Selected medicinal trees and shrubs in the collection of dendrological garden in Glinna near Szczecin (northwest Poland)

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Summary

The small dendrological garden in Glinna (about 5.5 ha) near Szczecin (northwest Poland) is well known for growing a lot of unique trees. The local mild microclimate in combination with the Atlantic climate of West Pomerania produce favorable conditions for growing many varieties of trees and shrubs which go freeze in the central and eastern Poland. The garden's collection amounts to 750 taxons of trees and shrubs, representing 220 species. What is valuable in the collection of the arboretum is that the cultural varieties of the plants make only 14%. The special collection of the Garden are species of Chinese origin (200 taxons) and maples (65 taxons). Basing on the data from the literature, over 147 taxons used in conventional and unconventional medicine as well as in country medicine were distinguished, among which plants of Asian origin (mainly from China) predominate.
This work presents the characteristics and the crop obtained from trees and shrubs rarely grown in Poland that possess medicinal properties, among others: *Cunninghamia lanceolata, Torreya* sp., *Acer davidii* subsp. *grosseri*, *Asimina triloba*, *Broussonetia papyrifera*, *Clerodendrum trichotomum, Chaenomeles cathayensis* var. *wilsonii*, *Diospyros kaki, Eleutherococcus* sp., *Eucommia ulmoides*, *Lindera benzoin*, *Magnolia officinalis* var. *biloba*, *Phellodendron sachalinense*, *Poncirus trifoliata*, *Sassafras albidum*, *Symplocos paniculata*, *Zanthoxylum piperitum*, *Zanthoxylum simulans*.

Key words: *medicinal trees and shrubs, dendrological garden, arboretum, Glinna, Poland*

INTRODUCTION

The dendrological garden in Glinna near Szczecin is famous for many trees and shrubs unique in Poland. A lot of them come from warmer clime and are able to

grow there due to the mild microclimate of the garden and Atlantic climate of West Pomerania. At present on the area of slightly above 5.5 hectares nearly 750 taxons of trees and shrubs of useable value are grown. They are used in conventional and alternative medicine.

The aim of this work is to present selected and species of trees and shrubs of medicinal properties rarely grown in Poland.

The Garden is located in the southeast part of the Beechwood Forest in the so-called Sunshine Basin. The unique local microclimate in combination with the Atlantic climate of West Pomerania produce favourable conditions for growing many varieties of trees and bushes which go freeze in the central and eastern Poland. According to the Heinze and Schreiber, the place in which trees are weather resistant (especially agains frost) is situated in the subzone 7a with the long term minimum average temperature from –15.0°C to –17.7°C [1]. The bioindicators of this subzone are: *Cedrus libanii* subsp. *atlantica*, *Ilex aquifolium* and *Prunus laurocerasus* which grow well in Glinna and do not freeze. The average annual temperature is 8.5°C, –1.0°C in January, 18.5°C in July and the average rainfall – 524 mm (349–715 mm).

The history of the garden goes back as far as 1823 when private tree and shrub nurseries were found here to be taken over by Śmierdnica Forest District Administration in 1870. Most of the oldest and rare species of exotic trees date back to that period. The first mention of the Garden dates back to 1911, and the Inventory of 1938 lists 52 exotic trees and shrubs. Colds, hurricane winds, the prolific growth of native vegetation and lack of planting in the post-war period left only 23 species of the initial inventory list, as of 1970 [2, 3]. In 1970, State Forest Administration and Arboretum SGGW in Rogów started a close cooperation to manage the the Garden appropriately. Since then it has been looked after by professor Jerzy Tumiłowicz, who keeps enriching collection and keeps a perfect record of all the trees and shrubs. Measurements and observations of growth, development, health and acclimatization as well as other plants' features are carried out in order to estimate their usefullness for different practical applications, e.g. in medical care. In 1985, the garden was expanded by 1.8 ha taking the land from the adjacent farmland. In 2005 on the 125th anniversary of the foundation of the garden a decision was made to enlarge the area by 5.5 hectars. In order to make the management of the garden collection more efficient and to render the scientific – educational information accessible, work was undertaken in the same year to create digital maps [4].

