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THERAPEUTIC PLANTS FOUND IN AGROCENOSES OF THE MIDDLE VISTULA RIVER VALLEY MESOREGION

ABSTRACT

Studies on the segetal flora of the Middle Vistula River Valley mesoregion were carried out between 2003 and 2006 in cereal and potato crops and in stubble fields (117 localities). A total of 184 medicinal vascular plant species were noted in the studied agrocenoses. Native plants (68%) dominated over species brought to Poland (32%). Hemicryptophytes (83 spp.), therophytes (74 spp.) and geophytes (26 spp.) were the most numerous groups of life forms. Perennials (55%) prevailed over short-lived plants (45%). Very rare and rare species (61%) built up the most numerous group of species. Their populations usually consisted of single specimens. Only a few of the medicinal plant species occured as larger populations. They were *Aphanes arvensis, Stellaria media* and *Galium aparine* in cereals, *Equisetum arvense, Stellaria media*, *Chenopodium album*, *Elymus repens*, *Plantago major*, *Polygonum amphibium*, *Mentha arvensis*, *Plantago intermedia*, *Polygonum hydropiper* and *Gypsophila muralis* in stubble fields, as well as *Stellaria media* in potato cultivations.

Key words: herbs, Middle Vistula River Valley mesoregion, resources

INTRODUCTION

Phytotherapy is considered to be the oldest and the broadest discipline of natural medicine. Recently these traditional therapeutic agents, prepared on the basis of herbs, have gained popularity. Medicinal plants may be advantageous due to their contents of active substances, producing definite pharmacological activity and of other valuable components, e.g., vitamins, micro and macro elements.

Segetal weed species occurring with a large abundance and high frequency, e.g. *Chenopodium album, Galinsoga parviflora* and *Stellaria media* are of the greatest importance in phytotherapy. Some of them, e.g. *Elymus repens* are used in pharmaceutical industry at present. A lot of other medicinal plants belong to the group of archa-

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eophytes, occurring exclusively in agrocenoses. They constitute an important source of therapeutic species.

The aim of the paper is to estimate the resources of plants used in traditional and modern phytotherapy, as well as to analyse their persistence, biological type, affiliation to geographic-historical groups and occurrence frequency.

MATERIAL AND METHODS

The Middle Vistula River Valley mesoregion is situated in central eastern Poland. It ranges from Vistula river gorge through Polish Uplands north of Puławy to valley narrowing in Warsaw (Kondracki 2002).

Studies on segetal flora of 117 localities situated in the Middle Vistula River Valley mesoregion were carried out between 2003 and 2006 (in cultivated fields cereal and root crops) and in stubble fields. The rich segetal flora includes 371 vascular plant species (Ługowska 2008), of which 184 have therapeutic properties. That group of plants was selected on the basis of work by Broda & Mowszowicz (2000). Nomenclature of species was accepted after Mirek *et al.* (2002). Characterization of the species, including their persistence, origin and biological type was based on Kornaś (1977), Zając (1979), Skrzyczyńska, Rzymowska (2001) and Rothmaler (2000). Occurrence frequency of species was given according to slightly changed Jasiewicz scale (stand = locality): very rare – 1–3 localities, rare – 4–9 localities, quite rare – 10–23 localities, frequent – 24–46 localities, quite common – 47–69 localities, common – 70–93 localities, very common – 94–117 localities. Abundance of the analysed populations was assessed on the basis of cover degree and was accepted as follows: 1 – very little (single specimens), 2 – little (around 5%), 3 – medium (10-15%), 4 – high (over 25%).

RESULTS

The rich and diverse herbal flora of the Middle Vistula River Valley mesoregion includes 184 vascular plant species. The results of the analysis of species affiliation to historical-geographic groups indicate the dominance of native plants (126 species – 69%) over species brought to Poland in various historical periods (58 species – 32%) (Table 1). Hemicryptophytes (83 species – 45%) and therophytes (74 species – 40%) are the most numerous groups of life forms. Besides, 26 geophytes (14%) and 1 chamaephyt (0.6%) were noted (Table 1). Perennials (101 species – 55%) prevailed over short-living

plants (83 species – 45%) in the analysed flora (Table 1).

