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RICHNESS OF MEDICINAL PLANTS OF THE PEATLANDS IN THE ŁĘCZNA-WŁODAWA LAKELAND

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Summary. The aim of this work was to present the medicinal plant species occupying the peatlands of the Łęczna-Włodawa Lakeland. The study was carried out in 2004–2007. On the basis of phytosociological relevés, the richness of medicinal plants in the studied sites was estimated. In the peatlands under study, 88 medicinal plant species were noted. Transitional mires and bogs, which are relatively little modified by man and which retain the natural character of vegetation, have the smallest share of medicinal plants. The quite abundant occurrence of medicinal plant species typical for meadows is a result of human agricultural activity conducted on the peatlands. Anthropogenic factors influenced the difference of the abiotic conditions and facilitated encroachment of many foreign as well as ruderal and nitrophilous medicinal plant species.

Key words: medicinal plants, species richness, peatland

INTRODUCTION

Medicinal plants have been collected from the natural conditions for centuries. Despite development of production of synthetic drugs and cultivation of plant species utilised in the pharmaceutical industry, harvesting in natural localities still plays a significant role. It is estimated that in Poland approximately 500 species of vascular plants are used as medicinal plants. A great majority of them can be found also in the Lublin Region [Miłkowska 1959, Izdebska 1968, Fijałkowski and Chojnacka-Fijałkowska 1987].

The cause of limited populations of numerous medicinal plant species is forest exploitation, drainage, use of herbicides and utilisation of plants for medicinal purposes [Fijałkowski and Chojnacka-Fijałkowska 1987, Fijałkowski

1988]. Therefore, many medicinal species are endangered and are under legal protection [Kucharczyk and Szukałowicz 2003, Zarzycki and Szeląg 2006, Forycka and Buchwald 2008].

About 70 medicinal plant species are grown in Poland nowadays, and the natural localities are still one of the sources of providing the industry with herbal material. In Poland, about 100 medicinal species are obtained from natural conditions [Jambor 2007]. Due to anthropogenic modifications of the environment, numerous species colonise newly creating habitats.

The aim of this work was to present the medicinal plant species occupying the peatlands of the Łęczna-Włodawa Lakeland and to analyse their distribution and species richness.

MATERIAL AND METHODS

The study was carried out in 2005–2007 in the peatlands (27) of the Łęczna-Włodawa Lakeland. A peatland is defined by Joosten and Clarke [2002] as „an area with or without vegetation with a naturally accumulated peat layer at the surface". Many of them adjoin to the lakes (20). On the basis of phytosociological relevés (580) which were made according to the Braun-Blanquet method [1951], the richness of medicinal vascular plants [Rutkowski 2007] in the studied peatlands was estimated.

The Detrended Correspondence Analysis (DCA) was applied to describe the difference between the composition of medicinal plants in the studied peatlands [Hill and Gauch 1980].

The data had qualitative character, i.e. they contained information about the presence or absence of a species (0/1). All the data analyses were performed in MVSP programs. The nomenclature for vascular plants follows Mirek *et al.* [2002].

RESULTS AND DISCUSSION

The DCA results indicate differentiation of the medicinal vascular plant composition of the studied peatlands in the Łęczna-Włodawa Lakeland (Fig. 1). The group of points (1–10) in the central part of the diagram DCA represents mainly transitional mires and bogs, not transformed or transformed to a small degree by melioration and other anthropogenic factors. The medicinal plant composition of the communities in these mires is remarkably different from the communities occupying the other sites, and is characterised by the smallest number of species, also including the smallest number of medicinal species. The herb taxa found here (*Ledum palustre*, *Oxycoccus palustris, Drosera rotundifolia*, *Menyanthes trifoliata*) represent mainly classes *Oxycocco-Sphagnetea* and *Scheuchzerio-Caricetea nigrae*.

