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Herbaceous flora of village Chocznia (southern Poland) with particular focus on medicinal plants

The chemistry development in the nineteenth century caused that herbal preparations were replaced by synthetic medicines (Sarwa, 2001). However, currently people began to appreciate the power of natural medicines again. Herbal preparations have a weaker effect, which makes them safer. The quantity of active ingredient in the capsule prepared in the laboratory is strictly determined. The plants regulate themselves in terms of production of the amount of the active ingredient. The revival of popularity of herb-derivative medicines is due to the fact that they cause fewer or none side effects. Obviously one should not assume that any plant, in any amount will not cause side effects. Common sense and knowledge of herbs should be enough to ensure their safe use (Duke, 2011).

In Poland, many medicinal plants are still coming from the natural environment. However, in some regions of the country, especially in the vicinity of the large urban areas, the anthropogenic impact and the state of environmental pollution make it impossible to exploit medicinal plants. Hence, there is a constant need to find new areas where the concentration of medicinal species is relatively large and the state of the environment is favorable for the harvest. So far, in the vicinity of the village Chocznia (Małopolska Voivodeship) no floristic exploration has been carried out. Therefore, the floristic studies were undertaken with the aim to analyse herbaceous plants composition, with particular emphasis on medicinal species.

Chocznia (49°51'51" N, 19°26'39" E) is a village located in the western part of the Małopolska Voivodeship in Wadowice commune (Fig. 1). It is situated at the altitude of 300–380 m above sea level on the border of Wieliczka Foothills (Pogórze Wielickie) and the eastern part of Small Beskid (Beskid Mały) near Wadowice, Zawadka, Kaczyna, Inwałd and Ponikiew (Siemionow, 1984; Zinkow, 2001).

The soils in this area are rather poor and shallow; pseudopodsolic and brown acidic soils are dominant. Chocznia is located in a temperate warm climate, where annual

Fig. 1. Study area – distribution of research stands in the village of Chocznia

rainfall ranges from 1000 to 1400 mm. The strongest winds are from the west and north-west and in spring and autumn warm mountain winds are causing thaws or rain, characteristic for this area. By the Chocznia village two rivers flow – Choczenka and Kanówka. Choczenka begins its flow on the Gancarz mount (Góra Gancarz) slopes and flows into the river Skawa from right tributary of the Vistula (Wisła). The second river is the Kanówka with its source on the foothills under Bliźniaki (Siemionow, 1984; Zinkow, 2001).

Chocznia area is mainly occupied by agriculture crops, to a lesser extent forests and forest land. In this area, as in the Small Beskid, dominant are spruce forests of beech (*Fagus sylvatica* L.) and fir (*Abies alba* Mill.) considered as contaminant species classified to the *Vaccinio–Abietenion* Oberda. 1962. alliance. There can also be found small birch forests mainly in the admixture of pine forests *Querco roboris–Pinetum* (W. Mat. 1981) J. Mat. 1988. The riverine riversides appear above the streams and rivers with alder (*Alnus* sp.) and willows (*Salix* sp.) in the tree stand. There are also preserved fragments of natural acid beech forest from the alliance *Luzulo–Fagenion* (Lohm. Ex R. Tx. 1954) Oberda. 1957 and fertile beech forests with the association *Dentario glandulose–Fagetum* W. Mat. 1964 ex Guzikowa et Kornaś 1969 (Siemionow, 1984; Szafer, Zarzycki, 1972).

Plants materials were collected in years 2014–2015. Collections were held starting from March 2014 until the end of the growing season and in the spring on the beginning of the growing season of 2015. In the area of the analysed village 10 research stands with different habitat conditions were determined (Fig. 1). The plants materials were collected several times during the season noting the phenology of species. The most frequent two specimens of the species were collected. Plants were identified both in the area and after drying in the laboratory using the available keys, atlases and guides (Broda, Mowszowicz, 2000; Macků, Krejča, 1989; Schönfelder, Schönfelder, 1997; Szafer et al., 1986). Nomenclature of species was given from the online *Atlas of Polish vascular plants* (http://www.atlas-roslin.pl/). The herbarium is a documentation of the study and it is deposited in the Department of Botany at the Pedagogical University of Kraków.

