae:** *Larix decidua* Mill. (M,Sn•RS); *Picea abies* (L.) Karsten (M,Sn•R,RS,S); *Pinus sylvestris* L. (M,Sn•R,J,RS,S); **Cupressaceae:** *Juniperus communis* L. (N,Ap/Sn•RS); *Thuja occidentalis* L. (M,Er•S)†; **Salicaceae:** *Populus alba* L. (M,Ap•S); *Populus ×hybrida* ? (M,Er•S,RS)†; *Populus nigra* L. (M,Ap•R); *Populus tremula* L. (M,Ap•J,P,RS,S); *Salix acutifolia* Willd. (N,Kn•J,P,RS,S)*; *Salix alba* L. (M,Ap•J,P,R,RS,S); *Salix aurita* L. (N,Ap/Sn•R,RS,S); *Salix babylonica* L. (M,Er•RS)†; *Salix caprea* L. (M,Ap/Sn•RS); *Salix cinerea* L. (N,Ap/Sn•J,P,R,RS,S); *Salix fragilis* L. (M,Ap•J,P,R,RS,S); *Salix fragilis* × *S. pentandra* (M,Ap×Ap/Sn•RS)†; *Salix pentandra* L. (M,Ap/Sn•R,J,RS,S); *Salix purpurea* L. (N,Ap•J,P,R,RS,S); *Salix rosmarinifolia* L. (N,Sn•S)*; *Salix triandra* L. (N,Sn•J,P,RS,S)*; *Salix viminalis* L. (N,Ap/Sn•J); **Juglandaceae:** *Juglans cinerea* L. (M,Er•R)*; **Betulaceae:** *Alnus glutinosa* (L.) Gaertn. (M,Sn•J,P,RS,S); *Alnus incana* (L.) Moench (M,Ap/Sn•RS); *Betula obscura* Kotula (M,Sn•P,S)*; *Betula pendula* Roth (M,Ap•J,P,R,RS,S); *Betula pubescens* Ehrh. (M,Sn•RS); **Corylaceae:** *Corylus avellana* L. (N,Ap/Sn•J,R,RS,S); *Carpinus betulus* L. (M,Sn•R,RS,S); **Fagaceae:** *Fagus sylvatica* L. (M,Sn•R,RS); *Quercus petraea* (Matt.) Liebl. (M,Sn•RS); *Quercus robur* L. (M,Sn•J,P,R,RS,S); *Quercus rubra* L. (M,Kn•RS,S); **Ulmaceae:** *Ulmus laevis* Pall. (M,Ap•J,RS,S); *Ulmus minor* Mill. (M,Ap•R); **Moraceae:** *Morus alba* L. (M,Kn•RS)*; **Cannabaceae:** *Humulus lupulus* L. (Hd,Ap•J,P,R,RS,S); **Urticaceae:** *Urtica dioica* L. (Hd,Ap•J,P,R,RS,S); *Urtica urens* L. (Td,Ar•S)†; **Santalaceae:** *Viscum album* subsp. *album* L. (Npp,Ap•R,S); *Viscum album* subsp. *austriacum* (Wiesb.) Vollm. (Npp,S•RS); **Polygonaceae:** *Fallopia convolvulus* (L.) Á. Löve (Td,Ar•P,R); *Fallopia dumetorum* (L.) Holub (Td,Sn•J,P,R,RS,S)*; *Persicaria ×ambigua* (Meisn.) B.Bock (Tm,Ap×Ap•S)*; *Persicaria amphibia* (L.) Delarbre (Hd/m,Ap•J,P,R,RS,S); *Persicaria ×hybrida* (Chaub. ex St.-Amans) Soják (Tm,Ap×Sn•R)*; *Persicaria hydropiper* (L.) Delarbre (Hel,Ap•J,P,R,RS,S); *Persicaria lapathifolia* subsp. *brittingeri* (Opiz) Soják (Tm,Ap•P,R,RS,S)*; *Persicaria lapathifolia* subsp. *lapathifolia* (Hd/m,Ap•J,P,R,RS,S); *Persicaria minor* (Huds.) Opiz (Td,Ap•RS,P)*; *Persicaria mitis* (Schrank) Assenov (Td,Sn•RS,P)*; *Persicaria maculosa* Gray (Td,Ap•R); *Persicaria tomentosa* (Schrank) E.P.Bicknell (Td,Ap•R)*; *Polygonum aviculare* L. (Td,Ap•J,P,R,S); *Polygonum bistorta* L. (Hm,Sn•J,P,R,RS,S); *Reynoutria japonica* Houtt. (G,Kn•P)*; *Rumex acetosa* L. (Hm,Ap•J,R,RS,S); *Rumex acetosella* L. (Hd,Ap•J,R,RS,S); *Rumex aquaticus* L. (Hm,S•R)†; *Rumex conglomeratus* Murray (Hm,Ap/Sn•RS); *Rumex crispus* L. (Hd,Ap•J,P,R,RS,S); *Rumex hydrolapathum* Huds. (Hel,Sn•RS,J,P,R,S); *Rumex maritimus* L. (Td/m,Ap•P,R,S)*; *Rumex obtusifolius* L. (Hd,Ap•J,P,RS,S); *Rumex rugosus* Campd. (Hd,Kn•P,R,RS)*; *Rumex sanguineus* L. (Hd/m,Ap/Sn•J,S)†; *Rumex thyrsiflorus* Fingerh. (Hd,Kn•J,P,R,RS,S); **Chenopodiaceae:** *Atriplex patula* L. (Td,Ap•P); *Atriplex prostrata* Boucher ex DC. (Td,Ap•J,P,RS,S)*; *Chenopodium album* L. (Td,Ap•J,RS,S); *Chenopodium ficifolium* Sm. (Td,Ap•J,RS,S)*; *Chenopodium glaucum* L. (Tm,Ap•P); *Chenopodium hybridum* L. (Td,Ar•J,R,S)*; *Chenopodium opulifolium* Schrad. ex W. D. J. Koch & Ziz. (Td,Ar•R)*; *Chenopodium polyspermum* L. (Td,Ap•P,R,RS)*; *Chenopodium rubrum* L. (Tm,Ap•P,R,RS)*; *Chenopodium strictum* Roth (Td,Kn•P,RS)*; **Portulacaceae:** *Montia fontana* subsp. *chondrosperma* (Fenzl) Walters (Hd/m,S•S)†; **Amaranthaceae:** *Amaranthus chlorostachys* Willd. (Td,Kn•P,S)*; *Amaranthus retroflexus* L. (Td,Ar•RS)*; **Caryophyllaceae:** *Arenaria serpyllifolia* L. (Td,Ap•S); *Cerastium arvense* L. s.s. (Hd,Ap•RS,S); *Cerastium holosteoides* Fr. EM. Hyl. (Hd,Ap•J,P,R,RS,S); *Cerastium macrocarpum* Schur em. Gartner (H,Sn•RS)*; *Cerastium semidecandrum* L.

