SYLWAN 166 (9): 593-602, September 2022
https://doi.org/10.26202/sylwan.2022047
Journal homepage: https://sylwan-journal.pl

SHORT COMMUNICATION

A new locality of *Dracocephalum ruyschiana* L. in Białowieża Forest

Tomasz Ginszt[(1,2)]✉, Agnieszka Laskowska-Ginszt[(3)]

[(1)] Institute of Forest Sciences, Faculty of Civil Engineering and Environmental Sciences, Białystok University of Technology, Wiejska 45A, 15-351 Białystok, Poland

[(2)] Białowieża Forest District, Wojciechówka 4, 17-230 Białowieża, Poland

[(3)] Hajnówka Forest District, Kolejki Leśne 12, 17-200 Hajnówka, Poland

ABSTRACT

Białowieża Forest is an extremely valuable and diverse area in which two approaches to nature conservation are used. On the one hand is passive conservation, a conservative approach whose purpose is to protect natural processes by reducing human intervention. On the other is active conservation, which aims to take steps to protect nature, including by maintaining areas in certain successional stages. *Dracocephalum ruyschiana* L., a Eurasian continental species with a fragmented distribution, undoubtedly requires active conservation. Its contiguous range extends from the Eastern European Plain to Eastern Siberia. It is found in scattered European sites from the southern Scandinavian Peninsula to the Alps, the Balkan Peninsula, and the Caucasus, and as far the west as the Pyrenees. In Poland, *D. ruyschiana* has been known to occur in about 50 locations. Most locations were in north-eastern Poland, as far west as the valleys of the Noteć and the lower and middle Vistula rivers. Unfortunately, at the moment, many of these sites were not identified for a hundred years or more. In recent years, *D. ruyschiana* has been found mainly in north-eastern Poland (Knyszyn Forest, Biebrza Valley, and Wigry National Park). *D. ruyschiana* was considered extinct in Białowieża Forest until its recent discovery. In Poland, *D. ruyschiana* is most often found in thermophilic edge communities of the *Trifolio-Geranietea* class, on exposed sites and in forest gaps, and in fresh mixed broadleaved forest habitats, where vegetation belongs to the thermophilous oak forest, *Potentillo albae-Quercetum*. The new locality of *D. ruyschiana* was discovered in the Hajnówka Forest District in Białowieża Forest. The new stand is located in an area of active forest conservation in fresh mixed broadleaved forest (LMśw), oak-hornbeam forest community (9170). *D. ruyschiana* is located in a 0.35 ha second-growth forest, established in 2017 in a gap created as a result of sanitary cuts carried out in 2012-2015 related to an outbreak of spruce bark beetle. The specimen of northern dragonhead had a height of about 40 cm with 15 generative shoots and 1 vegetative shoot.

KEY WORDS

active conservation, critically endangered, flora, Hajnówka Forest District, Northern dragonhead

✉e-mail: t.ginszt@pb.edu.pl, tomasz.ginszt@bialystok.lasy.gov.pl

Received: 16 August 2022; Revised: 24 November 2022; Accepted: 2 December 2022; Available online: 25 January 2023

Introduction

Białowieża Forest is an extremely interesting and diverse area serving as a place for research on natural processes. It is an area with exceptional characteristics and is of great importance for nature conservation. In many cases, passive approaches to conservation conducted in Białowieża Forest are not conducive to maintaining species diversity of many rare and endangered species of plants and animals. One such species is the northern dragonhead, *Dracocephalum ruyschiana* L., which was almost extinct in this valuable and unique area.

Dracocephalum is a genus of about 60 to 70 species of flowering plants native to the temperate regions of the Northern Hemisphere (Lazarević *et al*., 2009; Sonboli *et al*., 2011). The species represents a genus collectively called dragonheads, which are annual or perennial herbaceous plants or subshrubs, growing from 15 to 90 centimetres tall. *Dracocephalum* grows in alpine and semidry conditions, mainly in temperate Asia, with a few species occurring in Europe, one in North America, and 35 species in China (Flora of China, 2022).