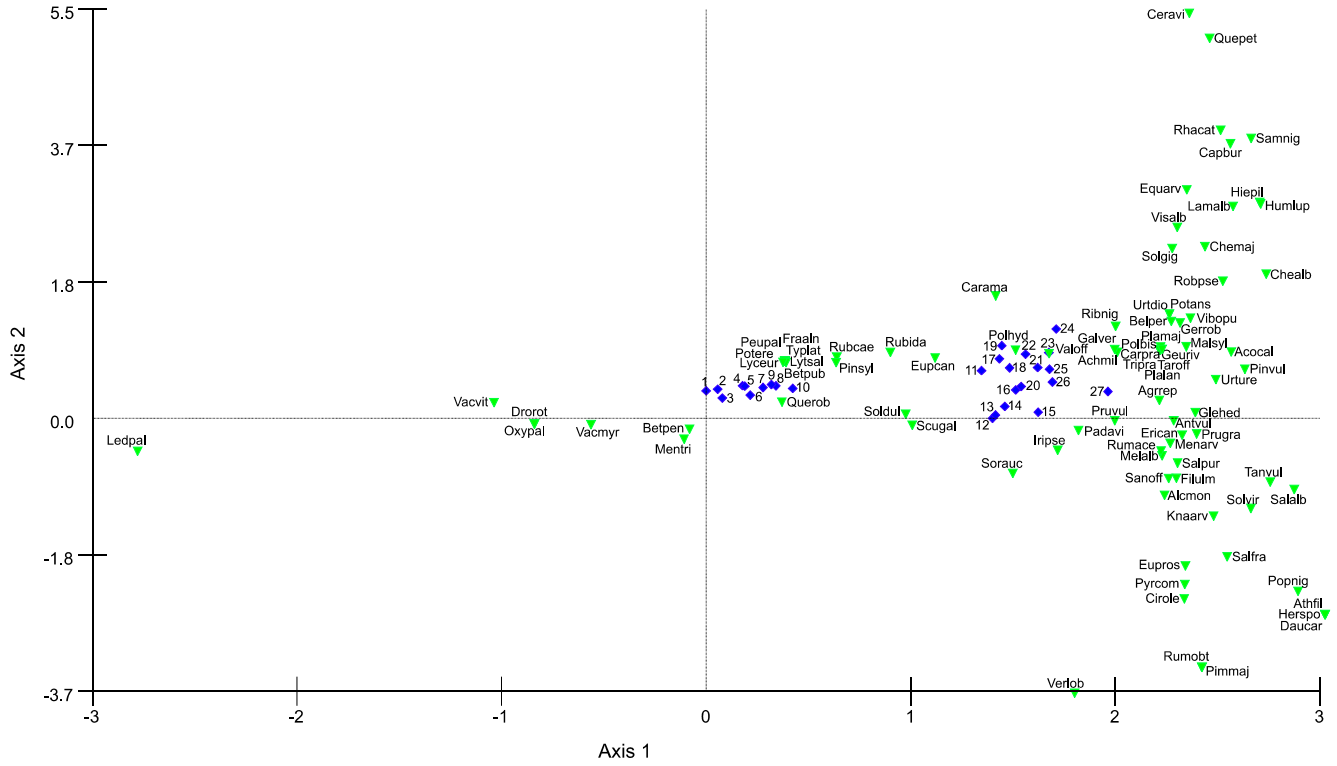

Fig. 1. Diagram of ordination of the studied peatlands and medicinal plant species on the two first DCA axes; sites: 1 – Durne Bagno, 2 – Brzeziczne, 3 – Płotycze (Sobibór), 4 – Długie, 5 – Czarne Gościnieckie, 6 – Moszne, 7 – Miejskie, 8 – Czarne Sosnowickie, 9 – Święte, 10 – Łukietek, 11 – Karaśne, 12 – Kosyń, 13 – Osowa, 14 – Bagno Bubnów, 15 – Dubeczno, 16 – Rotcze, 17 – Rogóźno, 18 – Sumin, 19 – Płotycze (Urszulin), 20 – Kleszczów, 21 – Gumienko, 22 – Jedlanka, 23 – Bikcze, 24 – Lipiniec, 25 – Krowie Bagno, 26 – Uściwierz, 27 – Dolina Tyśmienicy; explanations of the abbreviations – see Table 1