(Td,Ap•R,RS,S); *Cucubalus baccifer* L. (Hd,Ap/Sn•S); *Dianthus carthusianorum* L. (Hd,S•R,S)†; *Dianthus deltoides* L. (Hd,Ap•P,R,RS,S); *Gypsophila muralis* L. (Td,Ap•R)*; *Herniaria glabra* L. (Td,Ap•R); *Holosteum umbellatum* L. (Td,Ap•J,S); *Illecebrum verticillatum* L. (Td,Ap/Sn•RS)*; *Lychnis flos-cuculi* L. (Hm,S•R,RS,S); *Melandrium album* (Mill.) Garcke (Td,Ap•J,P,R,RS,S); *Moehringia trinervia* (L.) Clairv. (Td,Ap•P,R,S); *Myosoton aquaticum* (L.) Moench (Hd/m,Ap•J,P,RS,S)*; *Sagina nodosa* (L.) Fenzl (Hm,Sn•S)*; *Sagina procumbens* L. (Hm,Ap•P,R,RS); *Saponaria officinalis* L. (Hd,Ar•RS,J)†; *Scleranthus perennis* L. (Hd,Ap/Sn•R,RS,J)†; *Silene vulgaris* (Moench) Garcke (Hd,Ap•R,RS,S); *Spergula arvensis* L. (Td,Ar•J,P,R); *Spergula morisonii* Boucher ex DC. (Td,Ap/Sn•RS)†; *Spergularia rubra* (L.) J. Presl & C. Presl (Td,Ap•P,RS,S); *Stellaria graminea* L. (Hm,Ap•J,P,R,RS); *Stellaria holostea* L. (Hd,Sn•R,S)*; *Stellaria media* (L.) Vill. (Td,Ap•J,P,R,RS,S); *Stellaria neglecta* Weihe (Hd,Sn•R,S)*; *Stellaria nemorum* L. (Hm,S•S)†; *Stellaria pallida* (Dumort.) Piré (Td,Ap/Sn•J,P,R,RS,S)*; *Stellaria palustris* Retz. (Hm,Sn•J,R,S,RS); *Stellaria uliginosa* Murray (Hm,Sn•P,R,RS,S); **Nymphaeaceae:** *Nuphar lutea* (L.) Sibth. & Sm. (Hy-2,Sn•J,RS,S); *Nymphaea alba* L. (Hy-2,Sn•RS,S); *Nymphaea candida* Presl (Hy-2,Sn•R)†; **Ceratophyllaceae:** *Ceratophyllum demersum* L. s.s. (Hy-2,Sn•P,R,RS,S); *Ceratophyllum submersum* L. (Hy-1,Sn•RS)*; **Ranunculaceae:** *Anemone nemorosa* L. (G,Sn•RS); *Anemone ranunculoides* L. (G,Sn•R); *Caltha palustris* L. (Hel,Ap•RS,S); *Consolida regalis* Gray (Td,Ar•RS)*; *Myosurus minimus* L. (Td/m,Ap•RS)*; *Ranunculus acris* L. s.s. (Hm,Ap•J,P,R,RS,S); *Ranunculus aquatilis L.* (Hy-2,Sn•RS); *Ranunculus auricomus* L. s.l. (Hm,Sn•RS); *Ranunculus baudotii* Godr. (Hy-2,Sn•R)*; *Ranunculus circinatus* Sibth. (Hy-2,Sn•RS); *Ranunculus ficaria* L. (G,Sn•R,S); *Ranunculus flammula* L. (Hel,Sn•R,S); *Ranunculus lingua* L. (Hel,Sn•R); *Ranunculus peltatus* Schrank (Hy-2,Sn•J)*; *Ranunculus polyanthemos* L. (Hd,Sn•RS)*; *Ranunculus repens* L. (Hm,Ap•J,P,R,RS,S); *Ranunculus rionii* Lagger (Hy-2,Sn•P,RS,S)*; *Ranunculus sardous* Cr. (Hd,Ap•S)†; *Ranunculus sceleratus* L. (Hd/m,Ap•P,R,RS,S); *Ranunculus trichophyllus* Chaix (Hy-2,Sn•J,P,R,RS,S)*; *Thalictrum flavum* L. (Hm,Sn•P)*; *Thalictrum lucidum* L. (Hd,Sn•P,R); **Papaveraceae:** *Chelidonium majus* L. (Hd,Ap•J,P,R,S); *Fumaria officinalis* L. (Td,Ar•S); *Papaver dubium* L. (Td,Ar•P,R,RS); **Brassicaceae:** *Alliaria petiolata* (M. Bieb.) Cavara & Grande (Td,Ap•J,P,R,RS,S); *Arabidopsis thaliana* (L.) Heynh. (Td,Ap•P,R,RS); *Arabis glabra* (L.) Bernh. (Hd,Ap•R); *Arabis hirsuta* (L.) Scop. (Hd,Sn•RS)*; *Armoracia rusticana* P. Gaertn.,B. Mey. & Scherb. (G,Ar•P,R,RS,S)*; *Barbarea stricta* Andrz. (Hm,Sn•RS,S); *Barbarea vulgaris* R. Br. (Hm,Ap•RS)*; *Berteroa incana* (L.) DC. (Hd,Ap•P,R,RS,S); *Brassica napus* L. (Td,Kn•R,S); *Brassica nigra* (L.) Koch (Td,Ar•RS)†; *Capsella bursa-pastoris* (L.) Medik. (Td,Ar•J,P,R); *Cardamine amara* L. s.s. (Hd/m,Sn•RS); *Cardamine dentata* Schult. s.s. (Hm,Sn•RS)*; *Cardamine parviflora* L. (Tm,Sn•R,S)*; *Cardamine pratensis* L. s.s. (Hm,Ap/Sn•R,RS,S); *Cardaminopsis arenosa* (L.) Hayek (Hd,Ap/Sn•R,S)*; *Cardaria draba* (L.) Desv. (Hd,Kn•S)†; *Carum carvi* L. (Hd,Kn•J)†; *Descurainia sophia* (L.) Webb ex Prantl (Td,Ar•J,P,R,RS,S); *Erophila verna* (L.) Chevall. (Td,Ap•RS); *Erysimum cheiranthoides* L. (Td,Ap•P,R,RS,S); *Lepidium campestre* (L.) R. Br. (Td,Ar•R)*; *Lepidium ruderale* L. (Td,Ar•P)*; *Lepidium virginicum* L. (Td,Kn•S); *Raphanus raphanistrum* L. (Td,Ar•J)†; *Rorippa amphibia* (L.) Besser (Hel,Ap/Sn•J,P,RS,S); *Rorippa palustris* (L.) Besser (Tm,Ap•P,R,RS,S); *Rorippa sylvestris* (L.) Besser (Hel,Ap/Sn•S); *Sinapis arvensis* L. (Td,Ar•R); *Sisymbrium altissimum* L. (Td,Kn•R,RS)*; *Sisymbrium loeselii* L. (Td,Kn•J,RS)*; *Sisymbrium officinale* (L.) Scop. (Td,Ar•P,R,RS,S); *Teesdalea nudicaulis* (L.) R. Br. (Td,Ap•R,RS,J)†; *Thlaspi arvense* L. (Td,Ar•R,S); **Crassulaceae:** *Crassula aquatica* (L.) Schönland (Td/m,S•RS)*; *Sedum acre* L. (Hd,Ap•R,RS); *Sedum maximum* (L.) Hoffm. (Hd,Ap•R); *Chrysosplenium alternifolium* L. (Hm,S•R,S)†; *Parnassia palustris* L. (Hm,S•R)†; **Saxifragaceae:** *Saxifraga granulata* L. (Hd,Ap•R,RS); **Grossulariaceae:** *Ribes aureum* Pursh. (N,Er•R)†; *Ribes nigrum* L. (N ,Sn•R); *Ribes rubrum* L. (N,Ap•RS)†; *Ribes spicatum* E. Robson (N ,Ap/Sn•J,R,RS,S); *Ribes uva-crispa* L. (N ,Ap•RS); *Agrimonia eupatoria* L. (Hd,Ap•J,R); *Agrimonia procera* Allr. (Hd,Ap•J,P,R,RS,S)*; **Rosaceae:** *Alchemilla monticola* Opiz in Berchtold et Opiz (Hd,Ap/Sn•S)†; *Cerasus avium* (L.) Moench (M,Kn•RS,S)†; *Crataegus laevigata* (Poiret) DC. (M,Ap•R,RS,S)†; *Crataegus monogyna* Jacq. (M,Ap•J,P,R,S); *Filipendula ulmaria* (L.) Maxim. (Hel,Ap/Sn•J,P,R,RS); *Filipendula vulgaris* Moench (Hd,Ap/Sn•RS)*; *Fragaria vesca* L. (Hd,Sn•S)*; *Geum rivale* L. (Hm,Sn•S); *Geum urbanum* L. (Hd,Ap•P,R,RS,S); *Malus domestica* (Suckow) Borkh. (M,Kn•J,P,S)*; *Malus domestica* × *M. sylvestris* (M,Sn×Er•P)*; *Malus sylvestris* (L.) Mill. (M,Sn•S); *Potentilla