The available publications and atlases were used to determine which plants have medicinal properties and contain active substances (Broda, Mowszowicz, 2000; Kawałko, 1986; Krejča, Kresanek, 1983; Macků, Krejča, 1989; Nowiński, 1980; Ożarowski, Jaroniewski, 1987; Polakowska, 1982; Rausch, Lotz, 2006; Rumińska, 1983; Rumińska, Ożarowski, 1990; Sarwa, 2001; Schönfelder, Schönfelder, 1997; Senderski, 2007; Starý, Jirásek, 1976; Volák, Stodola, 1987). Moreover, all recorded species are classified based on their frequency scale in the analysed area. For this aim, the following frequency scale was accepted: rare species – from 1 to 3 stands, frequent species – from 4 to 6 stands, common species – 7 and more stands. Among the species recognised as common and frequent are medicinal plants potentially suitable for harvesting from their natural state.

A total of 99 plant species belonging to 37 families were found in the Chocznia village. Of all the taxons, 60 plants had medicinal properties (Appendix 1 – Tab. 1), which is 60.61% of all species observed. The families most abundant in medicinal species are the following: Asteraceae (9 species), Lamiaceae (7 species), Rosaceae (5 species), Fabaceae and Brassicaceae (4 species), Plantaginaceae (3 species). Other families were represented by one or two species (Fig. 2). All medicinal plants from Chocznia stands belong to 27 families. This is consistent with the described trends in floristic literature, because these families are most strongly represented in the flora of Poland (Szafer, Zarzycki, 1972; Szafer et al., 1986). Sunflower family is the largest not only in the native flora of Poland, but in the flora of the whole world – includes as many as 25 000 species (Kochanowska, Nowak, 2003), whereas the deadnettle family is a reservoir of medicinal, spice and cosmetics species. The plants belonging to this family are characterised by a high content of aromatic essential oils, which are widely used in herbal medicine, cosmetics and gastronomy. Their properties are known and appreciated since ancient times (Broda, Mowszowicz, 2000; Nowiński, 1980; Rumińska, 1983; Sarwa, 2001).

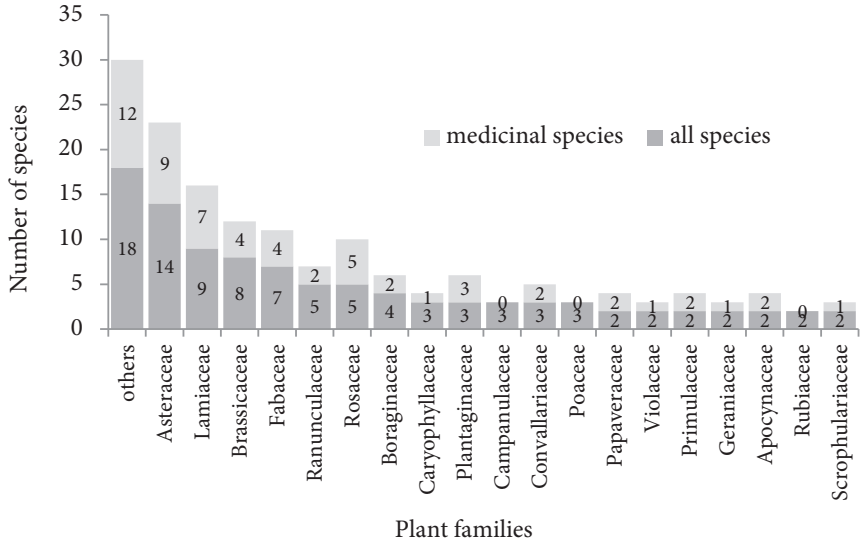

Fig. 2. Comparison of the total number of species and the number of medicinal plants belonging to individual families; others – include the families represented by only one species

On the studied area, among the medicinal plants the frequent status had 27 species and common status had 11 species. Potentially for the purpose of harvest of herbal medicine 38 of frequent and common species were suitable. Each area has a specific microclimate and the habitat conditions, which is reflected in the composition and species richness of its flora. Regularity is that the floras of different areas, more or less transformed, are dominated by rare species – generally common species are the least. Although common species occupy the largest surfaces, their amount in comparison to the total number of taxons on that area is relatively small (Szafer, Zarzycki, 1972). This is also confirmed in the flora of the analysed village (Fig. 3, Appendix 1 –- Tab. 1).