D. ruyschiana is a continental Eurasian species from the *Lamiaceae* family. The northern dragonhead is a perennial, clump-forming chamaephyte, whose shoots reach heights of 30 to 60 cm. Sumptuous, 2.5-3 cm long, bluish-violet flowers gather at the top of the plant in spiky inflorescences, which last from June to August. The bisexual flowers are pollinated by bumblebees (Hegi *et al*., 1927), but in the absence of pollinators, self-pollination may occur (Milberg and Bertillson, 1997). The range of the species is fragmented. The contiguous range stretches from the East European Plain to eastern Siberia. In isolated European sites, it occurs from the southern part of the Scandinavian Peninsula to the Alps, the Balkan Peninsula, and the Caucasus, and as far west as the Pyrenees (Hultén and Fries, 1986).

The northern dragonhead is a calciphilous species that prefers a slightly cooler and more continental climate (Simon, 1992; Farkas, 1999). *D. ruyschiana* is found in forest steppe, steppe meadows, and mountain meadow steppe (Walter, 1974; Lazarević *et al*., 2009). In the central part of its range in Eastern Europe and Western Asia, *D. ruyschiana* is associated with larch forests, pine and pine-oak forests, forest-steppe, and meadow steppes, occurring especially in lighter, sandy soils (Walter, 1974; Tihomirov, 1987; Adamowski and Wołkowycki, 2014). In Germany, the species is found on dry rocky, sandy or clay soils, in forest edge communities in association with *Geranion sanguinei*, in grasslands in association with *Festucion variae*, or in calcareous pine forests in the *Erico-Pinion* association (Oberdorfer, 1983; Adamowski and Wołkowycki, 2014). *D. ruyschiana* grows in sunny places, in fresh habitats of medium fertility and pH, and in light, well-drained humus and mineral soils. Optimal conditions for its development are found in fresh mixed coniferous forests and more fertile fresh mixed coniferous forests. The species disappears due to changes in the use of forest communities, resulting in the increasing density of forest. To protect the local populations of northern dragonhead the removal of overshading trees and shrubs and moving of expansive perennials are recommended (Adamowski and Wołkowycki, 2014).

In Poland, optimum development of northern dragonhead occurs in thermophilic edge communities of the *Trifolio-Geranietea* class, in well-exposed microsites and tree gaps, and in fresh mixed broadleaved forest habitats, where the vegetation is thermophilous oak forest, *Potentillo albae-Quercetum*. Northern dragonhead also inhabit fresh habitats with permeable mineral-humus soils made of weakly loamy sand and gravel, with moderate fertility and acidification. Some sites are located in various types of substitute communities, such as pine and aspen-oak woods (Adamowski and Wołkowycki, 2014).

The northern dragonhead is endangered in the European part of its range and is covered by the Bern Convention (Adamowski and Wołkowycki, 2014). In countries neighbouring Poland,

the northern dragonhead is extinct in Germany, the Kaliningrad Oblast, and Lithuania, threatened with extirpation in Belarus, and faces an unknown level of threat in Ukraine (Adamowski and Wołkowycki, 2014). It is known to have occurred historically in only three locations in the French Pyrenees, but two of these sites are unknown. There were no records of its occurrence in Spain or Andorra until 2021, when the first sighting of *D. ruyschiana* was found in Val d'Aran in the Catalonian Pyrenees, Spain (Guardiola, 2022). In Poland, northern dragonhead is a strictly protected species (Rozporządzenie, 2014), however, only in 2001 did it receive statutory protection (Rozporządzenie, 2001). *D. ruyschiana* was included in the Red List of Plants and Fungi of Poland, classified as a critically endangered species – threat category E (Mirek *et al*., 2006). In the 2016 edition of the Red List, the species received the CR category – critically endangered (Kaźmierczakowa *et al*., 2016) and it is rated as critically endangered (CR) in the Polish Red Book of Plants (Adamowski and Wołkowycki, 2014). Overall, there has been a decline in the number of sites, the size of its populations, and retraction of its range in Poland.