anglica* Laichard. (Hd,Sn•RS)*; *Potentilla anserina* L. (Hm,Ap•J,P,R,RS,S); *Potentilla arenaria* Borkh. (Hd,Ap/Sn•RS)†; *Potentilla argentea* L. s.s. (Hd,Ap•J,P,R,RS,S); *Potentilla collina* Wibel s.s. (Hd,Ap•RS)*; *Potentilla erecta* (L.) Raeusch. (Hd,Sn•R,RS,S); *Potentilla norvegica* L. (Td/m,Ap/Sn•J,S); *Potentilla reptans* L. (Hm,Ap•J,P,R,RS,S); *Potentilla supina* L. (Tm,Ap•S)*; *Prunus domestica* L. (M,Er•J); *Prunus padus* L. (M,Ap/Sn•J,P,R,RS,S); *Prunus serotina* Ehrh. (M,Kn•J,P,R,RS,S); *Prunus spinosa* L. (N,Ap•R,RS,S); *Pyrus pyraster* (L.) Burgsd. (M,Kn•J,P,R,RS,S); *Pyrus* ×*amphigenea* Domin (M,Kn×Er•RS,S)*; *Rosa canina* L. (N,Ap•J,P,R,RS,S); *Rosa corymbifera* Borkh. (N,Er•RS,S)†; *Rosa dumalis* Bechst. em. Boulenger (N,Ap•P,RS)*; *Rosa rubiginosa* L. (N,Ap•RS,S)*; *Rosa rugosa* Thunb. (N,Kn•S)†; *Rosa sherardii* Davies (N,Ap•RS,S)*; *Rosa tomentosa* Sm. (N,Ap/Sn•S)†; *Rubus caesius* L. (Ch,Ap•J,P,R,RS,S); *Rubus corylifolius* Sm. agg. (N,Ap•J,P,R,RS,S); *Rubus gracilis* J. Presl & C. Presl (N,Ap•P,RS)*; *Rubus idaeus* L. (N,Ap•P,R,RS,S); *Rubus macrophyllus* Weihe & nees (N,Ap/Sn•P)*; *Rubus plicatus* Weihe & nees (N,Ap•J,P,RS,S); *Rubus sylvaticus* Weihe & Nees (N,Ap/Sn•RS,J,S)†; *Sanguisorba officinalis* L. (Hm,Sn•S); *Sorbus aucuparia* L. em. Hedl. (M,Ap/Sn•J,P,R,RS,S); **Fabaceae:** *Astragalus glycyphyllos* L. (Hd,Ap•RS,S); *Comarum palustre* L. (Hel,S•R)†; *Coronilla varia* L. (Hd,Ap•R,RS); *Cytisus scoparius* (L.) Link (Ch,Kn•J); *Lathyrus pratensis* L. (Hd/m,Ap•R,RS)*; *Lathyrus tuberosus* L. (G,Ar•RS,S)*; *Lotus corniculatus* L. (Hd,Ap•J,P,R,RS,S); *Lotus uliginosus* Schkuhr (Hm,Sn•J,P,R,RS); *Lupinus luteus* L. (Td,Kn•RS)†; *Medicago lupulina* L. (Td,Ap•J,P,S); *Medicago sativa* L. (Hd,Kn•J)†; *Melilotus albus* Medik. (Td,Ap•P,R,S); *Melilotus officinalis* (L.) Pall. (Td,Ap•P); *Ornithopus sativus* L. (Td,D•RS)†; *Robinia pseudoacacia* L. (M,Kn•J,P,R,RS,S); *Trifolium alpestre* L. (Hd,Ap/Sn•S)†; *Trifolium arvense* L. (Td,Ap•R); *Trifolium campestre* Schreb. (Td,Ap•P)*; *Trifolium dubium* Sibth. (Td,Ap•J,P,RS,S); *Trifolium fragiferum* L. (Hm,Ap/Sn•RS,S)*; *Trifolium hybridum* L. (Hd,Ap•R,S); *Trifolium medium* L. (Hd,Ap•R,RS)*; *Trifolium pratense* L. (Hd,Ap•J,P,R,RS,S); *Trifolium repens* L. (Hd,Ap•J,R,RS); *Vicia sepium* L. (G,Kn•Ap/Sn)†; *Vicia angustifolia* L. (Td,Ar•J,P,RS,S); *Vicia cracca* L. (Hd,Ap/Sn•J,P,R,RS,S); *Vicia dasycarpa* Ten. (Td,Kn•J)*; *Vicia hirsuta* (L.) S. F. Gray (Td,Ar•J,R); *Vicia tetrasperma* (L.) Schreb. (Td,Ar•J,RS); *Vicia villosa* Roth (Td,Ar•P,R,S);

Oxalidaceae: *Oxalis acetosella* L. (Hd,Sn•R,RS); *Oxalis stricta* L. (G,Kn•P,S); **Geraniaceae:** *Erodium cicutarium* (L.) L'Hér. (Td,Ar•P,RS,S); *Geranium molle* L. (Td,Ar•RS); *Geranium palustre* L. (Hel,Sn•J,P); *Geranium pratense* L. (Hd,Ap/Sn•R,J,S)†; *Geranium pusillum* Burm. f. ex L. (Td,Ar•J,P,R,RS,S); *Geranium robertianum* L. (Td,Ap/Sn•J,R,RS,S); *Geranium sylvaticum* L. (Hd,Sn•S)†; **Polygalaceae:** *Polygala vulgaris* L. (Hd,Sn•R,J)†; **Linaceae:** *Linum catharticum* L. (Td ,Sn•R)*; *Radiola linoides* Roth (Td,Ap/Sn•RS)*; **Euphorbiaceae:** *Euphorbia cyparissias* L. (Hd,Ap•J,R,RS,S); *Euphorbia esula* L. (Hd,Ap•S)*; **Aceraceae:** *Acer campestre* L. (M,Ap•R,RS); *Acer platanoides* L. (M,Ap•RS,S); *Acer pseudoplatanus* L. (M,Ap•J,R,S); **Hippocastanaceae:** *Aesculus hippocastanum* L. (M,Kn•R,S); **Balsaminaceae:** *Impatiens noli-tangere* L. (Tm,Sn•S); *Impatiens parviflora* DC. (Td ,Kn•J,P,R,RS,S); **Celastraceae:** *Euonymus europaeus* L. (N,Ap/Sn•J,P,R,S); **Rhamnaceae:** *Frangula alnus* Mill. (N,Ap/Sn•J,P,R,RS); *Rhamnus cathartica* L. (N,Ap•R,RS,S); **Vitaceae:** *Parthenocissus quinquefolia* (L.) Planch. In A. & C. DC. (Nli,Er•RS)*; **Vitaceae:** *Vitis vinifera* L. (Nli,Er•R)*; **Tiliaceae:** *Tilia cordata* Mill. (M,Ap•P,R,RS,S); *Tilia platyphyllos* Scop. (M,Ap•RS,S)*; **Malvaceae:** *Abutilon theophrasti* Medik. (Td,D•R)*; *Malva alcea* L. (Hd,Ap•S); *Malva neglecta* Wallr. (Td,Ar•R); *Malva sylvestris* L. (Td,Ar•R); **Hypericaceae:** *Hypericum humifusum* L. (Tm ,Ap/Sn•RS)*; *Hypericum maculatum* L. (Td,S•S)†; *Hypericum perforatum* L. (Hd,Ap•J,R,RS,S); *Hypericum tetrapterum* Fr. (Hm,Sn•P)*; **Violaceae:** *Viola arvensis* Murray (Td,Ar•P,R,RS); *Viola canina* L. (Hd,Sn•RS); *Viola ×contempta* Jord. (Td,Ar×Ap•RS)*; *Viola odorata* L. (Hd,Kn•S); *Viola palustris* L. (Hm,Sn•RS); *Viola reichenbachiana* Jord. ex Boreau (Hd,Sn•R); *Viola riviniana* Rchb. (Hd,Sn•R); *Viola tricolor* L. (Td,Ap•RS)*; **Elatinaceae:** *Elatine hexandra* (Lapierre) DC. (Hd/m,Sn•P,RS,S)*; *Elatine hydropiper* L. em. Oeder (Hd/m,Sn•S)*; *Elatine triandra* Schkuhr (Hd/m,Sn•RS,S)*; **Cucurbitaceae:** *Echinocystis lobata* (F. Michx.) Torr. & A. Gray (Td,Kn•P,RS,S)*; **Lythraceae:** *Lythrum hyssopifolia* L. (Td,Sn•RS)*; *Lythrum portula* L. (Td/m,Ap/Sn•R,S)*; *Lythrum salicaria* L. (Hel,Ap•P,R,RS,S); **Onagraceae:** *Circaea lutetiana* L. (G,Sn•R); *Epilobium adenocaulon* Hausskn. (Hm,Kn•R,RS)*; *Epilobium angustifolium* L. (Hd,Ap•S); *Epilobium ×dacicum* Borbás (Hm,Ap×Sn•R)*; *Epilobium hirsutum* L. (Hel,Ap•RS,S); *Epilobium ×mentiens* Smejkal (Hm,Ap×Kn•RS)*; *Epilobium montanum* L. (Hd,S•S)†; *Epilobium