The second, markedly distinct group of points (11–27) in the DCA diagram (Fig. 1), represents different types of peatlands which were composed of a considerably bigger number of medicinal plant species. The close position of the points indicates great similarities in the share of medicinal plants in the flora of these peatlands. In this group there are fens which have retained their natural character and preserved peat-forming vegetation, and peatlands of various types without peat-forming vegetation, which have usually been drained and transformed into meadows, and which are partially degraded now. They are characterised by great richness of medicinal plant species thanks to the variety of habitats, which is a result of, among others, adapting the peatlands for agricultural purposes. The richness of medicinal plant species is determined by the presence of many herb species (*Trifolium pratense, Plantago lanceolata, Achillea millefolium, Polygonum bistorta, Agropyron repens*) usually occurring in meadow communities of the class *Molinio-Arrhenatheretea*. In fragments of dry peatlands, where the process of peat mineralisation is observed, there is common occurrence of nitrophilous species (*Urtica dioica, Urtica urens, Potentilla anserina, Chelidonium majus*) which were noted by other authors, too [Fijałkowski and Goś 1995, Trąba *et al.* 2004]. In degraded areas, ruderal species are observed (*Chenopodium album, Lamium album*, *Chelidonium majus*), as well as foreign species (*Solidago gigantea*), often referred to as invasive species which oust native flora elements [Szymura and Wolski 2005].

The most remarkable richness of medicinal species in the Lublin Region is observed in oak-lime-hornbeam forests (94), steppe grasslands (92) and ruderal habitats (92) [Fijałkowski and Chojnacka-Fijałkowska 1987]. In the studied peatlands, 88 medicinal plants were noted, out of which only several are typical peatland taxa. The remaining plants are meadow, ruderal or forest species. The Tyśmienica Valley, Krowie Bagno and Dubeczno peatlands were the richest in medicinal plants, while the peatlands located near the lakes Płotycze, Moszne and Święte contained the typical bog and transitional mire flora and were the poorest in medicinal species (Fig. 2).

Species that occurred in all the studied peatlands included *Lycopus europaeus, Peucedanum palustre, Frangula alnus, Lythrum salicaria, Typha latifolia, Potentilla erecta* and *Betula pubescens*. Some of them (*B. pubescens*) are common in other peatlands of Poland and Europe and contribute to the vertical structure of mire communities [Tomassen *et al*. 2003, Kucharski *et al.* 2004, Sugier and Czarnecka 2004].

The observed medicinal plants are under legal protection; they also include taxa which are under strict protection, such as: *Ledum palustre, Drosera rotundifolia, Pinguicula vulgaris* and *Veratrum lobelianum*. The first two species occurrelatively frequently in the study areas; the others were found only once (Tab. 1). The round-leaved sundew and the common butterwort have been assigned the status of endangered species [Zarzycki and Szeląg 2006]. *Frangula alnus, Menyanthes trifoliata,*

