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Changes of the ruderal flora of five selected villages in Kampinos National Park (Poland)

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Abstract: In 2004 a floristic survey of 39 species has been undertaken in abandoned villages in Kampinoski National Park. These particular species were charted in the same localities ten years ago. The study focused on the species characteristic for various types of plant communities found in ruderal sites.
Attention was also paid for overall change in species composition of the floras in studied villages, with special emphasis on the species that has not been noted previously. The changes are showed based on the data from five villages: in four of them the depopulation process has already been completed or they are inhabited by a very low population. In the fifth locality the depopulation process was halted and nowadays the village is inhabited.
In most of villages a lack or decline mainly in the number of localities of archaeophytes and some epoecophytes was observed. In case of very expansive epoecophyte *Solidago gigantea* the study showed increase in the number of localities. The charting data shows that in all the villages the largest number of localities are those of apophitic species.
From 12 to 24 species (incl. ergasiophygophytes) new to the flora of particular village were observed during the survey in 2004, most of them apophytes.

Keywords: synanthropic plants, ruderal flora, depopulated villages, isolation, Kampinos Forest, Poland.

Introduction

There are approx. 60 villages located within the Kampinos National Park or in its vicinity. Since the mid-1970. onwards National Park has conducted purchase of the agricultural lands and village buildings. Some of the farms go abandoned after the death of the owners. In years 1996-2003 National Park bought considerable amount of private land located chiefly in the heart of Kampinos Forest.

Exclusion of the farms, created within the Kampinos forest, from the agricultural use, diminishes the range and forms of anthropogenic impact put on this forest complex. These conditions allow the researcher to analyse the change in synanthropic systems, which vanish when two groups of factors are applied. Firstly it is a decline in the human population and absence of agricultural activities, and secondly direct and indirect impact of adjacent forest, swamp, and meadow communities. National Park activities (land purchase, restrictions for the tourism, forest re-plantation) aimed at re-naturalisation of the area, are not less important.

The study of the ruderal flora of the abandoned villages of the Kampinos National Park was conducted in years 1992-1995 (KIRPLUK 1996; 1998; 2003). Advanced the villages with the similar area covered by ruderal sites, and whith the depopulation process were chosen for study.

Materials and methods

In years 1993-1994 I charted localities of 39 chosen species characteristic for various types of plant communities found in ruderal sites in the Kampinos National Park. I used cartogram method (FALIŃSKI 1990). In year 2004 the same species were charted again. Attention was paid for overall change in species composition of the floras in studied villages, with special emphasis on the species that has not been noted previously.

The results of the study are given based on the example of the five villages. These villages are situated in the remote localities – among large forest complexes, swamps, various meadow types, and are distant from roads and important communication junctions. They also exhibit a decline in the human population or are completely abandoned: Karolinów village – at the beginning of the study in 1993 only one farm was inhabited, now abandoned; Grabina – two inhabited farms in 1993, now only one; Ławy – several farms in 1993, now abandoned; similarly Bieliny – now only two out of from several farms are inhabited. From among the presented villages the land purchase was halted in Buda, which allows the observation of floristic changes caused by different level of depopulation.

Plant names are given according to *Flora Europaea* (TUT. in 1968 - 1993).

Results

Table 1 shows the results of the floristic survey of 39 species conducted in years 1993-1994 and 2004 in five villages in the Kampinosk National Park – Karolinów, Ławy, Bieliny, Grabina, and Buda. An absence or decline in the number of archaeophytic species was observed: *Urtica urens, Descurainia sophia, Malva pusilla, Malva neglecta, Ballota nigra, Armoracia rusticana, Solanum nigrum, Setaria viridis, Echinochloa crus-galli, Centaurea cyanus, Spergula arvensis, Geranium pusillum, Sisymbrium officinale, Leonurus cardiaca, Fallopia convolvulus*. Similar results were obtained in case of some epoecophytes. Decline in the number of localities or absence of the following species was observed: *Cannabis sativa, Galinsoga parviflora, Galinsoga ciliata, Chamomilla suaveolens*.

In some rare cases I observed a small increase in number of localities of the species described above. Only in Buda a pronounced increase in number of localities of seven species was observed: *Geranium pusillum, Leonurus cardiaca, Ballota nigra, Galinsoga parviflora, Malva neglecta, Sisymbrium officinale, Chamomilla suaveolens*.

In case of the very expansive epoecophyte *Solidago gigantea* the study also showed increase in the number of localities (in four villages). The number of localities *of Oxalis stricta* slightly increased (in two villages).