obscurum* Schreb. (Hm,Sn•P,R,S)*; *Epilobium palustre* L. (Hm,Sn•RS); *Epilobium parviflorum* Schreb. (Hel,Ap•R,RS); *Epilobium roseum* Schreb. (Hel,Ap/Sn•RS); *Epilobium tetragonum* L. (Tm,Ap•R,RS)*; *Oenothera biennis* L. (Hd,Ap•P,RS,S); **Haloragaceae:** *Myriophyllum spicatum* L. (Hy-2,Sn•J,P,R,RS,S)*; *Myriophyllum verticillatum* L. (Hy-2,Sn•J,RS,S)*; **Hippuridaceae:** *Hippuris vulgaris* L. (Hm/d,Sn•RS)*; **Cornaceae:** *Cornus sanguinea* L. (N,Ap/Sn•J,R,RS,S); **Araliaceae:** *Hedera helix* L. (Ch,Kn•S); **Apiaceae:** *Aegopodium podagraria* L. (Hd,Ap•J,P,R,RS,s); *Aethusa cynapium* L. (Td,Ar•S)*; *Angelica sylvestris* L. (Hel,Sn•P,R,RS,S); *Anthriscus caucalis* M. BIEB. (Td,Ar•R)*; *Anthriscus sylvestris* (L.) Hoffm. (Hd,Ap•J,P,R,RS,s); *Berula erecta* (Huds.) Coville (Hel,Sn•J,P,RS); *Carum carvi* L. (Hd,Ap•J)†; *Chaerophyllum aromaticum* L. (Hd,Ap/Sn•S); *Chaerophyllum bulbosum* L. (Td,Ap•S); *Chaerophyllum temulum* L. (Td,Ap•J,P,R,S); *Cicuta virosa* L. (Hel,Sn•J,RS,S); *Conium maculatum* L. (Td,Ar•RS)*; *Daucus carota* L. (Td,Ap•J,R,S); *Heracleum sphondylium* L. (Hd,Ap/Sn•J,P,R,RS,S); *Hydrocotyle vulgaris* L. (Hm,Sn•R,RS,S); *Oenanthe aquatica* (L.) Poir. (Hel,Ap•P,R,RS,S); *Pastinaca sativa* L. (Hd,Ap•R,J,RS); *Peucedanum oreoselinum* (L.) Moench (Hd,Ap•RS); *Peucedanum palustre* (L.) Moench (Hel,Sn•R,RS); *Pimpinella major* (L.) Huds. (Hm,Sn•R,S); *Pimpinella nigra* Mill. (Hd,Ap•J,R,RS,S)*; *Pimpinella saxifraga* L. (Hd,Ap•R,RS,S); *Sanicula europaea* L. (Hd,Sn•S)†; *Selinum carvifolia* (L.) L. (Hm,S•RS,S)*; *Silaum silaus* (L.) Schinz & Thell. (Hm,Sn•P)*; *Sium latifolium* L. (Hel,Sn•P,R,RS); *Torilis japonica* (Houtt.) DC. (Td,Ap•J,P,R,RS,S); **Ericaceae:** *Calluna vulgaris* (L.) Salisb. (Ch,S•R,RS)†; *Vaccinium myrtillus* L. (Ch,Sn•P,RS); *Vaccinium vitis-idaea* L. (Ch,Sn•RS); **Primulaceae:** *Hottonia palustris* L. (Hy-2,Sn•J,RS); *Lysimachia minima* (L.) U.Manns & Anderb. (Tm,Sn•RS)*; *Lysimachia nummularia* L. (Hm,Sn•J,P,R,RS,S); *Lysimachia thyrsiflora* L. (Hel,Sn•RS); *Lysimachia vulgaris* L. (Hm,Ap/Sn•J,P,R,RS,S); *Samolus valerandi* L. (Hm,S•RS)*; *Trientalis europaea* L. (G,Sn•RS)†; **Plumbaginaceae:** *Armeria maritima* (Mill.) Willd. (Hd,Ap•P,R,RS,S); **Oleaceae:** *Fraxinus excelsior* L. (M,Ap•J,P,R,RS,S); *Fraxinus pennsylvanica* Marshall (M,Kn•S)*; *Ligustrum vulgare* L. (N,Kn•P,S)*; *Syringa vulgaris* L. (N,Er•S)*; **Gentianaceae:** *Centaurium erythraea* Rafn (Td,Ap•R)*; *Centaurium pulchellum* (Sw.) Druce (Tm,Sn•RS)*; **Menyanthaceae:** *Nymphoides peltata* (S. G. Gmel.) Kuntze (Hy-1,Sn•P); **Rubiaceae:** *Galium aparine* L. (Td,Ap•J,P,RS,S); *Galium boreale* L. (G,Sn•R)*; *Galium mollugo* L. (Hd,Ap•J,P,R,RS,S); *Galium palustre* L. (Hm,Sn•J,R,RS); *Galium schultesii* Vest (G,Sn•S)*; *Galium uliginosum* L. (Hm,Sn•RS,S); *Galium verum* L. (Hd,Ap•S)†; **Convonvulaceae:** *Calystegia sepium* (L.) R. Br. (Hel,Ap/Sn•J,P,R,RS,S); *Convolvulus arvensis* L. (G,Ap•P,R,RS,S); **Cuscutaceae** *Cuscuta europaea* L. (Td,Ap•RS)†; **Boraginaceae:** *Anchusa arvensis* (L.) M. Bieb. (Td,Ar•P,R)*; *Anchusa officinalis* L. (Hd,Ap•J,R,RS,S); *Cynoglossum officinale* L. (Hd,Ap•RS); *Echium vulgare* L. (Td,Ar•S)*; *Lithospermum arvense* L. (Td,Ar•RS)†; *Myosotis arvensis* (L.) Hill (Td,Ar•R,RS)*; *Myosotis caespitosa* Schultz (Hel,Sn•J,P,R,RS,S)*; *Myosotis discolor* Pers. (,•R,RS)†; *Myosotis palustris* (L.) L. Em. Rchb. (Hel,Sn•J,P,R,RS,S); *Myosotis ramosissima* Rochel (Td,Sn•RS)*; *Myosotis stricta* Link ex Roem. & Schult. (Td,Ap•P); *Myosotis sylvatica* Hofff. (Td,Ap/Sn•S)†; *Pulmonaria obscura* Dum. (Hd,S•S,R)†; *Symphytum officinale* L. (Hm,Ap•J,P,R,RS,S); **Verbenaceae:** *Verbena officinalis* L. (Td,Ar•RS,S)*; **Callitrichaceae:** *Callitriche cophocarpa* Sendtn. (Hd/m,Sn•RS,S)*; *Callitriche hamulata* Kütz. ex W. D. J. Koch (Hd/m,Sn•P,RS,S)*; *Callitriche palustris* L. em. Lönnr. (Hd/m,Sn•P)*; **Lamiaceae:** *Acinos arvensis* (Lam.) Dandy (Td,Ap•RS,S)*; *Ajuga reptans* L. (Hd,Sn•R,S); *Ballota nigra* L. (Hd,Ar•J,P,R,S); *Clinopodium vulgare* L. (Hd,Ap•S)*; *Galeobdolon luteum* Huds. (Hd,Sn•R,RS); *Galeopsis bifida* Boenn. (Td,Ap•R,RS)*; *Galeopsis pubescens* Besser (Td,Ap•J,P,R,S); *Galeopsis speciosa* Mill. (Tm,Ap/Sn•S)†; *Galeopsis tetrahit* L. (Td,Ap•R,RS,J,S)†; *Glechoma hederacea* L. (Hd,Ap•J,P,R,RS,S); *Lamium album* L. (Hd,Ar•J,P,R,RS,S); *Lamium maculatum* L. (Hd,Ap/Sn•J,R,S); *Lamium purpureum* L. (Td,Ar•P,RS,S); *Leonurus cardiaca* L. (Hd,Ar•P,RS,S); *Lycopus europaeus* L. (Hel,Sn•J,P,R,RS,S); *Mentha ×rotundifolia* (L.) Huds. (Hd,D•RS)*; *Mentha aquatica* L. (Hel,Sn•P,R,RS,S); *Mentha arvensis* L. (G,Ap•R,RS,S); *Prunella vulgaris* L. (Hd,Ap•J,R,RS,S); *Scutellaria galericulata* L. (Hm,Sn•P,R,RS,S); *Scutellaria hastifolia* L. (Hm,Sn•J)*; *Stachys palustris* L. (Hd/m,Ap/Sn•P,R,RS,S); *Stachys sylvatica* L. (Hd,Sn•R); *Teucrium scordium* L. (Hm,Sn•RS)*; *Thymus pulegioides* L. (Ch,Ap/Sn•RS); *Thymus serpyllum* L. em. Fr. (Ch,Ap/Sn•R,RS); **Solanaceae:** *Datura stramonium* L. (Td,Kn•RS)*; *Lycopersicon esculentum* Mill. (Td,D•S)*; *Solanum dulcamara* L. (Ch,Ap•J,P,R,RS,S); *Solanum nigrum* L. em. Mill. (Td,Ar•RS)*; **Scrophulariaceae:** *Lathraea squamaria* L.