According to the end of 2008, the garden's collection amounts to 750 taxons of trees and shrubs, representatives of 220 species. About 60% of taxons of trees and shrubs species originate from Asia (China, Japan and Korea), 25% from North America and 15% from Europe. What is valuable in the collection of the arboretum is that the cultural varieties make only 14% [5]. The dendrological garden of Glinna is widely known for a number of biggest exotic trees growing in Poland. These are: *Abies cephalonica, Abies grandis, Chamaecyparis thyoides, Carya ovata, Fagus sylvatica*

'Miltonensis', *Cunninghamia lanceolata* (one of the biggest in the country). Until recently the biggest specimen of mammoth tree *Sequoiadendron giganteum* in Poland grew here(its trunk's circumference – 446 cm), however, it froze in 1987, when the absolute minimum temperature dropped to –30°C. The mammoth tree (there are 6 trees of this species, the biggest one of 167 cm in the trunk's circumference, the highest – 17 meters in height), are the symbols of the garden. Its speciality are species of Chinese origin (200 taxons) and maples (65 taxons). In the garden there are growing about 25 species introduced for the first time to Poland [5].

In 2009 a list of trees and shrubs of medicinal properties growing in the arboretum was made. Basing on the list of trees and shrubs in arboretum in Glinna [6], observation and the data in literature [7-11] more than 147 taxons used in conventional and unconventional medicine as well as in country medicine were distinguished. Among them plants of Asian origin (mainly from China) predominate. In the unit "Results" a characteristic and results of 36 selected trees and shrubs rarely grown in Poland but present in arboretum in Glinna and used in medicine or due to their potential medicinal properties were presented.

In table 1, 36 selected medicinal trees and shrubs rarely grown in Polish dendrological collections [12] but present in arboretum in Glinna as well as their origin, parameters, age and remarks concerning acclimatization are presented. Most of listed plants (20 taxons) have adjusted well to the growing conditions and they undergo a full cycle of generative development, producing seeds capable for sprouting. Freezing temperatures are the main factor limiting the cultivation of numerous medicinal plants (especially those of Chinese and Korean origin). That is why they can be grown only in the warmest regions of our country. After the harsh winter 2005/06 with the lowest temperatures in January about –20°C and the absolute minimum of –26°C, a *Clerodendrum trichotomum,* young specimen of *Paulownia tomentosa* and *Zanthoxylum ailanthoides* was completely frozen [13]. However, these plants regenerated very well. Low temperatures either did not cause any damage in other trees and shrubs or only young shoots, their tips and in coniferous species needles were partially frostbitten.

Table 1.

The characteristic of medicinal trees and shrubs seldom grown in Poland but found in arboretum in Glinna

species (family)	provenance	number of specimen	age in 2009	height [m]/the circumference of trunk at 1,3 m above the ground [cm], acclimatization, notices
1	2	3	4	5
Gymnospermae				
Calocedrus deccurens Florin. 'Columnaris' (*Cupressaceae*)	Oregon, California, Nevada, Mexico	9	41, 27	9.0/155–103, bearing cones, in winter 2005/06 partially frozen needles[1]
Cedrus libanii A.Rich. (*Pinaceae*)	mountains of Liban and Taurus in Turkey	3	29, 24, 12	11.5/99; bearing cones
Cephalotaxus fortunei Hook. (*Cephalotaxaceae*)	China	2	25	3.8/25; seeding