The greatest diversity of medicinal plants were found on the 2, 7, 8 stands, which are generally characterised by high species diversity (Fig. 4). In all three cases, these are places characterised by a diversity of habitats. Hence, species with different spectra of environmental requirements are present on these stands. However, a large number of medicinal taxons does not mean that these species are there in quantities suitable for harvest. Species diversity is generally connected with a greater mosaic of area and very often a lack of dominant species in plots. Dispersion of medicinal plants is not conducive to harvesting them from their natural habitats. Therefore, an important element is the frequency of occurrence of medicinal species. They need to be characterised by the appropriate concentration on stands so that their harvest is not associated with a lot of effort to find them in the area.

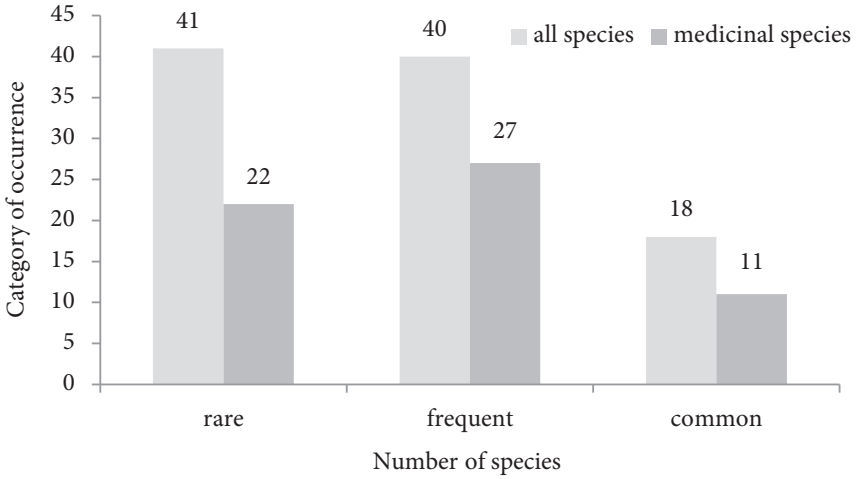

Fig. 3. Comparison of frequency of occurrence of all species and medicinal species on the studied area

The results of the study showed that the possibilities of harvesting medicinal species in Chocznia and the surrounding area are satisfactory (Appendix 1 – Tab. 1, Fig. 3). On the analysed stands, among the therapeutic species commonly occur: *Achillea millefolium*, *Aegopodium podagraria*, *Capsella bursa-pastoris*, *Cirsium rivulare*, *Lychnis flos-cuculi*, *Plantago lanceolata*, *P. maior*, *Ranunculus acris*, *Rumex acetosa*, *Taraxacum officinale*, *Urtica dioica*. The majority of these species are used in conventional medicine, but some of them were used so far mainly in folk medicine, e.g. *Cirsium rivulare*, *Lychnis flos-cuculi* or *Ranunculus acris*. These plants are well known to local residents, but now very few people know about their medicinal properties. Currently, people are less interested in collecting herbs for their own needs, because it requires a certain expertise knowledge. Additionally, availability in sales of prepared herbs substrates are large and generally they are not too expensive (Duke, 2011; Ożarowski, Jaroniewski, 1987).

However, in many Polish regions especially where there is relatively high unemployment due to the lack of large industrial plants, people engage in harvesting growing wild herbs for sale. The herbal substrate, well collected from the natural habitat, is better in terms of the content of the different active substances than that grown in artificial conditions (Duke, 2011; Nowiński, 1980; Rumińska, 1983; Sarwa, 2001; Skarżyński, 1994). Therefore, throughout Poland there are companies involved in the purchase of herbal raw materials. Obviously, in companies buying herbal raw materials it is necessary to specify the place where plants were harvested. In this context, Chocznia is an appropriate location for harvesting medicinal plants, both for industrial and personal consumption, because it is located far away from big cities and industry. The state of the environment here is relatively good and agriculture rather extensive in nature. These factors provide a high quality herbal raw materials from this area.