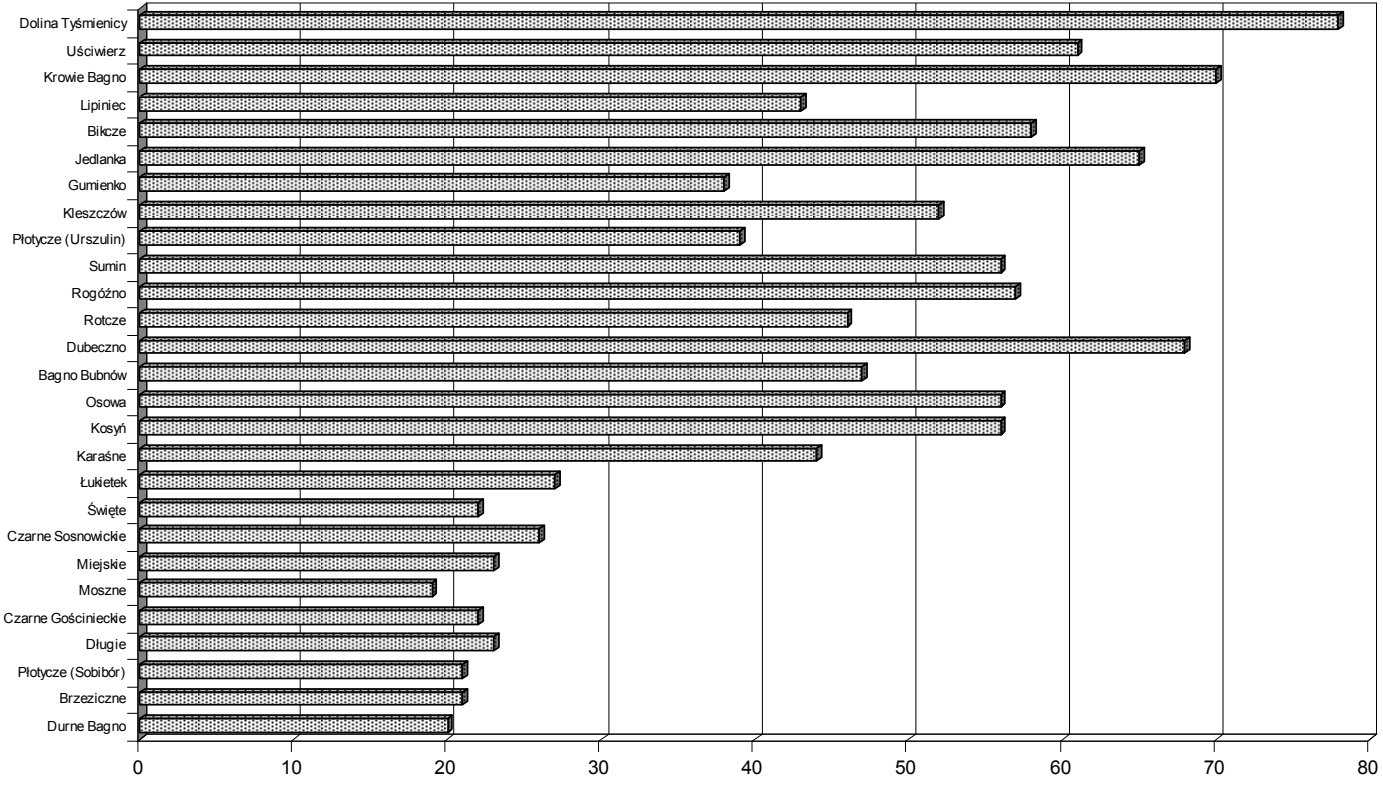

Fig. 2. Richness of medicinal plant species in the studied peatlands of Łęczna-Włodawa Lakeland

Table 1. Frequency of medicinal plant species in the studied peatlands of Łęczna-Włodawa Lakeland