In the past, *D. ruyschiana* was known to occur in about 50 locations in Poland. Most were in the northeast of the country, as far west as the valleys of the Noteć and the lower and middle Vistula rivers (Zając and Zając, 2001). However, many of these sites have not been confirmed for at least a century (Adamowski and Wołkowycki, 2014). Locations, where northern dragonhead were historically reported, include: the Toruń-Eberswalde Ice-Marginal Valley; in the vicinity of Krzyż and Wieluń (Spribille, 1897) and Szubin (Bock, 1908); in the Greater Poland Lake District; in the vicinity of Inowrocław (Spribille, 1883); in the Middle Mazovian Lowland near Puławy (Kucharczyk, 2001); in the North Masovian Lowland near Łomża (Waga, 1847-1848); and, with the largest number of sites, the Masurian Lake District (Abromeit *et al*., 1898-1940). Its occurrence at sites in the Vistula Valley near Kwidzyn, in the Toruń-Eberswalde Ice-Marginal Valley near Toruń, and the Chełmińsko-Dobrzyński Lake District near Lidzbark Welski, have not been confirmed for at least the last 60-70 years of the 20th century (Herbich, 1974; Załuski, 1988). Failing or now extinct populations in Wielkopolska, on the lower Vistula, and in the vicinity of Lidzbark Welski consisted of single individuals (Adamowski and Wołkowycki, 2014). Quite recently, two large populations were discovered in the North Podlasie Lowland: in the Biebrza Valley, from the mouth of the Jegrznia river to Brzeziny Kapickie (Werpachowski, 2000, 2005), and in Knyszyn Forest (Sokołowski, 1995b; Wołkowycki, 2008). Populations in the Biebrza Valley contain from 100 to 500 flowering and fruiting shoots, growing in small clusters (Adamowski and Wołkowycki, 2014). At the border of Wigry National Park, as well as in most of its sites in Knyszyn Forest, there are usually several dozen shoots, the largest of which, near Knyszyn, has over 1000 shoots on an area of 0.3 ha. Currently, the most western occurrence in Poland was discovered in 2012 in Kampinoski National Park (Torzewski, 2018). Populations of *D. ruyschina* usually occupy small areas, from 0.01 to 0.1 ha (Adamowski and Wołkowycki, 2014).

D. ruyschiana in Białowieża Forest was described as a declining species, identified on only 14 sites in oak and reed-pine mixed forest (Sokołowski, 1995a). Ten of the sites mentioned above are in the Białowieża Forest District and four are in the Hajnówka Forest District. *D. ruyschiana* was not reported in the Browsk Forest District or Białowieża National Park (Sokołowski, 1995a). Until the current report, the species was considered extinct in Białowieża Forest (Adamowski and Wołkowycki, 2014).

Materials and methods

Data comes from observations made in July 2021 and June-July 2022. During fieldwork, the species was identified, plants measured and the number of individual specimens counted. Photographic documentation was also made (Fig. 1). In order to fully characterise this new

Fig. 1.
D. ruyschiana in Hajnówka Forest District (photo: A. Laskowska-Ginszt, 28.06.2022)

locality of the species, a phytosociological relevé of the site was carried out. Latin names of vascular plants are given as per Mirek *et al.* (2020) and for bryophytes according to Ochyra *et al.* (2003). The relevé was taken in accordance with the methodology of Wysocki and Sikorski (2014).

Results

Northern dragonhead was discovered in the newly described location during an inspection by the Forest Service in the Hajnówka Forest District of Białowieża Forest in July 2021. In June-July 2022, a second sighting was made and the presence of *D. ruyschiana* confirmed. The specimen of northern dragonhead was about 40 cm high, with 15 generative shoots and 1 vegetative shoot (Fig. 2). The specimen is located in the middle of an opening, about 30 m from a road (Limestone Road) to the north (N 52°37'36.10"E, 23°39'14.40"). The site where *D. ruyschiana* is found is surrounded by a 70-year-old oak stand comprised of 70% oak, 10% hornbeam, and 10% spruce, all of which is 73-years-old and 10% hornbeam that is 53-years-old. In order to describe the stand in detail the following phytosociological relevé was carried out by Marek Wołkowycki:

Relevé 1. Date: 15.07.2022. Area of relevé – 400 m^2. Layer coverage: A – 10%, B – 80%, C – 90%, D – 5%. A – *Quercus robur* 2; B – *Quercus robur* 3, *Carpinus betulus* 3, *Sarothamnus scoparius* 2, *Picea abies* 1, *Pinus sylvestris* +, *Sorbus aucuparia* +; *Betula pendula* +; C – *Calamagrostis arundinaceae* 3, *Melica nutans* 2, *Fragaria vesca* 2, *Ajuga repens* 1, *Anemone nemorosa* 1, *Luzula pilosa* 1, *Maianthemum bifolium* 1, *Poa nemorosa* 1, *Rubus cf. sprengelii* 1, *Rubus idaeus* 1, *Pteridium aquilinum* 1, *Veronica officinalis* 1, *Stellaria holostea* 1, *Campanula persicifolia* +, *Carex digitata* +, *Carex hirta* +, *Carex ovalis* +, *Carex pallescens* +, *Chamaecytisus ratisbonensis* +, *Clinopodium vulgare* +, *Convallaria majalis* 1, *Conyza canadensis* +, *Dracocephalum ruyschiana* +, *Erigeron annuus* +, *Hieracium pilosella* +,