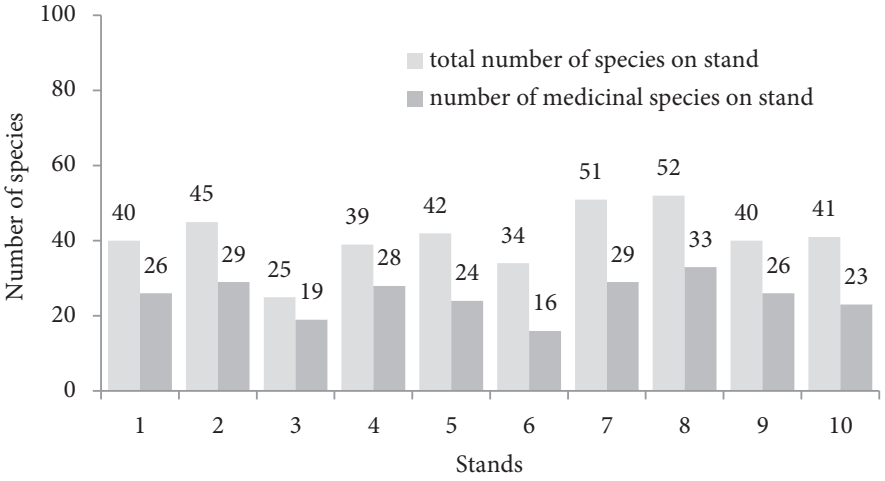

Fig. 4. Comparison of the participation of all taxons and medicinal species on distinguished research stands

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Appendix 1

Tab. 1. List of herbaceous species found on the study area; category of frequency on study area: R – rare species, F – frequent species, C – common species; 1–10 – numbers of stands according to figure 1, M – medicinal species

No.	Name of species	Plant families	Stands	Frequency category	Medical status
1.	*Achillea millefolium* L.	Asteraceae	1, 2, 3, 4, 5, 7, 8, 9, 10	C	M
2.	*Aegopodium podagraria* L.	Apiaceae	1, 2, 3, 4, 5, 6, 7, 8, 9	C	M
3.	*Agrimonia eupatoria* L.	Rosaceae	2, 5, 6, 7, 9	F	M
4.	*Ajuga reptans* L.	Lamiaceae	1, 4, 5, 7, 10	F	–
5.	*Alliaria petiolata* (M. Bieb.) Cavara et Grande	Brassicaceae	6, 8, 9, 10	F	M
6.	*Allium ursinum* L.	Alliaceae	7	R	M
7.	*Anemone nemorosa* L.	Ranunculaceae	2, 5, 6, 7, 8, 9, 10	C	–
8.	*Arabidopsis thaliana* L.	Brassicaceae	1, 2, 3, 4, 5, 6, 7	C	–
9.	*Asarum europaeum* L.	Aristolochiaceae	6, 7, 8, 9	F	M
10.	*Bellis perinnis* L.	Asteraceae	2, 4, 8, 10	F	M
11.	*Calendula officinalis* L.	Asteraceae	1	R	M
12.	*Caltha palustris* L.	Ranunculaceae	2, 5, 7, 8, 9	F	–
13.	*Campanula patula* L.	Campanulaceae	2, 4, 5, 7, 8, 9, 10	C	–
14.	*C. rapunculoides* L.	Campanulaceae	6, 10	R	–
15.	*C. trachelium* L.	Campanulaceae	6, 10	R	–
16.	*Capsella bursa-pastoris* (L.) Medik.	Brassicaceae	1, 2, 3, 4, 5, 7, 8	C	M
17.	*Cardamine amara* L.	Brassicaceae	8, 9, 10	R	–
18.	*C. pratensis* L.	Brassicaceae	2, 4, 5, 7, 10	F	M
19.	*Centurea cyanus* L.	Asteraceae	2, 3, 4, 5, 8	F	M
20.	*Cerastium holosteoides* Fr. em. Hyl.	Caryophyllaceae	1, 3, 4, 5, 6, 7, 8, 9	C	–
21.	*Chamomilla recutita* (L.) Rauschert	Asteraceae	1, 3, 4	R	M
22.	*Chamomilla suaveolens* (Pursh) Rydb.	Asteraceae	1, 3, 4, 6	F	M
23.	*Chelidonium majus* L.	Papaveraceae	1, 10	R	M
24.	*Cichorium intybus* L.	Asteraceae	1, 3, 4	R	M
25.	*Cirsium rivulare* (Jacq.) All.	Asteraceae	1, 3, 4, 5, 6, 7, 8, 9	C	M
26.	*Convallaria majalis* L.	Convallariaceae	7, 8, 9, 10	F	M
27.	*Coronilla varia* L.	Fabaceae	1, 4, 7, 8	F	M
28.	*Dactylis glomerata* L.	Poaceae	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	C	–
29.	*Dentaria glandulosa* Waldst. et Kitt.	Brassicaceae	5, 6, 7	R	–
30.	*Echium vulgare* L.	Boraginaceae	1, 3, 4	R	M
31.	*Equitesum arvense* L.	Equisetaceae	1, 3, 4, 5, 6, 7	F	M