(G,Sn•S)*; *Limosella aquatica* L. (Td/m,S•P,R,RS,S); *Linaria vulgaris* Mill. (G,Ap•J,R,RS,S); *Lindernia procumbens* (Krock.) Borbás (Td/m,Sn•P,R)*; *Melampyrum nemorosum* L. (Tdpp,Sn•R); *Melampyrum pratense* L. (Tdpp,Sn•RS); *Rhinanthus minor* L. (Tdpp,Sn•J,R,RS); *Rhinanthus serotinus* (Schönh.) Oborný (Tdpp,Sn•P,R,RS); *Scrophularia nodosa* L. (Hd,Ap/Sn•J,P,R,RS,S); *Scrophularia umbrosa* Dumort. (Hel,Sn•RS,S); *Verbascum lychnitis* L. (Td,Ap•RS,S)*; *Verbascum nigrum* L. (Td,Ap•P,R,RS,S); *Verbascum phlomoides* L. (Td,Ap•J,P,RS,S)*; *Verbascum thapsus* L. (Td,Ap•J,S,P)†; *Veronica anagallis-aquatica* L. (Hel,Sn•P,R,RS,S); *Veronica anagalloides* Guss. (Td/m,Kn?•J,P,R,RS,S)*; *Veronica arvensis* L. (Td,Ar•P,R,RS,S); *Veronica beccabunga* L. (Hel,Sn•S); *Veronica catenata* Pennell (Hel,Sn•RS)*; *Veronica chamaedrys* L. (Hd,Ap•J,P,R,RS,S); *Veronica hederifolia* L. (Td,Kn•J,P,R,RS,S)†; *Veronica longifolia* L. (Hd,Sn•S)*; *Veronica officinalis* L. (Hd,Sn•S); *Veronica peregrina* L. (Td/m,Kn?•J,P,R,RS,S)*; *Veronica persica* Poir (Td,Kn•J)†; *Veronica scutellata* L. (Hm,Sn•RS)*; *Veronica serpyllifolia* L. (Hd,Sn•RS)*; *Veronica triphyllos* L. (Td,Ar•R,RS)†; **Lentibulariaceae:** *Utricularia australis* R. Br. (Hy-1,Sn•P,R,RS)*; *Utricularia vulgaris* L. (Tm,Ap•R,S)†; **Plantaginaceae:** *Plantago intermedia* Gilib. (Tm,Ap•R,S)†; *Plantago lanceolata* L. (Hd,Ap•J,P,R,RS,S); *Plantago major* L. (Hd,Ap•J,P,RS,S); *Plantago media* L. (Hd,Ap•S)†; **Caprifoliaceae:** *Kolkwitzia amabilis* Graebn. (N,Er•R)*; *Lonicera xylosteum* L. (N,Ap•P,R)*; **Adoxaceae:** *Adoxa moschatellina* L. (G,Ap/Sn•RS,S); *Sambucus nigra* L. (N,Ap•J,P,R,RS,S); *Sambucus racemosa* L. (N,Ap•R,S); *Viburnum opulus* L. (N,S•J,P,R,RS,S); **Valerianaceae:** *Valeriana officinalis* L. (Hm,Ap/Sn•S); *Valeriana sambucifolia* J. C. Mikan (Hm,Ap/Sn•S)†; *Valerianella locusta* Laterr. em. Betcke (Td,Ap•R,RS); **Dipsacaceae:** *Knautia arvensis* (L.) J. M. Coult. (Hd,Ap•RS); *Succisa pratensis* Munch. (Hm,S•RS)†; **Campanulaceae:** *Campanula glomerata* L. (Hd,Ap•RS,S)*; *Campanula patula* L. (Hd,Ap/Sn•P,R,RS,S); *Campanula persicifolia* L. (Hd,S•S)†; *Campanula rotundifolia* L. (Hd,Sn•RS,S)*; *Jasione montana* L. (Hd,Ap/Sn•R,RS,S)†; **Asteraceae:** *Achillea millefolium* L. (Hd,Ap•J,P,R,RS,S); *Achillea pannonica* Scheele (Hd,Ap•J,P)*; *Achillea ptarmica* L. (Hm,Sn•RS)*; *Arctium lappa* L. (Hm,Ap•RS); *Arctium tomentosum* Mill. (Td,Ap•J,R)*; *Arnoseris minima* (L.) Schweigg. Et Koerte (Td,Ap•RS)†; *Artemisia absinthium* L. (Hd,Ap•P,R); *Artemisia campestris* L. (Hd,Ap•J,R,RS)*; *Artemisia vulgaris* L. (Hd,Ap•J,P,RS,S); *Aster lanceolatus* Wlld. (Hd,Kn•RS,S)*; *Aster novi-belgii* L. (Hd,Kn•J,P,S); *Aster ×salignus* Willd. (Hd,Kn•RS,S)*; *Aster tradescantii* L. (Hd,Kn•RS,S)*; *Bellis perennis* L. (Hd,Ap•J,P,R,RS,S)†; *Bidens cernua* L. (Hel,Ap•P,R,RS,S); *Bidens connata* H. L. Mühl. (Hel,Kn•J,P,R,RS,S)*; *Bidens frondosa* L. (Hel,Kn•J,P,R,RS,S); *Bidens radiata* Thuill. (Hel,Kn•RS)*; *Bidens tripartita* L. (Hel,Ap•J,P,R,RS)*; *Centaurea cyanus* L. (Td,Ar•S); *Centaurea jacea* L. (Hd,Ap•RS,S); *Centaurea jacea* × *C. pseudophrygia* (Hd×Hd,Sn×Ap•RS)*; *Centaurea pseudophrygia* C. A. Mey. (Hd,Sn•RS,S)*; *Centaurea rhenana* Bor. (Hd,Ap•S)†; *Centaurea scabiosa* L. (Hd,Ap•RS,S)*; *Cichorium intybus* L. (Hd,Ar•R); *Cirsium arvense* (L.) Scop. (G,Ap•J,P,R,RS,S); *Cirsium oleraceum* (L.) Scop. (Hm,Ap/Sn•RS); *Cirsium palustre* (L.) Scop. (Hm,Sn•RS,S); *Cirsium vulgare* (Savi) Ten. (Hd,Ap•RS,S); *Crepis biennis* L. (Hd,Ap•S)*; *Crepis capillaris* (L.) Wallr. (Td,Ap•S)*; *Crepis paludosa* (L.) Moench (Hm,Sn•P); *Erechtites hieracifolia* (L.) Raf. ex DC. (Td,Kn•R)*; *Erigeron acer* L. (Td,Ap•RS)†; *Erigeron annuus* (L.) Pers. (Td,Kn•RS)†; *Erigeron canadensis* L. (Td,Kn•J,P,R,RS,S); *Eupatorium cannabinum* L. (Hel,Ap/Sn•J,P,R,RS,S); *Galinsoga ×mixta* Murr (Td,Kn×Kn•S)*; *Galinsoga ciliata* (Raf.) S. F. Blake (Td,Kn•J,P,RS,S)*; *Galinsoga parviflora* Cav. (Td,Kn•P,RS,S)*; *Gnaphalium luteo-album* L. (Td,Ap•RS)*; *Gnaphalium sylvaticum* L. (Hd,Ap•S)*; *Gnaphalium uliginosum* L. (Tm,Ap•P,R,RS)*; *Helianthus tuberosus* L. (G,Kn•P,S)*; *Hieracium lachenalii* Suter (Hd,Sn•J,RS)*; *Hieracium laevigatum* Willd. (Hd,Sn•R,S); *Hieracium murorum* L. (Hd,Sn•R,RS); *Hieracium sabaudum* L. (Hd,S•J,P,R,RS,S); *Hieracium umbellatum* L. (Hd,Ap/Sn•J)*; *Hypochoeris glabra* L. (Td,Ap•S)*; *Hypochoeris radicata* L. (Hd,Ap•RS,S); *Inula britannica* L. (Hd,Ap•R)*; *Lactuca serriola* L. (Td,Ar•RS,S); *Lapsana communis* L. s.s. (Td,Ap•J,P,R,RS,S); *Leontodon autumnalis* L. (Hd,Ap•J,P,R,RS,S); *Leontodon taraxacoides* (Vill.) Mérat (Hd,Ap/Sn•P,R)*; *Leucanthemum vulgare* Lam. (Hd,Ap/Sn•R,RS,S); *Matricaria