The most numerous group of species (60.1% of the floristic list) consisted of very rare and rare species. Only one of them – *Aphanes arvensis* reached relatively high cover (about 15% in cereals) (Table 2). In the majority of plots only a single specimens of the remaining rare and very rare taxa were observed. *Polygonum hydropiper* and *Gypsophila muralis,* occurred exclusively in wet stubble fields (medium cover degree) and were found among the frequent medicinal plants. The most abundant populations of common species were *Polygonum amphibium, Menta arvensis* and *Plantago intermedia.* They were usually developing in stubble fields. In total, 20 common and very common herb species were recorded in the studied area (10%). In most potato cultivations, *Chenopodium album* and *Galinsoga parviflora* reached the highest (4) cover degree. In all studied agrocenoses, a medium cover of *Stellaria media* and *Galium aparine* (cereals) as well as *Equisetum arvense, Chenopodium album* and *Plantago major* (stubble fields) was noted (Table 2).

Table 1

Participation of geographical-historical groups, life forms and persistence of species in herbal flora of agrocenoses of the Middle Vistula River Valley

Groups	Numbers of species	% share of the analysed groups
Participation of geographic-historical		
Apophytes	126	68
Antropophytes	58	32
Total	184	100
Life forms		
Therophytes	74	40
Hemicryptophytes	83	45
Geophytes	26	14
Chamaephytes	1	1
Total	184	100
Life span		
Efemeral	83	45
Perenial	101	55

Table 2

List of medicinal plants in the agrocenoses of Middle Vistula River Valley mesoregion

Species	Freguency	Deegre of coverage		
		Cereal	Stubble fields	Potato crops
Equisetum arvense L. - Ał,W,G	very common	1	3	2
Polygonum aviculare L. – Anw, K, T	very common	2	2	2
Chenopodium album L. – Anw, K, T	very common	2	3	4
Stellaria media (L.) Vill. – Ał, K, T	very common	3	3	3
Capsella bursa –pastoris (L.) Medik. - Ar,K, T	very common	2	2	2
Centaurea cyanus L. – Ar, K, T	very common	2	1	1
Cirsium arvense (L.) Scop. – Al, W, G	very common	1	2	2
Galium aparine L. – Al, K, T	common	3	1	2
Papaver rhoeas L. – Ar, K, T	common	2	2	1
Galinsoga parviflora Cav. – Ep, K, T	common	1	2	4
Elymus repens (L.) Gould. - Anw, W, G	common	1	3	2
Anagallis arvensis L. – Ar, K, T	common	1	2	1
Plantago major L. – Al, W, H	common	1	3	1
Canyza canadensis (L.) Conquist – Ep, K, T	common	1	2	1
Polygonum amphibium L. – Anw, W, G	quite common	1	3	2
Mentha arvensis L. – Anw, W, G	quite common	2	3	2
Lapsana communis L. S. STR. – Al, K, T(H)	quite common	1	2	1
Plantago intermedia Gilib. – Anw, W, H	quite common	1	3	1
Gnaphalium uliginosum L. – Anw, K, T	quite common	1	1	2
Consolida regalis Gray - Ar, K, T	frequent	2	2	1
Polygonum hydropiper L. – Anw, K, T	frequent	1	3	1
Symphytum officinale L. –Anw(ł), W, G	frequent	1	2	1
Gypsophila muralis L. – Anw, K, T	frequent	1	3	1
Hypericum humifusum L.- Aps, W, T (H)	quite rare	1	2	1
Aphanes arvensis L. – Ar, K, T	very rare	4	-	-