32.	*Euphorbia cyparissias* L.	Euphorbiaceae	3, 4, 5, 7	F	M
33.	*Ficaria verna* Huds.	Ranunculaceae	2, 5, 7, 8, 9	F	M
34.	*Galathus nivalis* L.	Amaryllidaceae	7, 10	R	–
35.	*Fragaria vesca* L.	Rosaceae	2, 6, 10	R	M
36.	*Galeobdolon luteum* Huds.	Lamiaceae	2, 6, 8, 10	F	–
37.	*Galium aparine* L.	Rubiaceae	4, 5, 7, 8, 9	F	–
38.	*G. mollugo* L.	Rubiaceae	6, 7, 10	R	–
39.	*Geranium robertianum* L.	Geraniaceae	7, 9	R	M
40.	*G. phaeum* L.	Geraniaceae	7, 10	R	–
41.	*Geum rivale* L.	Rosaceae	1, 8	R	M
42.	*Glechoma hederacea* L.	Lamiaceae	2, 3, 4, 10	F	M
43.	*Hesperis matronalis* L.	Brassicaceae	1, 2	R	–
44.	*Hieracium murorum* L.	Asteraceae	5, 6, 7, 10	F	–
45.	*Humulus lupulus* L.	Cannabaceae	4, 9	R	M
46.	*Hypericum perforatum* L.	Hypericaceae	1, 3, 4, 10	F	M
47.	*Iris pseudacorus* L.	Iridaceae	1	R	–
48.	*Lamium album* L.	Lamiaceae	2, 7, 9, 10	F	M
49.	*Lathyrus pratensis* L.	Fabaceae	2, 8	R	–
50.	*Leucathemum vulgare* Lamm.	Asteraceae	3, 4, 7, 8	F	–
51.	*Luzula campestris* (L.) DC	Juncaceae	1, 2, 4, 7, 10	F	–
52.	*Lychnis flos-cuculi* L.	Caryophyllaceae	1, 2, 4, 5, 7, 8, 9, 10	C	M
53.	*Lysimachia vulgaris* L.	Primulaceae	2, 6, 8, 9	F	M
54.	*Lythrum salicaria* L.	Lythraceae	1, 2	R	M
55.	*Maianthemum bifolium* (L.) F. W. Schmidt	Convallariaceae	5, 6, 7, 10	F	–
56.	*Medicago lupulina* L.	Fabaceae	1, 6, 8, 9	F	–
57.	*Mentha longifolia* (L.) L.	Lamiaceae	1, 5, 8, 9	F	M
58.	*Myosotis palustris* (L.) L. em. Rchb.	Boraginaceae	2, 7, 8, 9	F	–
59.	*Ononis arvensis* L.	Lamiaceae	4	R	M
60.	*Origanum vulgare* L.	Lamiaceae	4	R	M
61.	*Oxalis acetosella* L.	Oxalidaceae	6, 7, 8, 9, 10	F	M
62.	*Papaver rhoeas* L.	Papaveraceae	2, 3, 4, 8	F	M
63.	*Petasites albus* L.	Asteraceae	6, 8	R	–
64.	*Phalaris arundinacea* L.	Poaceae	1	R	–
65.	*Plantago lanceolata* L.	Plantaginaceae	1, 2, 4, 5, 7, 8, 10	C	M
66.	*P. maior* L.	Plantaginaceae	1, 2, 4, 5, 7, 8, 10	C	M
67.	*P. media* L.	Plantaginaceae	7, 8	R	M
68.	*Platanthera bifolia* (L.) Rich.	Orchidaceae	9	R	–
69.	*Poa pratensis* L.	Poaceae	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	C	–
70.	*Polygonatum multiflorum* (L.) All.	Convallariaceae	1, 5, 10	R	M
71.	*Potentilla anserina* L.	Rosaceae	1, 2, 7, 8, 9	F	M
72.	*P. erecta* (L.) Raeusch.	Rosaceae	8, 9	R	M