1	2	3	4	5
Cephalotaxus sinensis Li	China	2	33, 21	5/16; 4.5/22, 19, 17, seeding
Cunninghamia lanceolata (Lamb.)Hook. (*Taxodiaceae*)	eastern Asia, China	5	38–25	15/92–76; bearing cones, one of the biggest in Poland
Pseudolarix amabilis (Lindl.)Gord. (*Pinaceae*)	small range in China endemic	12	12–4	2.5
Torreya californica Torr. (*Taxaceae*)	California	5	33–28	1.6/27 (above the ground); seeding, in winter 2005/06 partially frozen needles[1]
Torreya nucifera Siebold et Zucc.	Japan	3	33, 29	5.8/40; 4.5/23; 2.0/14 seeding
Torreya nucifera var. *igaensis* Ohwi	Japan	1	20	2.5/14; seeding
Angiospermae				
Acer davidii subsp. *grosseri* (Pax)de Jong (*Aceraceae*)	nord and central China	3	41	14/79, 64, 63 (3 trunks); 13/68; 13/55, 56 (2 trunks); fruiting
Acer saccharum Marshall (*Aceraceae*)	eastern North America	11	25	14/80–45; fruiting
Asimina triloba (L.)Dunal (*Annonaceae*)	eastern USA	3	19	5/31; 5/31; 4/16; blooming
Broussonetia papyrifera (L.)Vent. (*Moraceae*)	eastern Asia, China, Korea, Japan	9	28-7	5.5/32, 29 (47 – at the height of 1 m); fruiting
Chaenomeles cathayensis var. *wilsonii* (Hemsl.)Rehder (*Rosaceae*)	central China	1	30	4/16–12 (numerous shoots); fruiting, in winter 2005/06 frozen shoots, fast regeneration[1]
Clerodendrum trichotomum Thunb. (*Verbenaceae*)	China	2	33	5/19; blooming, in winter 2005/06 frozen at the ground[1], very fast regeneration
Diospyros kaki Thunb. (*Ebenaceae*)	eastern Asia – China, Japan	1	26	1,3; in winter 2005/06 frozen shoots, fast regeneration[1]
Eucommia ulmoides Oliv. (*Eucommiaceae*)	central China	2	17	7.0/54, 47, 21 (81 – at the height of 1 m); 6.0/48, 38 (77 – at the height of 0.3 m)
Eleutherococcus leucorrhisus Oliv. *(Araliaceae)*	eastern Asia - China	2	20	2.8 and 1; fruiting
Eleutherococcus senticosus (Rupr. et Maxim.)Maxim.	eastern Asia – China, Japan, Siberia	2	19	2.5/8, blooming
Ilex opaca Sol. ex Aiton. (*Aquifoliaceae*)	eastern North America	1	27	5.5/19–17, blooming
Ilex verticillata (L.)A.Gray (*Aquifoliaceae*)	eastern North America	2	18	2.8/10–12
Lindera benzoin (L.)Blume (*Lauraceae*)	south-eastern USA	2	20	4/20–15 (numerous shoots)
Magnolia denudata Desr. (*Magnoliaceae*)	central and eastern China	2	27	6/36; 6/32; fruiting
Magnolia officinalis var. *biloba* Rehder et Wils.	western China	3	29-8	6.5/49; 6.0/39; 5.5/39; fruiting
Oplopanax horridus Miq. (*Araliaceae*)	western North America	2	36	1,2; fruiting; in winter 2005/06 frozen shoots apex, fast regeneration[1]
Oxydendrum arboreum (L.)DC. (*Ericaceae*)	south-eastern North America	2	8	4.0/15; fruiting

1	2	3	4	5
Paulownia tomentosa (Thunb. ex Murr.)Steudel (*Scrophulariaceae*)	central China	2	35-12	14/131; fruiting; in winter 2005/06 oldest specimen small damage, youngest specimen frozen at the ground and new shoots generation[1]
Phellodendron sachalinense Sarg. (*Rutaceae*)	Sachalin, nord Japan, Korea, western China	2	8	3/10–12
Poncirus trifoliata (L.)Raf. (*Rutaceae*)	nord China, Korea	2	14	0.8; blooming
Sassafras albidum (Nutt.)Nees (*Lauraceae*)	eastern North America	4	-	8/66; 7/52; 7/43, 6/34
Symplocos paniculata (Thunb.)Miq. (*Symplocaceae*)	eastern Asia, China, Japan, Korea, Himalayas	3	28-23	5/12–16 (numerous shoots); 3.5/10; 2.5/8–9 fruiting; in winter 2005/06 frozen one-year shoots apex, fast regeneration[1]
Viburnum dilatatum Thunb. var. *pilosum* (*Caprifoliaceae*)	eastern Asia, China, Japan	2	37	4.5; fruiting
Xanthorhiza simplicissima Marshall (*Ranunculaceae*)	eastern Nord America	2	36	1.3 expansionary
Zanthoxylum ailanthoides Siebold et Zucc. (*Rutaceae*)	eastern Asia, south China, Japan	1	6	1.3; in winter 2005/06 frozen at the ground[1], fast regeneration
Zanthoxylum piperitum DC	nord China, Japan, Korea	2	13	1.5; good grow
Zanthoxylum simulans Hance.	China	5	24-11	4/26 (above the ground); 3/18 (above the ground); good grow, fruiting