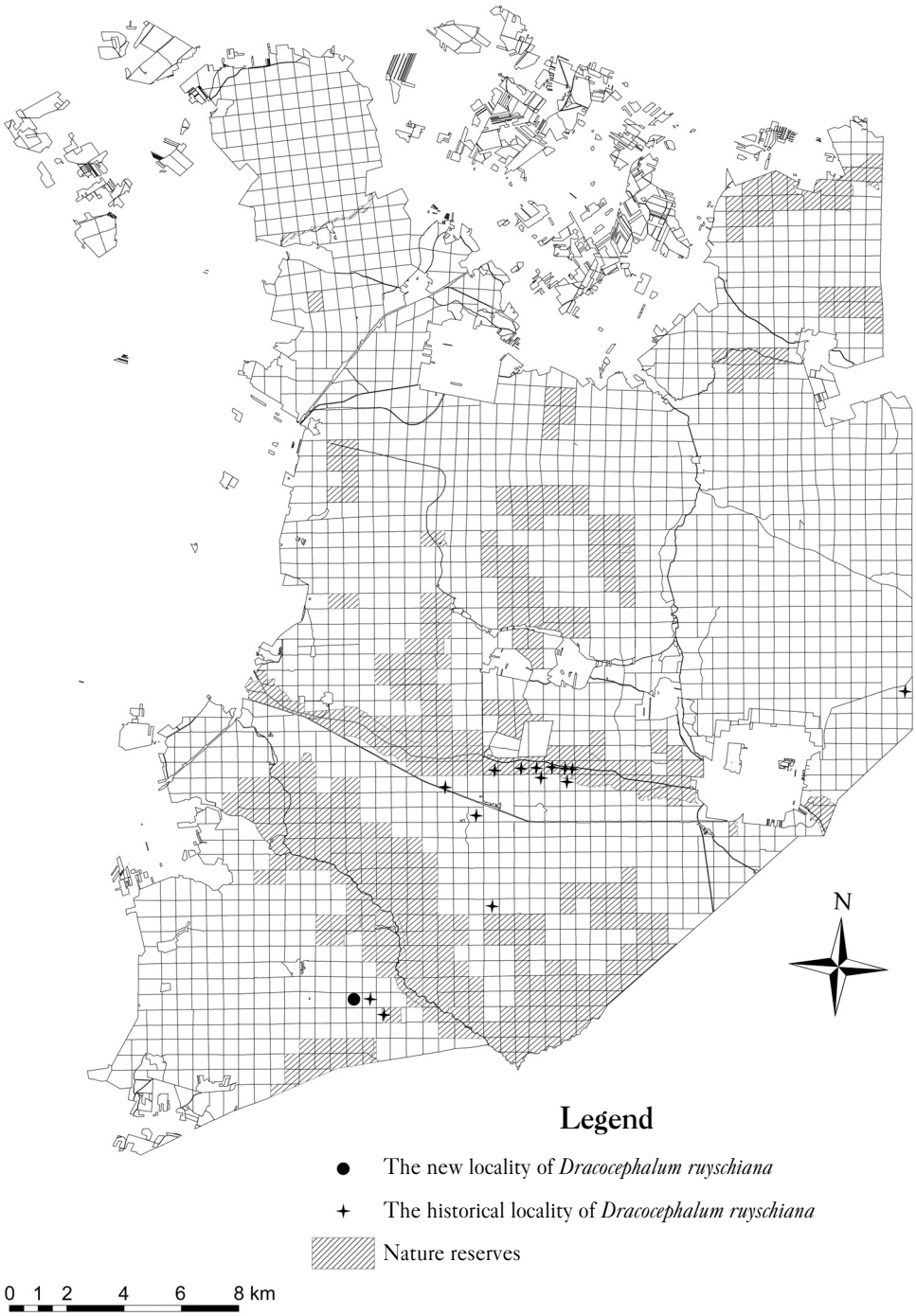

Fig. 2.
Białowieża Forest showing new and historical localities of *D. ruyschiana*

Hypericum perforatum +, *Juncus effusus* +, *Lathyrus sylvestris* +, *Lilium martagon* +, *Melampyrum nemorosum* +, *Mycelis muralis* +, *Polygonatum odoratum* +, *Rumex acetosa* +, *Rumex acetosella* +, *Solanum dulcamara* +, *Sonchus arvensis* +, *Veronica chamaedrys* +, *Vicia cracca* +; *Agrostis stolonifera* +; D – *Polytrichastrum formosum* 1.