During the research in 2004 I observed an increase in number of localities of some apophytes: *Chelidonium majus, Berteroa incana, Saponaria officinalis, Geum urbanum*. Less significant increase was observed for *Hypochoeris radicata*, *Heracleum sphondylium subsp.sibiricum* and *Aegopodium podagraria*. Interestingly apophytes, such as *Arctium tomentosum*, *Arctium minus*, *Artium lappa*, *Bromus hordaceus subsp.hordaceus*, *Corynephorus canescens, Euphorbia esula* and *Rubus caesius* decreased in the number of localities. Other species, such as *Linaria vulgaris*, *Holcus lanatus* and *Rumex crispus*, show a slight increase or decrease in the number of localities dependently on the village.

The charting results (Tab. 1) show that the highest number of localities in each village can be attributed to apophytes, except Buda where the same number of archaeophytes was noted (*Descurainia sophia, Geranium pusillum, Leonurus cardiaca, Ballota nigra*).

During the season of 2004 from 12 to 24 new species were found in the flora of each village (including ergasiophygophytes – plants that escaped from cultivation): *Anthemis tinctoria, Arnoseris minima, Bromus sterilis, Carex leporina, Cirsium palustre, Dianthus carthusianorum, Dianthus deltoides, Epipactis helleborine, Eryngium planum, Fragaria vesca, Geranium palustre, Geranium pratense, Glechoma hederacea, Helichrysum arenarium, Juncus tenuis, Lychnis flos-cuculi, Lysimachia nummularia, Lysimachia vulgaris, Oxalis acetosella, Peucedanum oreoselinum, Pimpinella saxifraga, Rubus idaeus, Scirpus sylvatica, Scutellaria galericulata, Solidago canadensis, Valeriana officinalis*.

Discussion

During the study conducted in 1993-1994 on the ruderal flora of abandoned villages in the Kampinos National Park it was found that the flora was characterised by the prevalence of the native taxa (apophytes) compared to the number of non-native species (anthropophytes). This high level of apophytism characteristic for floras of the studied villages was probably caused by their remoteness – the area was inaccessible for non-native taxa. In general the Kampinos villages are isolated by large forsts, and distant from important communication routes. Also the penetration of the area is small (low inhabitation, places not attractive for tourists).

Among the non-native species archaeophytes prevailed (KIRPLUK 1996; 1998; 2003). Such significant ratio of archaeophytes, along with the high level of apophytism, is characteristic for rural floras (FALIŃSKI 1971). The isolated Kampinos villages were considered primitive. The present study suggests a re-naturalisation process taking place in the flora of the studied villages. Archaeophytes decline in number while the number of native taxa (apophytes) increases. This trend is pronounced in abandoned or nearly abandoned villages (Karolinów, Grabina, Bieliny, Ławy). In Buda, where the number of inhabitants was constant during the last 10 years, a significant increase in number of archaeophytes is observed. This is consistent with the 'primitive village' diagnosis set in the previous study (KIRPLUK 1996; 1998, 2003). The factors influencing the change of the flora are, apart from depopulation process, direct or indirect impacts of adjacent natural and semi-natural plant communities. The activities of the National Park are not less important – new land acquired for the Park and excluded from the agricultural use is cleared, ploughed and re-afforested. This allows for spontaneous re-colonisation of the abandoned sites.

The appearance of some newly noted species seems significant. In general these are native taxa. Among these an appearance of *Epipactis helleborine* in ruderal sites in two of studied villages (Bieliny, Ławy) is especially noteworthy.

It seems that in consecutive years the increasing proportion of native taxa (apophytes) will be observed. If the process of depopulation continues and the athropopressure weakens, a decrease in the number of archaeophytes (especially annuals and biennials) should be observed, while epoecophytes, such as *Solidago gigantea*, may acquire a status of hemiagriophyte.

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References

Faliński J.B. (1971): Flora i roślinność synantropijna wsi i miast- próba analizy porównawczej.- Mat. Zakł. Fitosoc. Stos. Uniw. Warsz. 27: 15-37.

Faliński J.B. (1990): Kartografia geobotaniczna. Część 1. Zagadnienia ogólne, kartografia florystyczna i fitogeograficzna. - PPWK, Warszawa-Wrocław: 284pp.

Kirpluk I. (1996): Structure of ruderal floras in abandoned villages in the Kampinos Forest. - II. Antropization and environment of rural settlements. Flora and vegetation : 124–133. Proceedings of International Conference. Tarcal – Tokaj.

Kirpluk I. (1998): Anthropophytes of ruderal sites in several villages in the Kampinos Forest. - III. Antropization and environment of rural settlements. Flora and vegetation: 153–160. Proceedings of International Conference. Zemlinska Sirava.

Kirpluk I. (2003): Antropofity siedlisk ruderalnych wsi puszczańskich Kampinoskiego Parku Narodowego. [In :] Andrzejewski R. (ed.) Kampinoski Park Narodowy, tom I.Przyroda Kampinoskiego Parku Narodowego. - KPN, Izabelin: 275-283.

