Dynamic tendencies and medicinal plants' resources of forest complex in Górzno-Lidzbark Landscape Park

IWONA PASZEK*, TOMASZ ZAŁUSKI, DOROTA GAWENDA-KEMPCZYŃSKA, IWONA ŁAZOWY-SZCZEPANOWSKA

Department of Biology and Pharmaceutical Botany
Ludwik Rydygier Collegium Medicum in Bydgoszcz
Nicolaus Copernicus University in Toruń
M. Skłodowskiej-Curie 9
85-094 Bydgoszcz, Poland

*corresponding author: phone: +4852 5853802; fax: +4852 5853807;
e-mail: ipaszek@cm.umk.pl

Summary

This paper presents floristic richness of medicinal plants occurring in Górzno-Lidzbark Landscape Park (NE Poland). More important medicinal species were set out in four habitat groups with profile of population resources and evaluation of their dynamic tendencies included. Furthermore, natural and anthropogenic (forest management) factors effecting increase or decrease in these plants' population resources were pinpointed. Species with large population resources that may be acquired for medicinal reasons from the area of the Park were selected.

Key words: *Górzno-Lidzbark Landscape Park, medicinal plants, pharmacopeial plants, forest habitats, life forms*

INTRODUCTION

Górzno-Lidzbark Landscape Park (NE Poland) occupies an area of 27 764 ha. Circa 70% of the area of the Park constitutes a diversified forest complex. In its northern part dominate forests of oak-linden-hornbeam type and in southern part – mixed coniferous and pine forests. In land depressions on rich soils (i.a. in river valleys, on the banks of the lakes and in springs) different types of alder wood-

lands and alder carrs are present on trophically poorer soils – birch bog woodland and pine bog woodland. Among oak-linden-hornbeam and mixed coniferous forests, thermophilous oak forests as enclaves are preserved. On account of typological diversification of the forests as well as different degree of anthropopressure, high floristic diversity of studied forest complex – over 950 species – is observed [1, 2]. Nearly half of them constitute medicinal plants.

MATERIAL AND METHODS

Initially, a setout of medicinal plants of Górzno-Lidzbark Landscape Park was performed. The plants were selected on the basis of pharmaceutical literature: [3], [4], [5] and [6]. They were divided according to life forms and use in conventional medicine and folk medicine. Their counts were presented in a table. Subsequently more important medicinal species, viz. used mainly in conventional medicine and then typical to studied forest complex species were selected. Population resources and dynamic tendencies were estimated for each group which was possible because of many years' botanic research in this area. Floristic research was carried out from the middle of the 19th century to the middle of the 20th century [7], whereas floristic and phytosociological research were carried out from 70's of the 20th century [i.a. 8-13].

Population resources of the species were estimated in three-degree scale:

+ – low (few/a dozen localities or so, species aggregations usually <100 m^2),

++ – medium (a dozen localities or so, when species aggregations >100 m^2 or several dozen/a few hundred localities, when species aggregations <100 m^2),

+++ – high (several dozen/a few hundred localities, species aggregations usually >100 m^2).

Dynamic tendencies of these species were assessed as follows: ↑ – increase, ↓ – decrease, ↔ – lack of significant changes. The nomenclature of vascular plants taxa is after Mirek et al. [14].

RESULTS AND DISCUSSION

On account of typological diversification of the forests as well as different degree of anthropopressure, high floristic diversity of studied forest complex is observed. In studied area 448 medicinal species occur in total, comprising 36 trees species, 32 – bushes, 20 – shrubs and 360 – herbs. In conventional medicine 167 and in folk medicine 281 species are used. As many as 38 pharmacopeial species were noted (tab. 1). Some of the medicinal species occur abundandly or frequently, whereas others rarely or sporadically (tab. 2-5).

Table 1.

Numbers of medicinal plant species in the researched forest area

life forms	use			Σ
	conventional medicine		folk medicine	
	Farmakopea VI	other sources		
trees	7	13	16	36
bushes	7	13	12	32
shrubs	2	9	9	20
herbs	22	94	244	360
Σ	38	129	281	448

Among species typical to higrophilous deciduous forests the largest population resources are *Alnus glutinosa*, *Frangula alnus*, *Salix cinerea* and *Urtica dioica* (tab. 2). The majority of plants occurring in these forests does not reveal distinct resources changes. Only *Fraxinus excelsior* is decreasing its resources which can be related with phenomenon of 'ash disease', known in Poland [15]. Whereas *Salix cinerea* and *Urtica dioica* are revealing increase in abundance in localities. *Salix cinerea* is overgrowing in meadows as a consequence of lack of use of the meadows. While spreading of nitrophilous *Urtica dioica* is related i.a. with natural growth of forest habitats' trophy and creation of nitrophilous forest edges as a consequense of forest complexes' fragmentation.

Table 2.

