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CONSERVATION OF THE GENETIC POTENTIALS OF RARE PLANTS IN THE LUBLIN DISTRICT

Maciej KWIATKOWSKI, Agnieszka DĄBROWSKA, Ryszard SAWICKI

Botanical Garden, Maria Curie-Skłodowska University, Lublin, Sławinkowska 3, 20-810 Lublin, Poland; e-mail: botanik@hektor.umcs.lublin.pl

SUMMARY

Protected plants from the Lublin district have been collected since the establishment of the Botanical Garden of Maria Curie-Skłodowska University. They grow in field plots which are in different places of the garden forming the best habitat conditions for them. At present our collection consists of 48 plant species which are under a special care because of increasing degradation of the natural environment in the Lublin district, resulting in disappearance of many plant communities. One of the important factors of biodiversity conservation in our Botanical Garden is maintenance of rare xerothermal grass species from the Izbica environs and their protection. Long term studies have shown a reduction and floristic changes of these grass communities due to herbicides and mineral fertilizers used in agriculture. The considerable part of the areas with protected and threatend plants are private, which makes protection *in situ* difficult. The transfer of the threatened plants to the Botanical Garden to protect the given species, e.g. *Primula vulgaris* Huds., often requires an agreement of land owners.

Beside conservation of the biological variety of plants, which is our main purpose, protection of rare and threatened plant species in our Botanical Garden plays a great role in education of children and youth. An extensive explanation of the negative influence of human actions on the environment to young people can determine new perspectives of nature conservation.

INTRODUCTION

Biodiversity is an important problem in the law of environment protection and concerns maintenance of the existing plant populations. This issue is dealt with in Treaty, signed at the World Convention in Rio de Janerio in 1992, which is the most complex regulation of the international law determining the principles of biodiversity protection (Ciechanowicz-Maclin 2001). The countries, including Poland, that signed the treaty committed themselves to protect biodiversity in *in situ* and *ex situ* conditions. Protection *in situ* concerns protecting plant species in their natural habitats. Protection *ex situ* supplements *in situ* and aims at protecting biological variety outside the natural habitats. A big role in this respect is played by botanical gardens. The Lublin Botanical Garden of Maria Curie-Skłodowska University protects *ex situ* 48 rare plant species orginating from the Lublin district, which are threatened by extinction. They are gathered mostly as communities of living plants growing in the ground. Also work on *in situ* protection of 11 species has been conducted for over 10 years.

The purpose of this paper is to present a list of threatened species protected *in situ* and *ex situ* by the Botanical Garden of Maria Curie-Skłodowska University in Lublin.

MATERIALS AND METHODS

The Botanical Garden in Lublin has been conducting *ex situ* protection since 1964 and has collected 48 protected, rare and threatened plant species. They have come from their natural habitats in the Lublin district. Their selection for collections depended mostly on their health condition. The most representative and well developed plants with healthy seeds were selected. The material for *ex situ* protection was gathered according to the recommendations of Łukasiewicz (1985). In most cases the material was made up of seeds, more rarely plant fragments. Seeds and seedlings were sown and

planted first in experimental plots of the garden and then, when they showed a good adaptation in the new ground, they were transferred to stable places. Further *ex situ* work concerned their cultivation to provide those species with the best habitat conditions.

Their *in situ* protection in natural habitats has been conducted by our garden since 1989, using different methods dependence of the plant number of populations. In the case of large populations, e.g. *Iris aphylla* L. in Tarnogóra and Czumów 50 to 100 m^2 plots were established in which, beside registration of all plants, the studied species were counted. In the case of smaller populations, e.g. *Stipa joannis* Čelsk., at Tarnogóra observations were carried out in the whole area of their occurrence three times during the season, i.e. at the beginning of vegetation, during flowering and in the fructification phase. Evaluation of the habitats consisted in performing phytosociological analysis. Phytosociological records were taken by applying 5° scale of Braun-Blanquet (Hegi 1966, Faliński 2001) based on releve's Matuszkiewicz (1982).

RESULTS

In the Botanical Garden of Maria Curie-Sklodowska University in Lublin the *ex situ* protection of 48 species from the Lublin district is conducted (Table 1).