chamomilla* L. (Td,Ar•R); *Matricaria discoidea* DC. (Td,Kn•RS,S)*; *Matricaria maritima* L. (Td,Ar•J,P,R,RS,S); *Mycelis muralis* (L.) Dumort. (Hd,Sn•R,RS,S); *Petasites albus* (L.) Gaertn. (Hd,Ap•R)*; *Pilosella officinarum* Vaill. (Hd,Ap•J,R,RS,S); *Pulicaria vulgaris* Gaertn. (Tm,Ap/Sn•J)*; *Rudbeckia laciniata* L. (Hm,Kn•RS,S)*; *Senecio jacobaea* L. (Hd,Ap•R,RS,S); *Senecio ovatus* (P. Gaertn.,B. Mey. & Scherb.) Willd. (Hd,S•RS)†; *Senecio rivularis* (W. K.) DC. (Hm,Ap/Sn•S)†; *Senecio vernalis* Waldst. & Kit. (Td,Kn•RS,S); *Senecio viscosus* L. (Td,Ap•RS)†; *Senecio vulgaris* L. (Td,Ar•R)*; *Solidago gigantea* Aiton (Hd,Kn•J,P,R,RS,S); *Solidago virgaurea* L. s.s. (Hd,Sn•P,RS,S); *Sonchus arvensis* L. (Tm,Ap/Sn•S)*; *Sonchus oleraceus* L. (Td,Ar•P); *Tanacetum vulgare* L. (Hd,Ap•J,P,R,RS,S); *Taraxacum officinale* F. H. Wigg. (Hd,Ap•J,P,R,RS,S); *Tragopogon dubius* Scop. (Hd,Ap•R)*; *Tragopogon orientalis* L. (Hd,Ap•RS)*; *Tragopogon pratensis* L. s.s. (Hd,Ap•RS)*; *Tussilago farfara* L. (G,Ap•J,P,R,RS,S); **Alismataceae:** *Alisma gramineum* Lej. (Hd/m,Sn•J,RS,S)*; *Alisma lanceolatum* With. (Hd/m,Sn•P,RS)*; *Alisma plantago-aquatica* L. (Hd/m,Ap/Sn•J,P,R,RS,S)†; *Alisma ×rhicnocarpum* Schotsman (Hd/m,Ap/Sn•J,P,R,RS,S)*; *Sagittaria sagittifolia* L. (Hd/m,Sn•J,P,R,RS,S); **Butomaceae:** *Butomus umbellatus* L. (Hel,Ap/Sn•J,R,RS)*; **Hydrocharitaceae:** *Elodea canadensis* Michx. (Hy-2,Kn•J,P,R,RS)*; *Hydrocharis morsus-ranae* L. (Hy-1,Sn•J,P,R,RS,S); *Stratiotes aloides* L. (Hy-1,Sn•S); **Scheuchzeriaceae:** *Triglochin maritimum* L. (Hm,Sn•RS)*; *Triglochin palustre* L. (Hm,Sn•RS)*; **Potamogetonaceae:** *Potamogeton acutifolius* Link (Hy-2,Sn•J)*; *Potamogeton crispus* L. (Hy-2,Sn•J,P,R,RS,S); *Potamogeton filiformis* Pers. (Hy-2,Sn•S); *Potamogeton ×fluitans* Roth (Hy-2,Sn•RS)†; *Potamogeton gramineus* L. (Hy-2,Sn•RS)†; *Potamogeton lucens* L. (Hy-2,Sn•J,P,R,RS,S); *Potamogeton natans* L. (Hy-2,Sn•RS); *Potamogeton pectinatus* L. (Hy-2,Ap/Sn•P,RS,S); *Potamogeton trichoides* Cham. & Schltdl. (HY-2,Sn•RS)*; **Zannicheliaceae:** *Zannichellia palustris* L. (Hy-2,Sn•J,P,R,RS,S)*; **Najadaceae:** *Najas marina* subsp. *intermedia* (Wolfg. ex Gorski) Casper (Hy-2,S•P,RS,S)*; *Najas minor* All. (Hy-2,S•P,RS)*; **Asparagaceae:** *Convallaria majalis* L. (G,Sn•P,R,S); **Liliaceae:** *Gagea lutea* (L.) Ker Gawl. (G,Sn•R); **Liliaceae:** *Gagea pratensis* (Pers.) Dumort. (G,Ap•RS); **Asparagaceae:** *Maianthemum bifolium* (L.) F. W. Schmidt (G,Sn•R,S); **Melanthiaceae:** *Paris quadrifolia* L. (G,Sn•R); **Asparagaceae:** *Polygonatum multiflorum* (L.) All. (G,Sn•R); **Asparagaceae:** *Polygonatum odoratum* (Mill.) Druce (G,Sn•R); **Alliaceae** *Allium schoenoprasum* L. (G,D•RS)†; *Allium oleraceum* L. (G,Ap•S)†; **Iridaceae:** *Iris pseudacorus* L. (Hel,Ap/Sn•J,P,R,RS,S); *Iris sibirica* L. (Hd,Sn•S)†; **Juncaceae:** *Juncus alpino-articulatus* Chaix (Hel,Sn•J)*; *Juncus articulatus* L. em. K. Richt. (G,Ap/Sn•P,R,RS,S); *Juncus bufonius* L. (Tm,Ap•P,S); *Juncus capitatus* Weigel (Tm,Ap•RS)*; *Juncus compressus* Jacq.

(Hm,Sn•R,S); *Juncus conglomeratus* L. em. Leers (Hm,Ap/Sn•S); *Juncus effusus* L. (Hm,Ap•J,P,R,RS,S); *Juncus filiformis* L. (Hm,S•S); *Juncus effusus* × *J. filiformis* (Hm,Ap×Sn•R,S)*; *Juncus tenageia* Rehrh. (Tm,Sn•RS)*; *Juncus tenuis* Willd. (Hm,Kn•P,RS,S); *Luzula pallescens* (Wahlb.) Bess. (Hd,S•RS,S)†; *Luzula pilosa* (L.) Willd. (Hd,S•R,RS,S,P)†; *Luzula campestris* (L.) DC. (Hd,Ap•J,RS,S); *Luzula multiflora* (Retz.) Lej. (Hd,Sn•RS); **Poaceae:** *Agrostis canina* L. (Hm,Sn•RS); *Agrostis capillaris* L. (Hd,Ap•J,P,RS,S); *Agrostis gigantea* Roth (Hd,Ap•P,S)*; *Agrostis stolonifera* L. (Hm,S•P,R,RS,S); *Alopecurus aequalis* Sobol. (Hm,Ap/Sn•P,R,RS,S); *Alopecurus geniculatus* L. (Hm,Ap/Sn•S); *Alopecurus pratensis* L. (Hm,Ap/Sn•J,P,R,RS,S); *Anthoxanthum aristatum* Boiss. (Td,Kn•S); *Anthoxanthum odoratum* L. (Hd,Ap•J,R,RS,S); *Apera spica-venti* (L.) P. Beauv. (Td,Ar•P,RS,S); *Arrhenatherum elatius* (L.) P. Beauv. ex J. Presl & C. Presl (Hd,Ap•J,P,R,RS,S); *Avena sativa* L. (Td,D•R)*; *Avenula pubescens* (Huds.) Dumort. (Hd,Ap/Sn•R,RS,S); *Brachypodium sylvaticum* (Huds.) P. Beauv. (Hd,Sn•J,R,RS,S); *Briza media* L. (Hd,Sn•RS); *Bromus erectus* Huds. (Hd,Ap/Sn•S)†; *Bromus hordeaceus* L. (Td,Ap•J,P,R,RS,S); *Bromus inermis* Leyss. (Hd,Ap•J,P,RS,S); *Bromus sterilis* L. (Td,Ar•P,RS,S); *Bromus tectorum* L. (Td,Ar•P,RS); *Calamagrostis canescens* (Weber) Roth (Hm,Sn•J,P,RS,S); *Calamagrostis epigejos* (L.) Roth (G,Ap•J,P,R,RS,S); *Calamagrostis arundinacea* (L.)Roth (Hd,S•R,RS,S)†; *Catabrosa aquatica* (L.) P. Beauv. (Hm,Ap/Sn•RS)*; Coleanthus subtilis (Tratt.) Seidel ex Roem. & Schult. (Td/m,Kn?