This newly discovered site is within the area of active conservation of the Topiło forest range, forest compartment 633D, with fresh mixed broadleaved forest (LMśw) forest habitat type, in an oak-hornbeam forest community (9170) (Fig. 2). This locality of *D. ruyschiana* is within a second-growth forest of 0.35 ha, established in 2017. The second-growth forest was established in a gap created by sanitary cuts related to an outbreak of spruce bark beetle, carried out in 2012--2015. As a result of cutting, about 90 m^3 of infested spruce wood and 13 m^3 of wood of other species were harvested. In 2017, the area was cleaned up and then secured with a fence, after which artificial regeneration was carried out by hand planting. The composition of tree species in the new second-growth forest was 100% oak. In the following years (2018-2021), after the second-growth forest was established, stand tending was carried out by limiting the growth of competing vegetation and removing or inhibiting the growth of undesirable admixtures that suppress trees belonging to preferred species.

Discussion

D. ruyschiana is known to have previously grown on several sites in Białowieża Forest (Sokołowski, 1995a). The last recorded observation of it in this forest area was made in 2000-2003 (Adamowski and Wołkowycki, 2014). The new locality, located in the active conservation part of the Hajnówka Forest District, is a unique and unexpected discovery, as the species was considered extinct in Białowieża Forest and is the first record of it there in about 20 years. The nearest historical locality of *D. ruyschiana* was about 400 meters from the current location (Sokołowski, 1995a).

The main reason for the decline and disappearance of northern dragonhead in Białowieża Forest was the transformation of forest communities and edge communities. Succession changes in open and mixed forests are associated with increased density of undergrowth and lower tree layers of the stand, mainly by hornbeam and spruce, along with the spread of perennial plants such as common bracken and various species of reed grass, which consequently increase shade (Adamowski and Wołkowycki, 2014). In the case of northern dragonhead, passive conservation by minimising human intervention, which is the dominant approach in Białowieża Forest, is unfavourable because it creates conditions that contribute to the loss of *D. ruyschiana*.

In many of the sites where northern dragonhead was once found, such as in Białowieża Forest, understory trees and plants were previously held back by browsing of herbivorous wild and domestic animals, which once grazed in these forests (Adamowski and Wołkowycki, 2014). Maintaining *D. ruyschiana* will require active measures to create and maintain site environmental conditions that favour the species.

The new site northern dragonhead discovered in Hajnówka Forest District is located in a managed forest stand within a second-growth forest. It can be assumed that the forest management activities that produced the second-growth stand also created site conditions favourable to *D. ruyschiana*. However, carrying out similar forest management activities that might favour further northern dragonhead establishment is not allowed in many places within Białowieża Forest. Nevertheless, the discovery of this new population suggests that the health of local populations of *D. ruyschiana* may require removal of trees and shrubs that shade the sites, as well as possibly mowing aggressive perennial plants (Adamowski and Wołkowycki, 2014).

The main threat to the new site is the low number of individuals, which makes it highly susceptible to changes in environmental conditions. For this reason, and in connection with the uniqueness of this discovery, the site should be inspected annually and active conservation measures undertaken, consisting of removing the accumulated biomass and reducing the shrub layer. Implementing a conservation breeding program for northern dragonhead would also be advisable. Attempts should also be made to implement active protective measures in the vicinity of the localized site, consisting of increasing light transmission to the forest floor by thinning overstory trees and removing the shrub layer in selected locations, and removing areas of heavy undergrowth. These steps would be especially valuable due to the historical locations of *D. ruyschiana*, reported from divisions 634C and 667B (Sokołowski, 1995a).

Conclusions

- A new locality of *D. ruyschiana* in Hajnówka Forest District is the first record of this species in Białowieża Forest in about 20 years. This species was previously considered extinct in this area.
- The site where *D. ruyschiana* was found shows that suitable habitat for this species includes fresh mixed forests where pedunculate oak is the main tree species.
- The habitat requirements of *D. ruyschiana* and its presence in Hajnówka Forest District indicate the need for active measures to protect the species, consisting of maintaining the habitat at the appropriate stage of succession by removing trees, shrubs and perennial plants that shade the site.
- The study indicates the need for continued research on the habitat requirements of *D. ruyschiana*, as well as an attempt to take active conservation measures in the vicinity of the site, where the species currently and historically has occurred.