The remaining species occurring in 1st degree of cover: *Convolvulus arvensis* L. – Amk,W,G (very common), *Viola arvensis* Murray- Ar,K,T (very common), *Polygonum persicaria* L. – Anw,K,T (common), *Artemisia vulgaris* L. –Ał/nw/,W,H (common), *Achillea millefolium* L. S. STR. - Ał,W,H (common), *Trifolium repens* L. – Ał,W,H (common), *Galinsoga ciliata* (Raf.) S. F. Blade - Ep,K,T (quite common), *Anthemis arvensis* L. – Ar,K,T (quite common), *Tanacetum vulgare* L. – Al/nw/,W,H (quite common), *Senecio vulgaris* L. – Ar,K,T/H/

(quite common), *Sonchus oleraceus* L. - Ar,K,T/H/ (quite common), *Taraxacum officinale* F. H. Wingg - Ał,W,H (quite common), *Melandrium album* (Mill.) Garcke. – Ał,K,T (quite common), *Spergularia rubra* (L.) J. Presl et C. Presl.–Anw,K,T (frequent), *Erysimum cheiranthoides* L. – Ar,K,T (frequent), *Potentilla anserina* L. – Ał,W,H (frequent), *Thlaspi arvense* L. –Ar,K,T (frequent), *Erodium cicutarium* (L.) L'He'r. – Ar,K,T/H/ (frequent), *Vicia cracca* L. – Ał,W,H (frequent), *Trifolium pratense* L. – Ał,K,T (frequent), *Aethusa cynapium* L. – Ar,K,T (frequent), *Daucus carota* L. – Ar,K,T (frequent), *Lithospermum arvense* L. – Ar,K,T (frequent), *Galeopsis tetrahit* L. – Al,K,T (frequent), *Glechoma hederacea* L. – Ał,W,H (frequent), *Solanum nigrum* L. em. Mill. – Ar,K,T (frequent), *Plantago lanceolata* L. – Ał,W,H (frequent), *Erigeron annuus* (L.) Pers. - Ep,K,H (frequent), *Chamomilla suaveolens* (Pursh) Rybd. – Ep,K,T (frequent), *Phragmites australis* (Cav.) Trin. ex Stend. – Anw,W,G (frequent), *Rumex crispus* L. – Ał,W,G (quite rare), *Atriplex patula* L. – Ar,K,T (quite rare), *Papaver dubium* L. – Ar,K,T (quite rare), *Fumaria officinalis* L. – Ar,K,T (quite rare), *Sisymbrium officinale* (L.) Scop.- Ar,K,T (quite rare), *Descurainia sophia* (L.) Webb ex Prantl. - Ar,K,T (quite rare), *Papaver argemone* L. – Ar,K,T (quite rare), *Sinapis arvensis* L. – Ar,K,T (quite rare), *Trifolium arvense* L. – Aps,K,T (quite rare), *Malva neglecta* Wallr. – Ar,K,H (quite rare), *Hypericum perforatum* L. – Ał,W,H (quite rare), *Pimpinella saxifraga* L. – Amk,W,H (quite rare), *Centaurium pulchellum* (Sw.) Druce – Ał,K,T (quite rare), *Linaria vulgaris* (L.) Mill. – Aps,W,G (quite rare), *Bidens tripartita* L. – Anw,K,T (quite rare), *Gnaphalium silvaticum* L. - Al,W,H (quite rare), *Cichorium intybus* L. – Ar,W,G (quite rare), *Hieracium pilosella* L. – Aps,W,H (quite rare), *Urtica urens* L. – Ar,K,T (rare), *Urtica dioica* L. – Al,W,G/H/ (rare), *Rumex confertus* (L.) Willd. – Ał,W,H (rare), *Polygonum bistorta* L.- Ał,W,G (rare), *Cerastium arvense* L. S. STR - Aps,W,H/Ch/ (rare), *Saponaria officinalis* L. – Anw,W,G/H/ (rare), *Hernaria hirsuta* L.- Aps,K,T (rare), *Silene vulgaris* Salisb.- Amk,W,H (rare), *Ranunculus bulbosus* L. - Amk,W,H (rare), *Chelidonium maius* L.- Al,W,H (rare), *Armoracia rusticana* P. Gaertn., B. Mey. et Scherb. - Ar,W,G (rare), *Berteroa incana* (L.) DC. – Amk,K,H (rare), *Sinapis alba* L. – Er,K,T (rare), *Oxalis acetosella* L.-Al,W,G (rare), *Potentilla argentea* L. S. STR. – Amk,W,H (rare), *Rubus caesius* L. – Al,W,Ch (rare), *Geum urbanum* L. – Al,W,H (rare), *Lathyrus pratensis* L. – Ał,W,H (rare), *Melitotus officinalis* (L.) Pall. – Al/nw/,K,T (rare), *Lepidium ruderale* L. – Ar,K,T (rare), *Geranium pratense* L. – Ał,W,H (rare), *Euphorbia peplus* L. – Ar,K,T (rare), *Euphorbia cyparissias* L. – Amk,W,G/H/ (rare), *Malva sylvestris* L.- Ar,K/,H (rare), *Viola tricolor* L. S. STR.- Aps,K,T (rare), *Oenothera biennis* L. S. STR. – Aps,K,T (rare), *Aegopodium podagraria* L. – Amk,W,H (rare), *Falcaria vulgaris* Bernh – Amk,K,H (rare), *Pastinaca sativa* L. S. STR. – Ał,K,H (rare), *Lysimachia vulgaris* L. – Ał,W,G/H/ (rare), *Lysimachia nummularia* L.- Ał,W,H, G (rare), *Galium verum* L. S. STR. – Ał,W,G (rare), *Galium mollugo* L. S. STR. – Ał,W,G (rare), *Anchusa officinalis* L.-