•RS)*; *Corynephorus canescens* (L.) P. Beauv. (Hd,Ap•RS); *Dactylis glomerata* L. (Hd,Ap•J,P,R,RS,S); *Dactylis polygama* Horvat. (Hd,Sn•J,R); *Deschampsia caespitosa* (L.) P. Beauv. (Hm,Ap•J,P,R,RS,S); *Deschampsia flexuosa* (L.) Trin. (Hd,Sn•RS,S); *Digitaria ischaemum* (Schreb.) H. L. Mühl. (Td,Ar•R)*; *Digitaria sanguinalis* (L.) Scop. (Td,Ar•P,S)*; *Echinochloa crus-galli* (L.) P. Beauv. (Td,Ar•R,RS,S)*; *Elymus caninus* (L.) L. (G,S•S)†; *Elymus repens* (L.) P.Beauv. (G,Ap•P); *Eragrostis minor* Host (Td,Kn•R)*; *Festuca arundinacea* Schreb. (Hm,Ap•RS); *Festuca gigantea* (L.) Vill. (Hd,Sn•P,R,RS,S); *Festuca ovina* L. (Hd,Sn•P,R,RS); *Festuca pratensis* Huds. (Hm,Ap•J,R,RS); *Festuca rubra* L. s.s. (Hd,Ap•J,P,R,RS,S); *Festuca trachyphylla* (Hack.) Krajina (Hd,Ap•J,RS,S)*; *Glyceria declinata* Bréb. (Hm,Sn•R,S)*; Glyceria fluitans (L.) R. Br. (Hel,Sn•RS); Glyceria maxima (Hartm.) Holmb. (Hel,Sn•J,P,R,RS,S); Glyceria plicata Fr. (Hel,Sn•RS)*; *Holcus lanatus* L. (Hd,Ap•J,P,R,RS,S); *Holcus mollis* L. (Hd,Ap•J,R,RS,S); *Hordeum vulgare* L. (Td,D•S)*; Leersia oryzoides (L.) Sw. (Hel,Sn•P,R)*; Lolium multiflorum Lam. (Hd,Kn•RS)†; *Lolium perenne* L. (Hd,Ap•J,P,R,RS,S); *Melica nutans* L. (Hd,Sn•R); *Milium effusum* L. (Hd,Sn•R); *Molinia caerulea* (L.) Moench (Hm,Sn•J,P,R,RS,S); *Nardus stricta* L. (Hd,Sn•J,S); Phalaris arundinacea L. (Hel,Ap/Sn•J,P,R,RS,S); *Phleum pratense* L. (Hd,Ap/Sn•R,S)*; Phragmites australis (Cav.) Trin. ex steud. (Hel,Ap/Sn•J,P,R,RS,S); *Poa angustifolia* L. (Hd,Ap•RS); *Poa annua* L. (Td,Ap•J,R,RS,S); *Poa compressa* L. (Hd,Ap•R,S)*; *Poa nemoralis* L. (Hd,Ap/Sn•J,R,RS,S); Poa palustris L. (Hel,S•J,P,R,RS,S); *Poa pratensis* L. (Hm,Ap/Sn•J,P,R,S); *Poa subcaerulea* Sm. (Hd,Ap/Sn•J,P,RS,S)*; *Poa trivialis* L. (Hm,Ap/Sn•J,P,R,RS,S); *Secale cereale* L. (Td,D•P,R,RS); *Setaria pumila* (Poir.) Roem. & Schult. (Td,Ar•P,R,RS,S)*; *Setaria viridis* (L.) P. Beauv. (Td,Ar•P,R,RS,S)*; *Trisetum flavescens* (L.) P. B. (Hd,Ap/Sn•S)†; *Triticum aestivum* L. (Td,D•S)*; *Vulpia myuros* (L.) Gmel. (Td,Ap/Sn•RS)†; *Zea mays* L. (Td,D•RS,S)*; **Araceae:** Acorus calamus L. (Hel,Kn•J,P,R,RS,S); Lemna gibba L. (Hy-1,Sn•R,RS)*; Lemna minor L. (Hy-1,Ap/Sn•J,P,R,RS,S); Lemna minuta Kunth (Hy-1,Kn•R,RS)*; Lemna trisulca L. (Hy-1,Sn•P,RS,S); Lemna turionifera Landolt (Hy-1,Kn•RS)*; Spirodela polyrhiza (L.) Schleid. (Hy-1,Sn•J,P,R,RS,S); Wolffia arrhiza (L.) Horkel ex Wimm. (Hy-1,Ap/Sn•P,RS)*; **Sparganiaceae:** Sparganium emersum Rehmann (Hel,Sn•R,RS)*; Sparganium erectum L. em. Rchb. s.s. (Hel,Sn•J,R,S); **Typhaceae:** Typha angustifolia L. (Hel,Ap/Sn•J,P,R,RS,S); Typha ×glauca Godr. (Hel,Ap/Sn•S)*; Typha latifolia L. (Hel,Ap/Sn•J,P,R,RS,S); **Cyperaceae:** Bulboschoenus maritimus (L.) Palla (Hel,Sn•J,P,R,RS,S); *Carex acuta* L. (Hm,S•RS,J,S)†; Carex acutiformis Ehrh. (Hel,Sn•J,P,R,RS,S); *Carex bohemica* Schreb. (Hm,Sn•P,R,S); *Carex canescens* L. (Hm,Sn•RS); *Carex caryophyllea* Latourette (Hd,Sn•RS)†; *Carex cuprina* (Sándor ex Heuff.) Nendtv. (Hm,Sn•S)*; *Carex disticha* Huds. (G,Sn•R)*; Carex elata All. (Hel,Sn•P,R,RS); *Carex elongata* L. (Hm,Sn•R,RS,S); *Carex ericetorum* Poll. (Hd,Sn•RS)†; *Carex flacca* Schreb. (Hm,Sn•RS)*; *Carex flacca* × *C. panicea* (Hd,SnxSn•RS)*; *Carex gracilis* Curtis (Hel,Sn•J,P,R,RS,S); *Carex hartmaniorum* A.Cajander (Hm,Sn•RS)*; *Carex hirta* L. (G,Ap•J,P,R,RS,S); *Carex leporina* Good. (Hd,Ap•R,RS,S); *Carex nigra* Reichard (G,Sn•J,R,RS,S); *Carex pallescens* L. (Hd,Sn•RS); *Carex panicea* L. (G,Sn•R,RS,S); Carex paniculata L. (Hel,Sn•RS); *Carex pilulifera* L. (Hd,Sn•R,RS,S); *Carex praecox* Schreb. (G,Ap•R)*; Carex pseudocyperus L. (Hel,Sn•R,RS,S); *Carex remota* L. (Hm,Sn•R,RS,S); Carex riparia Curtis (Hel,Sn•J,R,RS,S); Carex rostrata Stokes (Hel,Sn•S); *Carex spicata* Huds. (Hd,Ap•R)*; *Carex sylvatica* Huds. (Hm,S•S,P)†; Carex vesicaria L. (Hel,Sn•RS,S); *Carex vulpina* L. (Hm,Ap/Sn•S)*; *Cyperus fuscus* L. (Tm,Sn•J,P,R,RS,S)*; Eleocharis acicularis (L.) Roem. & Schult. (Hd/m,Sn•P,R,RS,S); Eleocharis ovata (Roth) Roem. & Schult. (Td/m,Sn•P,R,S)*; Eleocharis palustris (L.) Roem. & Schult. (Hel,Sn•R,RS,S); *Eleocharis uniglumis* (Link) Schult. (Hm,Sn•RS); *Eriophorum angustifolium* Honck. (Hm,Sn•R,RS,S)†; *Isolepis setacea* (L.) R. Br. (Tm,Sn•R,RS)*; Schoenoplectus lacustris (L.) Palla (Hel,Sn•R,S); Schoenoplectus tabernaemontani (C. C. Gmel.) Palla (Hel,Sn•P,RS,S)*; Scirpoides holoschoenus (L.) Soják (Hel,Sn•R)*; Scirpus sylvaticus L. (Hel,Ap/Sn•J,P,R,RS,S); **Orchidaceae:** *Dactylorhiza incarnata* (L.) Soó (G,Sn•RS); *Dactylorhiza majalis* (Rchb.) P. F. Hunt & Summerh. (G,Sn•RS,S)*; *Epipactis helleborine* (L.) Crantz (G,Sn•RS)*; *Listera ovata* (L.) R. Br. (G,Sn•RS); *Platanthera chlorantha* (Custer) Rchb. (G,Sn•R)*.