73.	*Primula elatior* (L.) Hill	Primulaceae	2, 5, 8, 9, 10	F	M
74.	*Prunella vulgaris* L.	Lamiaceae	2, 5, 6, 8	F	M
75.	*Ranunculus acris* L.	Ranunculaceae	2, 3, 4, 5, 7, 8, 9, 10	C	M
76.	*R. bulbosus* L.	Ranunculaceae	2, 7, 8	R	–
77.	*Rudbeckia laciniata* L.	Asteraceae	1	R	–
78.	*Rumex acetosa* L.	Polygonaceae	2, 4, 5, 6, 7, 8, 9, 10	C	M
79.	*Salvia pratensis* L.	Lamiaceae	1	R	M
80.	*Senecio jacobaea* L.	Asteraceae	3, 4, 5, 6, 7, 10	F	–
81.	*Symphytum officinale* L.	Boraginaceae	8, 9	R	M
82.	*S. tuberosum* L.	Boraginaceae	5, 6, 10	R	–
83.	*Taraxacum officinale* F.H. Wigg	Asteraceae	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	C	M
84.	*Thlaspi arvense* L.	Brassicaceae	3, 4, 5, 8	F	M
85.	*Thymus serphyllum* L.	Lamiaceae	1	R	M
86.	*Trifolium pratense* L.	Fabaceae	2, 7, 8, 10	F	M
87.	*T. repens* L.	Fabaceae	2, 7, 8, 9, 10	F	M
88.	*Typha latifolia* L.	Typhaceae	1	R	–
89.	*Urtica dioica* L.	Urticaceae	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	C	M
90.	*Vaccinium myrtillus* L.	Ericaceae	6, 7, 9	R	M
91.	*Valeriana simplicifolia* (Rchb.) Kabath	Valerianaceae	2, 9	R	–
92.	*Veronica chamaedrys* L.	Scrophulariaceae	1, 2, 4, 5, 6, 7, 8, 9, 10	C	–
93.	*V. officinalis* L.	Scrophulariaceae	2, 5, 6, 7	F	M
94.	*Vicia sepium* L.	Fabaceae	2, 5, 7, 8, 9	F	–
95.	*Vinca minor* L.	Apocynaceae	9	R	M
96.	*Vincetoxinum hirudinaria* Medik.	Apocynaceae	1, 2, 5, 10	F	M
97.	*Viola arvensis* Murray.	Violaceae	2, 3, 8	R	M
98.	*V. reichenbachiana* Boreau	Violaceae	2, 5, 6, 8	F	–
99.	*Viscaria vulgaris* Rohl.	Caryophyllaceae	1, 5, 8	R	–

Flora zielna miejscowości Chocznia (południowa Polska), ze szczególnym uwzględnieniem roślin leczniczych

Streszczenie

W Polsce większość roślin leczniczych nadal pozyskuje się z naturalnych siedlisk. Jednak w niektórych regionach, zwłaszcza w okolicach dużych miast, antropogeniczne oddziaływania i zanieczyszczenia powodują, że zbiory tych roślin są niemożliwe. Dlatego bardzo ważne jest, aby szukać miejsc, w których koncentracja roślin leczniczych będzie wystarczająca do pozyskiwania. Celem niniejszej pracy było zbadanie składu flory zielnej w obrębie wsi Chocznia (województwo małopolskie, Polska południowa), ze szczególnym zwróceniem uwagi na gatunki lecznicze. W różnych warunkach siedliskowych wyznaczono na badanym obszarze 10 stanowisk, z których zbierano materiał roślinny. Zbiory wykonano w okresach wegetacyjnych w 2014 i 2015 roku. Materiały zbierano kilka razy w ciągu sezonu, zwracając uwagę na fenologię gatunków. Dokumentacją badań był zielnik, zdeponowany na Uniwersytecie Pedagogicznym w Krakowie w Zakładzie Botaniki. Analiza florystyczna stanowisk wykazała łącznie 99 gatunków roślin zielnych z 37 rodzin. Ponad połowa z nich (60 gatunków) posiadała właściwości lecznicze. Najwięcej gatunków leczniczych reprezentowało rodziny: Asteraceae (9 gatunków), Lamiaceae (7 gatunków), Rosaceae (5 gatunków), Fabaceae i Brassicaceae (po 4 gatunki), Plantaginaceae (3 gatunki). Wśród roślin leczniczych, gatunków częstych w skali terenu stwierdzono 27, a pospolitych 11. Potencjalnie do zbioru na potrzeby ziołolecznictwa nadaje się tu łącznie 38 gatunków. Badane stanowiska położone są z dala od strefy zanieczyszczeń, dużych miast i autostrad. Stąd miejscowość ta wydaje się być dobrym obszarem do zbierania surowców zielarskich na potrzeby przemysłu farmaceutycznego i na użytek własny.

Key words: flora, herbaceous, plant, medicinal plant, southern Poland

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