Amk,K,H (rare), *Echium vulgare* L.- Amk,K,H (rare), *Ballota nigra* L. – Ar,W,H (rare), *Prunella vulgaris* L. – Ał,W,H (rare), *Sclophularia nodosa* L. – Al,W,H (rare), *Veronica chamaedris* L. S. STR. – Ał,W,H (rare), *Rhinanthus serotinus* (Schonh.) Oborny' - Ar,K,T (rare), *Knautia arvensis* (L.) J. M. Coult. - Ał,W,H (rare), *Plantago media* L. – Ał,W,H (rare), *Solidago virgaurea* L. S. STR. – Al,W,H (rare), *Solidago gigantea* Aiton – Ep,W,H/G/ (rare), *Solidago canadensis* L. – Ep,W,H (rare), *Chamomilla recutita* (L.) Rauschert – Ar,K,T (rare), *Artemisia absinthium* L. – Ar, W, H (rare), *Artemisia campestris* L. –Aps,W,H (rare), *Tussilago farfara* L. – Anw,W,G (rare), *Senecio vernalis* Waldst.et Kit.- Ar,K,T /H/ (rare), *Arctium tomentosum* Hill. – Al,K,H (rare), *Arctium lappa* L. – Al,K,H (rare), *Cirsium jacea* L. –Ał,W,H (rare), *Lactuca serriola* L. – Ar, K, H (rare), *Dactylis glomerata* L. – Ał,W, H (rare), *Humulus lupulus* L. – Al,W,H (very rare), *Aristolochia clematitis* L. – Ar,W,H (very rare), *Fallopia dumetorum* (L.) Holub – Al/Az/,K,T (very rare), *Rumex acetosa* L. – Ał,W,H (very rare), *Rumex obtusifolius* L. – Al,W,G (very rare), *Rumex conglomeratus* Murray – Al,W,G (very rare), *Polygonum heterophyllum* Lindm. em. H. Scholz – Anw,K,T (very rare), *Polygonum mite* (L.) Schrank- Anw,K,T (very rare), *Fagopyrum esculentum* Gillib – Er,K,T (very rare), *Chenopodium hybridum* L. – Ar,K,T (very rare), *Chenopodium rubrum* L. – Anw,K,T (very rare), *Lychnis flos-cuculi* L. – Ał,W,H (very rare), *Corydalis solida* Sm. – Al,W,G (very rare), *Ranunculus acris* L. S. STR. – Ał,W,H (very rare), *Ranunculus flammula* L. – Anw,W,H (very rare), *Papaver sommniferum* L. – Er,K,T (very rare), *Camelina microcarpa* subsp. *sylvestris* (Wallr.) Hiitonen – Amk,K,T (very rare), *Sedum maximum* (L.) Hoffm. – Amk,W,G (very rare), *Sedum acre* L. – Amk,W,H (very rare), *Potentilla reptans* L. – Ał,W,H (very rare), *Filipendula ulmaria* (L.) Maxim. – Ał,W,H (very rare), *Alchemilla monticola* Opiz – Ał,W,H (very rare), *Sanguisorba officinalis* L. – Ał,W,H (very rare), *Galega officinalis* L. – Ef,W,H (very rare), *Astragalus glycyphyllos* L. – Al,W,H (very rare), *Chamaenerion angustifolium* (L.) Scop. - Az,W,H (very