Name of species	Abbrev.	Freq.	Name of species	Abbrev.	Freq.
Acorus calamus	Acocal	30	*Pimpinella major*	Pimmaj	15
Achillea millefolium	Achmil	67	*Pinguicula vulgaris*	Pinvul	4
Alchemilla monticola	Alcmon	30	*Pinus sylvestris*	Pinsyl	96
Agropyron repens	Agrrep	56	*Plantago lanceolata*	Plalan	63
Anthyllis vulneraria	Antvul	44	*Plantago major*	Plamaj	63
Athyrium filix-femina	Athfil	7	*Polygonum bistorta*	Polbis	63
Bellis perennis	Belper	37	*Polygonum hydropiper*	Polhyd	78
Betula pubescens	Betpub	100	*Populus nigra*	Popnig	11
Betula pendula	Betpen	89	*Potentila anserina*	Potans	56
Capsella bursa-pastoris	Capbur	15	*Potentilla erecta*	Potere	100
Cardamine amara	Carama	41	*Prunella grandiflora*	Prugra	15
Cardamine pratensis	Carpra	63	*Prunella vulgaris*	Pruvul	63
Cerasus avium	Ceravi	15	*Pyrus communis*	Pyrcom	26
Chelidonium majus	Chemaj	30	*Quercus robur*	Querob	89
Chenopodium album	Chealb	19	*Quercus petraea*	Quepet	7
Cirsium oleraceum	Cirole	30	*Ribes nigrum*	Ribnig	44
Daucus carota	Daucar	7	*Rhamnus catharticus*	Rhacat	19
Drosera rotundifolia	Drorot	78	*Robinia pseudacacia*	Robpse	22
Equisetum arvense	Equarv	30	*Rubus caesius*	Rubcae	96
Erigeron canadensis	Erican	37	*Rubus idaeus*	Rubida	93
Eupatorium cannabinum	Eupcan	89	*Rumex acetosa*	Rumace	48
Euphrasia rostkoviana	Eupros	30	*Rumex obtusifolius*	Rumobt	15
Filipendula ulmaria	Filulm	44	*Salix alba*	Salalb	11
Frangula alnus	Fraaln	100	*Salix fragilis*	Salfra	19
Galium verum	Galver	67	*Salix purpurea*	Salpur	37
Geranium robertianum	Gerrob	52	*Sambucus nigra*	Samnig	11
Geum rivale	Geuriv	63	*Sanguisorba officinalis*	Sanoff	44
Glechoma hederacea	Glehed	44	*Scutellaria galericulata*	Scugal	78
Heracleum sphondylium	Herspo	52	*Solanum dulcamara*	Soldul	81
Hieracium pilosella	Hiepil	22	*Solidago gigantea*	Solgig	48
Humulus lupulus	Humlup	22	*Solidago virgaurea*	Solvir	11
Iris pseudacorus	Iripse	56	*Sorbus aucuparia*	Sorauc	52
Knautia arvensis	Knaarv	11	*Tanacetum vulgare*	Tanvul	15
Lamium album	Lamalb	22	*Taraxacum officinale*	Taroff	63
Ledum palustre	Ledpal	52	*Trifolium pratense*	Tripra	63
Lycopus europaeus	Lyceur	100	*Typha latifolia*	Typlat	100
Lythrum salicaria	Lytsal	100	*Urtica dioica*	Urtdio	56
Malus sylvestris	Malsyl	41	*Urtica urens*	Urture	30
Melilotus alba	Melalb	41	*Vaccinium myrtillus*	Vacmyr	78
Mentha arvensis	Menarv	56	*Vaccinum vitis-idaea*	Vacvit	70
Menyanthes trifoliata	Mentri	89	*Valeriana officinalis*	Valoff	74
Oxycoccus palustris	Oxypal	78	*Veratrum lobelianum*	Verlob	7
Padus avium	Padavi	56	*Viburnum opulus*	Vibopu	11
Peucedanum palustre	Peupal	100	*Viscum album*	Visalb	33

Ribes nigrum and *Viburnum opulus* are under partial protection. The first two species were reported very often (Tab. 1), while the occurrence of *Ribes nigrum* and *Viburnum opulus* was less frequent.

CONCLUSIONS

1. Transitional mires and bogs, which are relatively little modified by man and which retain the natural character of vegetation, have the poorest share of medicinal plants.

2. The quite abundant occurrence of medicinal plant species typical for meadows is a result of human agricultural activity conducted on the peatlands.

3. In comparison to other ecosystems, peatlands display high richness of medicinal plant species. This results, on the one hand, from the natural habitat diversity (and hence from the diversity of plant communities), and on the other hand, from transformation of habitats (mainly, drainage of peat soil) which diversifies the abiotic conditions and facilitates encroachment of many foreign as well as ruderal and nitrophilous medicinal plant species.

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BOGACTWO ROŚLIN LECZNICZYCH TORFOWISK POJEZIERZA ŁĘCZYŃSKO-WŁODAWSKIEGO

Streszczenie. Celem pracy było przedstawienie bogactwa gatunkowego roślin leczniczych występujących na torfowiskach Pojezierza Łęczyńsko-Włodawskiego. Zróżnicowanie florystyczne wykonano na podstawie zdjęć fitosocjologicznych wykonanych w latach 2005–2007. Na badanych torfowiskach zarejestrowano 88 taksonów roślin leczniczych. Najbardziej ubogie w te gatunki okazały się torfowiska przejściowe i wysokie, stosunkowo najmniej przekształcone przez człowieka i o naturalnym charakterze roślinności. Występowanie licznych gatunków roślin leczniczych typowych dla łąk na torfowiskach jest wynikiem ich zagospodarowania i wykorzystywania do celów rolniczych. Czynniki antropogeniczne wpływają na zróżnicowanie warunków abiotycznych, co umożliwia wkraczanie obcych, a także ruderalnych oraz nitrofilnych gatunków roślin leczniczych.

Słowa kluczowe: rośliny lecznicze, bogactwo gatunkowe, torfowiska