[1] – source: [13]

CONCLUSIONS

1. In the collection of arboretum in Glinna among over 750 taxons (according to the data from 2008), 147 species and varieties used in medicine or having potential medicinal properties were registered; 36 of those used in medicine have been described in present work.
2. There are some trees and shrubs rarely cultivated in Polish dendrological collections but grown in arboretum in Glinna: *Asimina triloba, Clerodendrum trichotomum, Broussonetia papyrifera, Diospyros kaki, Eucommia ulmoides, Eleutherococcus* sp., *Ilex opaca, Ilex verticillata, Lindera benzoin, Magnolia officinalis* var. *biloba, Phellodendron sachalinense, Poncirus trifoliata, Sassafras albidum, Symplocos paniculata, Xanthorhiza simplicissima, Zanthoxylum* sp.
3. Plants fully adjusted to the conditions of the arboretum in Glinna which undergo a full cycle of generative development include: *Calocedrus deccurens* 'Columnaris', *Cedrus libanii*, *Cephalotaxus fortunei*, *Cephalotaxus sinensis*, *Cunninghamia lanceolata*, *Torreya californica*, *Torreya nucifera*, *T. nucifera* var. *igaensis*, *Acer saccharum*, *A. davidii* subsp. *grosseri*, *Broussonetia papyrifera*, *Chaenomeles cathayensis* var. *wilsonii*, *Eleutherococcus leucorhizzus*, *Magnolia denudata*, *M. officinalis* var. *biloba, Oplopanax horridus, Oxydendrum arboreum*, *Paulownia tomentosa*, *Viburnum dilatatum* var. *pilosum*, *Zanthoxylum simulans*.

4. Plants which regenerate well after complete freezing: *Clerodendrum trichotomum, Paulownia tomentosa* and *Zanthoxylum ailanthoides*. The other plants damaged by frost in the 2005/06 winter returned to their regular appearance.

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WYBRANE DRZEWA I KRZEWY LECZNICZE W KOLEKCJI OGRODU DENDROLOGICZNEGO W GLINNEJ K. SZCZECINA (PÓŁNOCNO-ZACHODNIA POLSKA)

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Streszczenie

Ogród Dendrologiczny w Glinnej k. Szczecina znany jest z uprawy wielu unikalnych w Polsce roślin drzewiastych, w tym pochodzących z cieplejszych stref klimatycznych, na co pozwala łagodny mikroklimat ogrodu i atlantycki klimat Pomorza Zachodniego (podstrefa 7a, bioindykatory: *Cedrus libanii* subsp. *atlantica*, *Ilex aquifolium*, *Prunus laurocerasus*). Obecnie na powierzchni ponad 5,5 ha uprawiane są drzewa i krzewy ponad 750 taksonów, których kolekcję sukcesywnie od 1970 r. wzbogaca i dokumentuje prof. Jerzy Tumiłowicz z Arboretum SGGW w Rogowie. O wartości kolekcji świadczy fakt, iż uprawiane są tu przede wszystkim rośliny pochodzące z różnych regionów Ziemi (m.in. 200 taksonów pochodzących z Chin i 65 taksonów z rodzaju *Acer*), natomiast odmiany uprawne (kultywary) stanowią tylko 14% taksonów.
W kolekcji zarejestrowano 147 taksonów znajdujących zastosowanie w medycynie konwencjonalnej i alternatywnej (naturalnej). W artykule przedstawiono parametry 36 wybranych cennych roślin oraz dane dotyczące ich aklimatyzacji. Do rzadko uprawianych w Polsce drzew i krzewów o właściwościach leczniczych rosnących w arboretum w Glinnej, należą: *Cunninghamia lanceolata, Torreya* sp., *Asimina triloba, Clerodendrum trichotomum, Broussonetia papyrifera, Diospyros kaki, Eucommia ulmoides, Eleutherococcus* sp., *Ilex opaca, Ilex verticillata, Lindera benzoin, Magnolia officinalis* var. *biloba, Phellodendron sachalinense, Poncirus trifoliata, Sassafras albidum, Symplocos paniculata, Xanthorhiza simplicissima, Zanthoxylum* sp.

Słowa kluczowe: *drzewa i krzewy lecznicze, ogród dendrologiczny, arboretum , Glinna, Polska*