rare), *Lithrum salicaria* L- Ał,W,H (very rare), *Linum usitatissimum* L. – Er,K,T (very rare), *Malva pusilla* Sm. – Ar,K,H (very rare), *Eryngium planum* L. – Aps,W,H (very rare), *Carum carvi* L. – Ał,K,T (very rare), *Heracleum sphondylium* L. S. Str. – Ał,W,H (very rare), *Heracleum sibiricum* L. – Ał,W,H (very rare), *Anethum graveolens* L. – Er,K,T (very rare), *Galium odoratum* (L.) Scop. – Al,W,H (very rare), *Calystegia sepium* L.- Az,W,H (very rare), *Lycopus europaeus* L. – Anw,W,H/Hy/ (very rare), *Elsholtzia ciliata* (Thunb.) Hyl. – Ep,K,T (very rare), *Ajuga reptans* L. – Az,W,H (very rare), *Galeopsis ladanum* L. – Ar,K,T (very rare), *Galeopsis speciosa* Mill. – Al,K,T (very rare), *Thymus serpyllum* L. Emend. Fr. – Aps,W,H (very rare), *Leonurus cardiaca* L. – Ar,W,H (very rare), *Lamium album* L.- Ar,W,T (very rare), *Datura stramonium* L. – Ep,K,T (very rare), *Verbascum thapsus* L. – Amk,K,T (very rare), *Veronica spicata* L. – Amk,W,H (very rare), *Jasione montana* L – Aps,K,T (very rare), *Hieracium umbellatum* L. – Ał,W,H (very rare), *Chrysanthemum leucantemum*

L. –Ał,W,H (very rare), *Bellis perennis* L.- Ał,W,H (very rare), *Tragopogon pratensis* L. S. Str. – Ał,W,H (very rare), *Helichrysum arenarium* (L.) Moench. – Aps,W,H (very rare), *Senecio jacobea* L. – Al,W,H (very rare), *Arctium minus* (Hill.) Bernh. - Az,K,H (very rare), *Briza media* L. – Ał, W, H (very rare),

CONCLUSIONS

1. The medicinal vascular flora of agrocenoses of the Middle Vistula River Valley mesoregion was rich and included 184 species. On the other hand, the abundance of populations, in spite of high biodiversity, was low.

2. The highest cover degree in most of the studied localities reached: *Aphanes arvensis, Stellaria media, Galium aparine* (in cereals), *Equisetum arvense, Stellaria media, Chenopodium album, Elymus repens, Plantago major, Polygonum amphibium, Mentha arvensis, Plantago intermedia, Polygonum hydropiper* and *Gypsophila muralis* (in stubble fields), as well as *Stellaria media* (in potato cultivations).

3. Only two herbal species, *Chenopodium album* and *Galinsoga parviflora* exceeded 25% cover in most root cultivations of the Middle Vistula River Valley mesoregion.

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