Supplementary Material II

Conservation status of plant species in the Milicz Ponds reserve at the regional, national, and European levels

Explanation: macrophytes are underlined

Lower Silesia (Kącki 2007)
Category RE: *Pilularia globulifera, Scirpoides holoschoenus*. **Category CR:** *Catabrosa aquatica, Cerastium macrocarpum, Coleanthus subtilis, Crassula aquatica, Dactylorhiza incarnata, Radiola linoides*. **Category EN:** *Dryopteris cristata, Juncus tenageia, Lysimachia minima, Najas minor, Nymphoides peltata, Osmunda regalis, Platanthera chlorantha, Scutellaria hastifolia*. **Category VU:** *Alisma gramineum, A. lanceolatum, Centaurium pulchellum, Elatine hexandra, E. hydropiper, E. triandra, Eleocharis ovata, Gnaphalium luteo-album, Gypsophila muralis, Hippuris vulgaris, Illecebrum verticillatum, Leersia oryzoides, Lindernia procumbens, Lycopodium clavatum, Lythrum hyssopifolia, Ophioglossum vulgatum, Pulicaria vulgaris, Salvinia natans, Schoenoplectus tabernaemontani, Trifolium fragiferum, Triglochin palustre*. **Category NT:** *Achillea pannonica, Carex bohemica, C. disticha, Cyperus fuscus, Dactylorhiza majalis, Gagea pratensis, Glyceria declinata, Limosella aquatica, Thalictrum flavum*. **Category LC:** *Bulboschoenus maritimus, Ceratophyllum submersum, Consolida regalis, Eleocharis uniglumis, Hypericum humifusum, Hypochoeris glabra, Isolepis setacea, Juncus filiformis, Myosurus minimus, Myriophyllum verticillatum, Nymphaea alba, Ranunculus circinatus, Sagina nodosa, Stratiotes aloides, Thalictrum lucidum, Wolffia arrhiza*. **Category DD:** *Agrimonia procera, Arabis hirsuta, Callitriche hamulata, Cardamine parviflora, Juncus alpino-articulatus, Juncus capitatus, Najas marina, Stellaria pallida, Teucrium scordium, Triglochin maritimum, Utricularia australis, Zannichellia palustris*. **Category NE:** *Potamogeton acutifolius, P. trichoides, Veronica catenata.*

Wielkopolska (Jackowiak *et al*. 2007)
Category CR: *Crassula aquatica, Juncus tenageia, Lindernia procumbens, Najas minor, Pilularia globulifera, Potamogeton filiformis, Samolus valerandi*. **Category EN:** *Alisma gramineum, Callitriche hamulata, Cardamine parviflora, Carex bohemica, Elatine hexandra, E. hydropiper, E. triandra, Glyceria declinata, Juncus filiformis, Platanthera chlorantha, Scirpoides holoschoenus*. **Category VU:** *Alisma lanceolatum, Carex hartmaniorum, Catabrosa aquatica, Eleocharis ovata, Illecebrum verticillatum, Isolepis setacea, Juncus alpino-articulatus, Leersia oryzoides, Lythrum hyssopifolia, Nymphoides peltata, Ophioglossum vulgatum, Osmunda regalis, Potamogeton acutifolius, P. trichoides, Radiola linoides, Salvinia natans, Stellaria uliginosa, Triglochin maritimum, Utricularia australis, Veronica catenata, Zannichellia palustris*. **Category LC:** *Bidens radiata, Chenopodium opulifolium, Dactylorhiza incarnata, D. majalis, Galium schultesii, Gnaphalium luteo-album, Juncus capitatus, Listera ovata, Lycopodium clavatum, Potentilla norvegica, Rubus macrophyllus, Silaum silaus, Teucrium scordium*. **Category DD:** *Cerastium macrocarpum.*

Poland (Zarzycki & Szeląg 2006)
Category E: *Crassula aquatica, Pilularia globulifera, Ranunculus baudotii, R. peltatus, Samolus valerandi*. **Category [E]:** *Triglochin maritimum*. **Category V:** *Alisma gramineum, A. lanceolatum, Carex bohemica, C. praecox, Dryopteris cristata, Elatine hexandra, E. hydropiper, Eleocharis ovata, Gagea pratensis, Hippuris vulgaris, Illecebrum verticillatum, Lindernia procumbens, Lythrum hyssopifolia, Myosurus minimus, Najas minor, Ophioglossum vulgatum, Osmunda regalis, Potamogeton filiformis, Radiola linoides, Salvinia natans, Scutellaria hastifolia, Utricularia australis, Valerianella locusta, Zannichellia palustris*. **Category [V]:** *Nymphoides peltata.* **Category R:** *Juncus tenageia.*

Poland (Kaźmierczakowa *et al*. 2016)
Category CR: *Najas minor, Pilularia globulifera, Potamogeton filiformis, Ranunculus baudotii.* **Category EN:** *Cardamine parviflora, Chenopodium opulifolium, Coleanthus subtilis, Elatine hexandra, E. hydropiper, E. triandra, Juncus tenageia, Lindernia procumbens, Lythrum hyssopifolia, Samolus valerandi, Scirpoides holoschoenus.* **Category VU:** *Alisma gramineum, A. lanceolatum, Carex bohemica, Eleocharis ovata, Nymphoides peltata, Ophioglossum vulgatum, Radiola linoides, Scutellaria hastifolia, Triglochin maritimum, Veronica catenata*. **Category NT:** *Dactylorhiza incarnata, D. majalis, Isolepis setacea, Juncus filiformis, Leersia oryzoides, Leontodon taraxacoides, Limosella aquatica, Lycopodium clavatum, Najas marina, Platanthera chlorantha, Potamogeton acutifolius, P. trichoides, Pulicaria vulgaris, Ranunculus trichophyllus, Silaum silaus, Teucrium scordium, Utricularia australis, Zannichellia palustris*. **Category DD:** *Callitriche hamulata, C. palustris, Chenopodium ficifolium, Ranunculus peltatus.*

Europe (Bilz 2011)
Category LC: *Agrostis stolonifera, Alisma gramineum, A. lanceolatum, Alopecurus aequalis, A. geniculatus, A. pratensis, Armoracia rusticana, Arrhenatherum elatius, Barbarea stricta, B. vulgaris, Berula erecta, Bidens cernua, B. radiata, B. tripartita, Bolboschoenus maritimus, Butomus umbellatus, Callitriche cophocarpa, C. palustris, Caltha palustris, Cardamine pratensis, Carex acuta, C. acutiformis, C. elata, C. paniculata, C. pseudocyperus, C. riparia, C. rostrata, C. vesicaria, Catabrosa aquatica, Ceratophyllum demersum, C.submersum, Cichorium intybus, Cicuta virosa, Coleanthus subtilis, Cyperus fuscus, Dactylorhiza incarnata, D. majalis, Daucus carota, Elatine hexandra, E. hydropiper, E. triandra, Eleocharis acicularis, E. ovata, E. palustris, E. uniglumis, Epipactis helleborine, Equisetum arvense, E.fluviatile, E. palustre, Festuca ovina, F. rubra, Fragaria vesca, Glyceria declinata, G. fluitans, G. maxima, G. plicata, Hippuris vulgaris, Hydrocharis morsus-ranae, Hydrocotyle vulgaris, Iris pseudacorus, Juncus articulatus, J. bufonius J. effusus, J. tenageia, Lactuca serriola, Lathyrus*

tuberosus, Leersia oryzoides, Lemna minor, L. gibba, L. trisulca, Lepidium campestre, L. ruderale, Limosella aquatica, Lindernia procumbens, Lolium perenne, Lycopodium clavatum, Lycopus europaeus, Lysimachia nummularia, L. thyrsiflora, L. vulgaris, Lythrum hyssopifolia, L. salicaria, Medicago lupulina, Melilotus albus, M. officinalis, Mentha aquatica, Myosotis palustris, Myriophyllum verticillatum, M. spicatum, Najas marina, N. minor, Nuphar lutea, Nymphaea alba, Nymphoides peltata, Oenanthe aquatica, Padus avium, Peplis portula, Phalaris arundinacea, Phleum pratense, Phragmites australis, Platanthera chlorantha, Poa pratensis, Polygonum amphibium, P. hydropiper, P. lapathifolium, Potamogeton crispus, P. filiformis, P. lucens, P. trichoides, Prunus spinosa, Pyrus pyraster, Ranunculus aquatilis, R. baudotii, R. circinatus, R. flammula, R. peltatus, R. repens, R. rionii, R. sceleratus, R. trichophyllus, Rorippa amphibia, R. palustris, R. sylvestris, Sagittaria sagittifolia, Salvinia natans, Samolus valerandi, Schoenoplectus lacustris, S. tabernaemontani, Scirpus sylvaticus, Sinapis arvensis, Sium latifolium, Sparganium emersum, S. erectum, Spirodela polyrhiza, Teucrium scordium, Trifolium arvense, T. hybridum, T. pratense, T. repens, Typha angustifolia, T.latifolia, Urtica dioica, Utricularia australis, Veronica anagallis-aquatica, V. anagalloides, V. beccabunga, V. catenata, V. scutellata, Wolffia arrhiza, Zannichellia palustris. **Category NT:** *Pilularia globulifera, Potamogeton acutifolius.* **Category DD:** *Crassula aquatica, Lemna turionifera, Malus sylvestris.* **Category NE:** *Secale cereale.*