Species preferring higrophilous deciduous forests

No.	species	medicinal material	population resources	dynamic tendencies
1.	*Allium ursinum*	*Allii ursini bulbus, herba*	++	↔
2.	*Alnus glutinosa*	*Alni folium, cortex*	+++	↔
3.	*Corydalis cava*	*Corydalis bulbus, herba*	++	↔
4.	*Frangula alnus*	*Frangulae cortex*	+++	↔
5.	*Fraxinus excelsior*	*Fraxini folium, cortex*	++	↓
6.	*Humulus lupulus*	*Lupuli strobilus, Lupulinum*	++	↔
7.	*Impatiens noli-tangere*	*Impatientis herba*	+	↔
8.	*Ribes nigrum*	*Ribis nigri folium, fructus*	++	↔
9.	*Salix aurita*	*Salicis cortex*	++	↔
10.	*Salix cinerea*	*Salicis cortex*	+++	↑
11.	*Salix pentandra*	*Salicis cortex*	+	↔
12.	*Solanum dulcamara*	*Dulcamarae stipes*	++	↔
13.	*Sambucus nigra*	*Sambuci flos, fructus, folium, cortex, radix*	++	↔
14.	*Urtica dioica*	*Urticae folium, radix, herba*	+++	↑

Population resources:
+ – small, ++ – medium, +++ – large;
Dynamic tendencies:
↑ – increase, ↓ – decrease, ↔ – lack of significant changes

Among species occurring in mesophilous deciduous forests (mainly in oak-linden-hornbeam forests), the largest population resources are having *Fagus sylvatica* and *Rubus idaeus* (tab. 3). *Fagus sylvatica* reveals a distinct increase in abundance in localities. It has a good viability and is additionally favored by forest management. In turn, *Rubus idaeus* reveals strong fluctuations – it disappears along with increase of tree stand density and spreads intensively in cutting areas and in young forest cultivations [16], whereas, in partially protected *Asarum europaeum*, *Viburnum opulus* and *Tilia cordata* a slow decreasing of number of the localities and population size is observed.

Table 3.

Species preferring mesophilous deciduous forests

No.	species	medicinal material	population resources	dynamic tendencies
1.	*Asarum europaeum*	*Asari cum radicibus herba*	++	↓
2.	*Chelidonium majus*	*Chelidonii herba, radix*	++	↔
3.	*Equisetum hyemale*	*Equiseti majoris herba*	+	↔
4.	*Euonymus europaea*	*Euonymi fructus, radix, cortex*	++	↔
5.	*Fagus sylvatica*	*Fagi fructus, oleum, cortex, folium, pix*	+++	↑
6.	*Galium odoratum*	*Asperulae odoratae herba*	++	↔
7.	*Hedera helix*	*Hederae helicis folium*	+	↔
8.	*Larix decidua*	*Laricis resina*	++	↔
9.	*Polypodium vulgare*	*Polypodii rhizoma*	+	↓
10.	*Rubus idaeus*	*Rubi idaei fructus, folium*	+++	↔
11.	*Scrophularia nodosa*	*Scrophulariae nodosae radix, herba*	++	↔
12.	*Tilia cordata*	*Tiliae inflorescentia*	++	↓
13.	*Viburnum opulus*	*Viburni opuli cortex*	+	↓

legend (see table 2)

In thermophilous deciduous forest the largest resources are having tree species *Quercus robur* and *Q. petraea*. In herb layer, among medicinal plants, *Fragaria vesca* and partially protected *Convallaria majalis* are dominant (tab. 4). In these forests decreasing of population resources of many medicinal plants is noted. Especially for *Arnica montana* decreasing of the number of the localities and decrease in abundance is observed [2, 17-19]. Also resources of: *Crataegus monogyna*, *Genista tinctoria*, *Origanum vulgare*, *Primula veris* and *Solidago virgaurea* are decreasing. This is mainly due to disappearing of thermophilous oak forests [comp. 20, 21] and with gradual shadowing of light edges of roads. The rest of the heliophilous species are revealing fluctuations. In some localities they may disappear but appear in others, which revealed i.a. research of dynamic tendencies of *Hypericum perforatum* [22].

Table 4.

Species preferring thermophilous deciduous forests

No.	species	medicinal material	population resources	dynamic tendencies
1.	*Agrimonia eupatoria*	*Agrimoniae herba*	++	↔
2.	*Arnica montana*	*Arnicae flos, herba, radix*	+	↓
3.	*Convallaria majalis*	*Convallariae inflorescentia, herba*	+++	↔
4.	*Crataegus monogyna*	*Crataegi fructus, flos, folium*	+	↓
5.	*Fragaria vesca*	*Fragariae fructus, folium, radix*	+++	↔
6.	*Genista tinctoria*	*Genistae tinctoriae herba*	++	↓
7.	*Hypericum perforatum*	*Hyperici herba*	++	↔
8.	*Origanum vulgare*	*Origani herba*	+	↓
9.	*Primula veris*	*Primulae radix*	++	↓
10.	*Quercus petraea*	*Quercus cortex*	+++	↔
11.	*Quercus robur*	*Quercus cortex, folium, semen*	+++	↔
12.	*Solidago virgaurea*	*Virgaureae herba*	++	↓

legend (see table 2)

Table 5.