Authors' contributions

T.G. – research concept, field research, methodology, data analyses, manuscript preparation, review and editing; A.L.-G. – research concept, field research, review and editing manuscript.

Conflict of interests

The authors declare no conflicts of interest.

Funding source

The research was financed personally by the authors.

References

Abromeit, P., Neuhoff, W., Steffen, H., 1898-1940. Flora von Ost und Westpreussen. Berlin, Königsberg: Kommissionsverlag Gräfe und Unzer, 1/1-25 (1898): 1-402, 2/26-43 (1903): 403-684, 3/44-49 (1926): 685-780, 4/50-52 (1931): 781-828, 5/53-55 (1934): 829-876, 6/56-78 (1940): 877-1248.

Adamowski, W., Wołkowycki, D., 2014. *Dracocephalum ruyschiana* L., Pszczelnik wąskolistny. W: R. Kaźmierczakowa, K. Zarzycki, Z. Mirek, ed. *Polska Czerwona Księga Roślin. Paprotniki i rośliny kwiatowe*. Wyd. III. Kraków: Instytut Ochrony Przyrody, Polska Akademia Nauk, pp. 425-427.

Bock, W., 1908. Taschenflora von Bromberg (das Netzegebiet). Bromberg: Mitteler'sche Buchhandlung, 214 pp.

Farkas, S., 1999. Magyarország védett növényei (Protected plants of Hungary) [In Hungarian] Budapest: Mezőgazda Kiadó, 416 pp.

Flora of China, 2022. *Dracocephalum*. Available at: http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=110891 [accesed: 31.07.2022].

Guardiola, Moisčs, 2022. *Dracocephalum ruyschiana* (*Lamiaceae*): first record for Spain. *Anales del Jardín Botánico de Madrid,* 79 (1): e125. DOI: https://doi.org/10.3989/ajbm.2612.

Hegi, G., Gams, H., Marzell, H., 1927. V. Band, 4. Teil Dicotyledones (V. Teil). Sympetalae – Hegi: Illustrierte Flora von Mitteleuropa – 5_4_1927. Freisinf-Munchen: F.P. Datterer and Cie., pp. 2363-2365.

Herbich, J., 1974. Problem zachowania rezerwatów leśnych w okolicach Opalenia nad dolną Wisłą (Problem of preservation of forest reserves near Opalenie on the lower Vistula) [in Polish]. *Ochrona Przyrody*, 40: 113-138.

Kaźmierczakowa, R., Bloch-Orłowska, J., Celka, Z., Cwener, A., Dajdok, Z., Michalska-Hejduk, D., Pawlikowski, P., Szczęśniak, E., Ziarnek, K., 2016. Polska czerwona lista paprotników i roślin kwiatowych. (The Polish red list of pteridophytes and flowering plants) [in Polish]. Kraków: Instytut Ochrony Przyrody Polskiej Akademii Nauk, 44 pp.

Hultén, E., Fries, M., 1986. Atlas of north European vascular plants north of the Tropic of Cancer. Köningstein: Koeltz Scientific Books.

Kucharczyk, M., 2001. Distribution atlas of vascular plants in the Middle Vistula River Valley. Lublin: UMCS Press, 395 pp.

Lazarević, P., Lazarević, M., Krivošej, Z., Stevanović, V., 2009. On the distribution of *Dracocephalum ruyschiana* (*Lamiaceae*) in the Balkan Peninsula. *Phytologia Balcanica*, 15 (2): 175-179.

Milberg, P., Bertillson, A., 1997. What determines seed set in *Dracocephalum ryuschiana* L. endangered grassland plant. *Flora*, 192: 361-367. DOI: https://doi.org/10.1016/S0367-2530(17)30806-X.

Mirek, Z., Piękoś-Mirkowa, H., Zając, A., Zając, M., 2020. Rośliny naczyniowe Polski. Adnotowany wykaz gatunków (Vascular plants of Poland. An annotated check-list) [in Polish]. Kraków: W. Szafer Institute of Botany, Polish Academy of Sciences, 526 pp.