Tutin T.G., Heywood V.H., Burges N.A., Moore D.M., Valentine D.H., Walters S.M. & Webb D.A.(eds) (1964-1980): Flora Europaea. 1. XXXII + 464 pp. (1964); 2. XXVII + 454 pp. (1968); 3. XXIX + 370 pp. (1972); 4. XXIX + 505 pp. (1976); 5. XXXVI + 452 pp. (1980). - Cambridge University Press, Cambridge.

Tab. 1. Number of localities of the mapped species in 5 villages in Kampinos National Park.

species	Bieliny		Buda		Grabina		Karolinów		Ławy	
	a	**b**	**a**	**b**	**a**	**b**	**a**	**b**	**a**	**b**
1	4	3	11	7	2	0	3	2	3	2
2	2	0	9	3	1	0	2	0	3	0
3	7	5	3	3	2	4	4	0	1	2
4	1	1	6	4	3	2	1	3	1	9
5	8	12	18	18	0	0	8	8	4	22
6	0	3	8	3	4	4	1	0	4	1
7	9	5	0	0	0	0	0	0	1	0
8	8	15	1	3	18	13	16	21	2	15
9	2	1	2	4	0	0	1	1	3	0
10	10	4	24	17	2	2	11	3	5	1
11	4	13	33	35	0	0	1	2	12	5
12	11	8	7	5	7	5	9	11	6	3
13	1	3	5	2	1	0	0	0	4	2
14	2	4	0	0	8	8	0	9	3	14
15	2	0	1	8	1	0	1	0	7	0
16	3	2	3	2	0	0	1	0	6	0
17	1	1	0	2	1	2	0	0	1	1
18	9	5	6	21	1	2	16	15	13	4
19	1	0	0	0	11	15	1	0	1	3
20	5	3	1	1	1	3	1	5	1	1
21	1	0	1	1	1	0	1	0	6	0
22	1	2	2	1	2	1	10	0	1	3
23	2	0	9	17	3	0	1	1	7	11
24	6	2	15	19	7	3	1	0	31	26
25	3	9	3	6	3	1	1	3	4	14
26	7	4	2	9	1	3	1	0	4	2
27	1	0	1	1	1	0	1	0	1	0
28	4	5	6	8	0	0	0	0	1	1
29	1	4	30	31	6	3	1	2	13	13
30	10	5	4	2	4	1	1	0	1	0
31	7	0	1	0	0	0	5	12	3	2
32	2	0	1	0	0	0	3	0	4	0

Tab. 1. - continued

species	Bieliny		Buda		Grabina		Karolinów		Ławy	
	a	**b**	**a**	**b**	**a**	**b**	**a**	**b**	**a**	**b**
33	2	1	9	3	0	0	1	1	4	1
34	2	3	7	9	1	1	1	3	1	2
35	1	0	1	0	0	0	0	0	2	0
36	1	0	1	0	0	0	1	0	2	0
37	4	4	10	5	10	3	2	4	1	3
38	5	4	12	13	5	2	7	3	16	8
39	12	2	20	10	2	1	12	0	2	0

Symbol of the charted species (number of particular taxon):
1 - *Cannabis sativa*, 2 - *Urtica urens*, 3 - *Rumex crispus*, 4 - *Fallopia convolvulus*, 5 - *Saponaria officinalis*, 6 - *Spergula arvensis*, 7 - *Euphorbia esula*, 8 - *Chelidonium majus*, 9 - *Sisymbrium officinale*, 10 - *Descurainia sophia*, 11 - *Berteroa incana*, 12 - *Armoracia rusticana*, 13 - *Rubus caesius*, 14 - *Geum urbanum*, 15 - *Malva neglecta*, 16 - *Malva pusilla*, 17 - *Oxalis stricta*, 18 - *Geranium pusillum*, 19 - *Aegopodium podagraria*, 20 - *Heracleum sphondylium subsp.sibiricum*, 21 - *Solanum nigrum*, 22 - *Linaria vulgaris*, 23 - *Leonurus cardiaca*, 24 - *Ballota nigra*, 25 - *Solidago gigantea*, 26 - *Galinsoga parviflora*,
27 - *Galinsoga ciliata*, 28 - *Chamomilla suaveolens (Matricaria discoidea)*, 29 - *Artemisia campestris*, 30 - *Arctium tomentosum*, 31 - *Arctium lappa*, 32 - *Arctium minus*,
33 - *Centaurea cyanus*, 34 - *Hypochoeris radicata*, 35 - *Echinochloa crus-galli*, 36 - *Setaria viridis*, 37 - *Holcus lanatus*, 38 - *Corynephorus canescens*, 39 - *Bromus hordaceus subsp.hordaceus*

a – number of localities in years 1993-1994
b – number of localities in year 2004