Species preferring coniferous forests

No.	species	medicinal material	population resources	dynamic tendencies
1.	*Betula pendula*	*Betulae folium, gemmae, cortex, oleum*	+++	↔
2.	*Betula pubescens*	*Betulae folium, gemmae, cortex, oleum*	++	↔
3.	*Calluna vulgaris*	*Callunae flos*	+++	↓
4.	*Sarothamnus scoparius*	*Sparthii herba, flos*	++	↑
5.	*Juniperus communis*	*Juniperi fructus, lignum, summitas*	+++	↓
6.	*Picea abies*	*Piceae folium, turio, resina*	+++	↑
7.	*Pinus sylvestris*	*Pini folium, turio, gemmae, resina*	+++	↑
8.	*Potentilla erecta*	*Tormentillae rhizoma*	++	↔
9.	*Sorbus aucuparia*	*Sorbi fructus*	++	↔
10.	*Vaccinium myrtillus*	*Myrtilli fructus*	+++	↑
11.	*Vaccinium vitis-idaea*	*Vitis-idaeae folium, fructus*	+++	↓
12.	*Veronica officinalis*	*Veronicae herba*	++	↔

legend (see table 2)

Most of the medicinal plants with large and medium population resources occur in coniferous forests. Among them there are common elements of tree layer – *Pinus sylvestris* and *Betula pendula*, shrub layer – *Sorbus aucuparia* and *Juniperus communis* as well as herb layer – *Vaccinium myrtillus*. Disappearing species of coni-

ferous forests (mainly mixed coniferous forests) are heliophilous *Juniperus communis*, *Calluna vulgaris* and *Vaccinium vitis-idaea* [23]. Shadowing species and displacing heliophytes is i.a. *Padus serotina* introduced in forests, whereas *Pinus sylvestris* and *Picea abies* are revealing increase in resources which is related with forest management preferring these species. As a consequence, pinetization causes acidifying of habitat and increase in abundance of the *Vaccinium myrtillus,* a specimens in herb layer of mixed coniferous forests. This causes a nearly mono-species phytocoenoses and frequently are exceeding half meter in height.

CONCLUSIONS

In Górzno-Lidzbark Landscape Park a share of *Pinus sylvestris*, *Picea abies*, *Fagus sylvatica* and *Vaccinium myrtillus* is increasing distinctly, whereas *Tilia cordata*, *Vaccinium vitis-idaea*, *Arnica montana, Solidago virgaurea, Juniperus communis* and others are gradually decreasing their resources. On the other hand, *Quercus robur*, *Q. petraea*, *Betula pendula*, *Frangula alnus*, *Juniperus communis*, *Rubus idaeus*, *Convallaria majalis* and *Allium ursinum* are not revealing significant changes in their resources, despite fluctuations.

The pollution in the studied forest complex is small which gives potential possibilities of collecting some of the plants from natural state, proceeded by phytochemical tests. Especially plants with large population resources and constantly increasing their area can be acquired for medicinal reasons. Among them there are: *Pinus sylvestris*, *Fagus sylvatica, Vaccinium myrtillus, Quercus robur*, *Q. petraea*, *Betula pendula*, *Frangula alnus*, *Juniperus communis*, *Rubus idaeus* and *Convallaria majalis*. In case of *Arnica montana* and *Allium ursinum*, rare in Lowland Poland, conduction of semicultivations is possible.

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TENDENCJE DYNAMICZNE I ZASOBY ROŚLIN LECZNICZYCH W KOMPLEKSIE LEŚNYM GÓRZNIEŃSKO-LIDZBARSKIEGO PARKU KRAJOBRAZOWEGO

IWONA PASZEK*, TOMASZ ZAŁUSKI, DOROTA GAWENDA-KEMPCZYŃSKA, IWONA ŁAZOWY-SZCZEPANOWSKA

Katedra i Zakład Biologii i Botaniki Farmaceutycznej
Collegium Medicum im. Ludwika Rydygiera w Bydgoszczy
Uniwersytet Mikołaja Kopernika w Toruniu
ul. M. Skłodowskiej-Curie 9
85-094 Bydgoszcz

*autor, do którego należy kierować korespondencję: tel. +4852 5853802; faks: +4852 5853807; e-mail: ipaszek@cm.umk.pl

S t r e s z c z e n i e

Praca przedstawia bogactwo gatunkowe roślin leczniczych występujących w Górznieńsko-Lidzbarskim Parku Krajobrazowym (Polska północno-wschodnia). Ważniejsze gatunki lecznicze zestawiono w cztery grupy siedliskowe wraz z charakterystyką zasobów populacyjnych i oceną ich tendencji dynamicznych. Ponadto wskazano czynniki naturalne i antropogeniczne (gospodarka leśna) wpływające na wzrost lub spadek zasobów tychże roślin. Wytypowano gatunki o dużych zasobach populacyjnych, które mogą być pozyskiwane do celów leczniczych z terenu Parku.

Słowa kluczowe: *Górznieńsko-Lidzbarski Park Krajobrazowy, rośliny lecznicze, rośliny farmakopealne, siedliska leśne, formy życiowe*