Mirek, Z., Zarzycki, K., Wojewoda, W., Szeląg, Z., 2006. Czerwona lista roślin i grzybów Polski (Red list of plants and fungi in Poland) [in Polish]. Kraków: W. Szafer Institute of Botany, Polish Academy of Sciences, 14 pp.

Oberdorfer, E., 1983. Pflanzensoziologische Exkursionflora für Süddeutschland und die angrenzenden Gebiete. Stuttgart: Verl. E. Ulmer.

Ochyra, R., Żarnowiec, J., Bednarek-Ochyra, H., 2003. Katalog mchów Polski (Census catalogue of Polish mosses). [in Polish]. Kraków: W. Szafer Institute of Botany, Polish Academy of Sciences, 372 pp.

Rozporządzenie, 2001. Rozporządzenie Ministra Środowiska z dnia 11 września 2001 roku w sprawie określenia listy gatunków roślin rodzimych dziko występujących objętych ochroną gatunkową ścisłą i częściową oraz zakazów właściwych dla tych gatunków i odstępstw od tych zakazów (Dz.U. 2001 nr 106 poz. 1167).

Rozporządzenie, 2014. Rozporządzenie Ministra Środowiska z dnia 9 października 2014 roku w sprawie ochrony gatunkowej roślin. (Dz.U. z 2014 r. poz. 1409).

Simon, T., 1992. A magyarországi edényes flóra határozója, Harasztok – virágos növények. Budapest: Tankönyvkiadó, 892 pp.

Sokołowski, A.W., 1995a. Flora roślin naczyniowych Puszczy Białowieskiej (The flora of vascular plants in the Białowieża forest) [in Polish]. Białowieża: Białowieski Park Narodowy, 276 pp.

Sokołowski, A.W., 1995b. Rośliny naczyniowe Puszczy Knyszyńskiej (Vascular plants of Knyszyn Forest) [in Polish]. *Parki Narodowe i Rezerwaty Przyrody*, 14 (1): 3-84.

Sonboli, A., Gholipour, A., Mirjalili, M.H., Rad, M.A., 2011. Molecular characterization of Iranian *Dracocephalum* (*Lamiaceae*) species based on RAPD data. *Acta Biologica Szegediensis*, 55 (2): 227-230.

Spribille, F., 1883. Flora von Schrimm nebst einem Beitrag zur Flora von Inowrozlaw. Inowrozlaw: Königliches Gymnasium, 20: 1-21.

Spribille, F., 1897. Beitrag zur Flora des Kreises Filehne. Verhandlungen des Botanisches Vereins de Provinz Brandenburg 39: 5-23.

Tihomirov, V.N., 1987. Opredelitel' rastenij Meščery. 2. Moskva: Izd. Mosk. Univ., 224 pp.

Torzewski, K., 2018. New locality of *Dracocephalum ruyschiana* (*Lamiaceae*) in Kampinos National Park. *Fragmenta Floristica et Geobotanica Polonica*, 25 (2): 292-294

Waga, J., 1847-1848. Flora polska jawnokwiatowych rodzajów. T. 1,2. Flora Polonica Phanerogama sive Descriptiones plantarum phanerogamicum. Vol. 1,2. Warszawa: Stanisław Strabski.

Walter, H., 1974. Die Vegetation Osteuropas, Nord- und Zentralasiens. Vegetationsmonographien der einzelnen Grossräume, 7. Stuttgart: G. Fischer, 452 pp.

Werpachowski, C., 2000. Lista roślin naczyniowych Kotliny Biebrzańskiej ze szczególnym uwzględnieniem Biebrzańskiego Parku Narodowego (List of vascular plants of Biebrza Valley with particular emphasis on those present in the Biebrza National Park) [in Polish]. *Parki Narodowe i Rezerwaty Przyrody*, 19 (4): 19-52.

Werpachowski, C., 2005. Świat roślin naczyniowych Kotliny Biebrzańskiej i Biebrzańskiego Parku Narodowego (The vascular plant world in the Biebrza River Valley and the Biebrza National Park) [in Polish]. W: Dyrcz, A., Werpachowski, C., *Przyroda Biebrzańskiego Parku Narodowego* (Nature of the Biebrza National Park). Osowiec-Twierdza: Biebrzański Park Narodowy, pp. 87-106.