Table 1. A list of the species under *ex situ* protection in the Botanical Garden of Maria Curie-Skłodowska University, Lublin

Taxon name	Introduction year	Origin	Abundance	Condition
1	2	3	4	5
Aconitum variegatum L.	1994	Dys n. Lublin	C	4
Adonis vernalis L.	1967	Czumów n. Hrubieszów	C	4
	1997	Ciechanki n. Łęczna	A	4
Anemone sylvestris L.	1985	Kazimierz Dolny	E	4
	1998	Opoka Duża n. Annopol	E	4
	1999	Żmudz n. Chełm	E	4
	1982	Stawska Góra n. Chełm	D	4
Aquilegia vulgaris L.	1975	Kazimierz Dolny	C	4
Arctostaphylos uva-ursi (L.) Spreng.	1996	Oblasy n. Puławy	A	3
Aruncus sylvestris Kostel.	1977	Tarnogóra n. Izbica	B	4
Asarum europaeum L.	1967–1976	Zwierzyniec	E	4
	1977	Kazimierz Dolny	E	4
Aster amellus L.	1970	Czumów n. Hrubieszów	D	4
Betula humilis Schrank	1994	J.Uściwierz – Poj. Łęczyńsko-Włodawskie	B	4
Carlina onopordifolia Besser	1960	Stawska Góra n. Chełm	D	4
Cerasus fruticosa Pall.	1967	Czumów n. Hrubieszów	A	4
	2003	Tarnogóra n. Izbica	A	1
Chamaecytisus albus (Hacq.) Rothm.	1967	Czumów n. Hrubieszów	B	4
Cimicifuga europaea Schipcz.	1967	Tarnogóra n. Izbica	B	4
Cirsium pannonicum (L.f.) Link	1996	Broczówka n. Skierbieszów	B	4
Clematis recta L.	1993	Kazimierz Dolny	A	4
	1992	Wirkowice n. Izbica	A	4
	1995	Szczecyn-Kamienna Góra n. Gościeradów	A	4
Convallaria majalis L.	1975	Kazimierz Dolny	D	4

1	2	3	4	5
Daphne mezereum L.	1967	Dębówka n. Lublin	B	4
Dianthus carthusianorum L.	1982	Czumów n. Hrubieszów	B	4
Dianthus deltoides L.	1998	Gołąb n. Puławy	B	4
Dianthus superbus L.	1996	Ciechanki n. Łęczna	B	4
Digitalis grandiflora Mill.	1995–1996	Kazimierz Dolny	C	4
Echium russicum J.F.Gmel.	1967	Czumów n. Hrubieszów	B	4
Frangula alnus Mill.	1997	Dys n. Lublin	A	4
Galanthus nivalis L.	1965	Zwierzyniec	E	4
	1975–1976	Bochotnica n. Kazimierz Dolny	E	4
Gentiana cruciata L.	1975	Tarnogóra n. Izbica	A	4
Gypsophila paniculata L.	1967	Czumów n. Hrubieszów	B	4
Hedera helix L.	1973	Zwierzyniec	E	4
	1976	Kazimierz Dolny	E	2
Hepatica nobilis Schreb.	1971–1976	Kazimierz Dolny	E	4
	1973–1977	Zwierzyniec	E	4
	1977	Wieprzów n. Tomaszów Lubelski	C	4
	2002	Polanówka	B	4
	1997	Janki n. Chełm	B	4
Iris aphylla L.	1967	Czumów n. Hrubieszów	D	4
	1973	Tarnogóra n. Izbica	E	4
	1990	Kazimierz Dolny	C	4
	1994	Sobianowice n. Lublin	B	4
	1998	Zawadówka n. Chełm	B	4
Iris sibirica L.	1992	Bagno Bubnów – Poleski PN	E	4
	1998	Gwizdów	D	4
Jovibarba sobolifera subsp. *typicum* S.Pawł.	1997	Karczmiska n. Puławy	E	4
	1998	Głodno n. Opole Lubelskie	E	2
	1994	Szczecyn-Kamienna Góra n. Gościeradów	E	4
Lilium martagon L.	1976	Bochotnica n. Kazimierz Dolny	B	4
Linosyris vulgaris Cass.	1994	Tarnogóra n. Izbica	B	4
Menyanthes trifoliata L.	1998	Stawy Gózd n. Puławy	A	4
Nuphar lutea (L.) Sibth. & Sm.	2003	Gródek n. Hrubieszów	A	2
	2001	Zagroda n. Chełm	B	4
Nymphaea alba L.	2001	Zagroda n. Chełm	B	4
	2001	Ludwin n. Łęczna	A	4
	1997	Ostrówek Podyski n. Łęczna	A	4
Ononis spinosa L.	1976–1996	Kazimierz Dolny	B	4
Osmunda regalis L.	1998	Ruda Jastkowska	A	4
Polemonium coeruleum L.	1994	Dys n. Lublin	B	4
Polypodium vulgare L.	1998	Brzeźce n. Janowiec	A	1
Primula veris L.	1977	Tarnogóra n. Izbica	B	4
	1967	Czumów n. Hrubieszów	B	4
	1995	Szczecyn-Kamienna Góra n. Gościeradów	B	4
Primula vulgaris Huds.	1981–1991	Dębówka n. Lublin	B	4

1	2	3	4	5
Ribes nigrum L.	1976	Czemierniki n. Radzyń Podlaski	A	4
	1997	J. Piskory n. Puławy	B	4
Salix lapponum L.	1996	J. Bikcze – Poj. Łęczyńsko-Włodawskie	B	3
Trollius europaeus L.	1995	Kraśnik	B	4
Veratrum nigrum L.	1966	Łabunie n. Zamość	B	4
Veronica paniculata L.	2002	Izbica	B	4
Viburnum opulus L.	1975	Zwierzyniec	A	4
	1985	Kazimierz Dolny	A	4

Abundance:
A – 1–5 plants; B – 6–20 plants; C – 21–50 plants; D – 51–100 plants; E – above 100 plants

Condition:
1 – weak plants not flowering (or not forming spores)
2 – good growth of plants but not flowering (or not forming spores)
3 – good growth of plants, flowering (or forming spores), but not producing seeds
4 – good growth of plants, flowering (or forming spores), and producing seeds

For over ten years 11 species are under in situ protection in the area of the Lublin distrct (Table 2).

It was found that the plant number of a population of each species decreased in most localities studied. During a year 5% of plants died. The plant number of a few populations studied, i.e. *Iris aphylla* L. in Tarnogóra and Czumów, *Stipa joannis* Čelsk. in Tarnogóra and *Jovibarba sobolifera* subsp. typicum S.Pawł. in Szczecyn-Kamienna Góra, was on the same level for many years.

Table 2. A list of species under in situ protection in the Lublin district

Taxon name	Year of study onset	Locality of studies	Plant number of the population
Echium russicum J.F.Gmel.	1985	Czumów n. Hrubieszów	10
Gypsophila paniculata L.	2001	Czumów n. Hrubieszów	135
Iris aphylla L.	1995	Czumów n. Hrubieszów	1000
	1992	Tarnogóra n. Izbica	3000
	1989	Kazimierz Dolny	600
	1990	Sobianowice n. Lublin	1200
	1989	Szczecyn-Kamienna Góra n. Gościeradów	120
Iris sibirica L.	1998	Gwizdów	43
Jovibarba sobolifera subsp. *typicum* S.Pawł.	1995	Szczecyn-Kamienna Góra n. Gościeradów	1000
	1997	Karczmiska n. Puławy	3950
	1998	Zaklików	1800
Linosyris vulgaris Cass.	2000	Tarnogóra n. Izbica	1000
Osmunda regalis L	1998	Ruda Jastkowska	40
Polemonium coeruleum L.	1996	Dys n. Lublin	500
Stipa joannis Čelsk.	1995	Tarnogóra n. Izbica	14
Trollius europaeus L.	1992	Kraśnik	11000
Veronica paniculata L.	2002	Izbica	4500

The main cause of plant number reduction of populations are herbicides and mineral fertilizers used in agriculture.

Observations of *Iris aphylla* L. stands in Kazimierz Dolny point to floristic changes consisting in overgrowing xerothermic grassy areas with trees and shrubs. Then photophilous species are replaced by forest ones.

A great threat for populations of *Osmunda regalis* L and *Polemonium coeruleum* L. is water table decline caused by drainage.

DISCUSSION

The plant species listed in Table 1 are those grown in our botanical garden which are under ex situ protection. These plants are registered in the *Polska czerwona księga roślin* (Kaźmierczakowa, Zarzycki 2001) and *Atlas roślin chronionych* (Piękoś-Mirkowa, Mirek 2003). The ex situ protection of species in living plant communities, constituting the chief protection method of biodiversity is conducted by 15 research centres (Galera at al. 2000). Special programmes have been developed for this kind of studies (Wyse Jackson, Sutherland 2000).

Increasing degradation of the natural environment in the Lublin district causes disappearance of many plant species as well as the whole plant communities. Its main cause are pesti – and herbicides and mineral fertilizers used in agriculture (Sawicki at al. 2002).

To maintain the typical composition of xerothermic grassy areas, controlled cutting of trees and shrubs should be done. This is confirmed by the studies of Dąbrowska at al. (1997) carried out in Kazimierz Dolny at the stand of *Iris aphylla* L. in the years 1991–1992 and in Tarnogóra at the stand of *Stipa joannis* Čelsk. in the years 1995–2003 (Franszczak-Być at al. 2003).

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