Wołkowycki, D., 2008. Puszcza Knyszyńska jako ostoja zagrożonych gatunków roślin naczyniowych. (The role of Knyszyn Forest as the mainstay of endangered species of vascular plants] [in Polish], W: A. Górniak, B. Poskrobko. *Park Krajobrazowy Puszczy Knyszyńskiej w systemie ochrony przyrody i edukacji środowiskowej. (Landscape Park of Knyszyn Forest in system of nature protection and environmental education).* Białystok: Fundacja Ekonomistów Środowiska i Zasobów Naturalnych, pp. 56-63.

Wysocki, Cz., Sikorski, P., 2014. Fitosocjologia stosowana w ochronie i kształtowaniu krajobrazu (Phytosociology used in landscape protection and shaping) [in Polish]. Warszawa: Wydawnictwo SGGW, 556 pp.

Zając, A., Zając, M., 2001. Atlas rozmieszczenia roślin naczyniowych w Polsce. Kraków: Pracownia Chorologii Komputerowej Instytutu Botaniki Uniwersytetu Jagiellońskiego, pp. 11-12.

Załuski, T., 1988. Reliktowe i rzadkie gatunki roślin okolic Górzna i Nowego Miasta Lubawskiego (Relikt- und seltene Pflanzenarten der Gegend von Górzno und Nowe Miasto Lubawskie). [in Polish]. *Acta Universitatis Nicolai Copernici*, *Biologia*, 29: 99-114.

STRESZCZENIE

Nowe stanowisko pszczelnika wąskolistnego *Dracocephalum ruyschiana* L. w Puszczy Białowieskiej

Puszcza Białowieska to niezwykle ciekawy i zróżnicowany obszar służący jako miejsce badań na wielu przyrodniczych płaszczyznach. Jest obiektem o wyjątkowym charakterze oraz dużym znaczeniu dla ochrony przyrody. To również miejsce, w którym ścierają się dwa podejścia do ochrony przyrody. Z jednej strony jest to ochrona bierna (konserwatorska), preferująca ochronę procesów naturalnych, z drugiej ochrona czynna, której celem jest zachowanie obszarów na odpowiednim etapie sukcesji, co wpływa pozytywnie na różnorodność gatunkową. *Dracocephalum ruyschiana* L. to euroazjatycki gatunek kontynentalny o pofragmentowanym zasięgu z rodziny jasnotowatych (*Lamiaceae*), wymagający czynnych działań ochronnych. Na świecie jego zwarty zasięg ciągnie się od Niziny Wschodnioeuropejskiej po wschodnią Syberię. Na rozproszonych stanowiskach europejskich występuje od południowej części Półwyspu Skandynawskiego po Alpy, Półwysep Bałkański i Kaukaz, na zachodzie po Pireneje. W przeszłości *D. ruyschiana* w Polsce był znany z około 50 stanowisk. W większości położone były one w północno-wschodniej części kraju, sięgając na zachód po doliny Noteci oraz dolnej i środkowej Wisły. W ostatnich latach *D. ruyschiana* wykazywany jest głównie z północno-wschodniej Polski (Puszcza Knyszyńska, Dolina Biebrzy i Wigierski Park Narodowy). Obecnie najdalej wysuniętą na zachód w Polsce lokalizacją jest odnalezione w 2012 roku stanowisko w Kampinoskim Parku Narodowym. W Puszczy Białowieskiej *D. ruyschiana* do niniejszego odkrycia był uznawany za gatunek wymarły. W latach 90. ubiegłego wieku określany był jako gatunek zanikający, znany z 14 stanowisk w dąbrowie i w trzcinnikowo-sosnowym borze mieszanym. Nowe stanowisko *D. ruyschiana* znajduje się w Nadleśnictwie Hajnówka na terenie Puszczy Białowieskiej i jest odkryciem wyjątkowym – gatunek ten nie był stwierdzany na tym obszarze od blisko 20 lat (ryc. 1). Nowa lokalizacja znajduje się w części nadleśnictwa, gdzie realizowane są działania z zakresu ochrony czynnej, na siedliskowym typie lasu las mieszany świeży (LMśw), siedlisku przyrodniczym (9170) grąd subkontynentalny (ryc. 2). *D. ruyschiana* znajduje się na uprawie leśnej o powierzchni 0,35 ha. Uprawa została założona w 2017 roku na luce pokornikowej, która powstała w wyniku cięć sanitarnych związanych z gradacją kornika drukarza zrealizowanych w latach 2012-2015. W ostatnich latach wykonywano tam pielęgnację gleby polegającą na usuwaniu na wybranych fragmentach warstwy krzewów i wykaszaniu fragmentów runa leśnego. Należy przypuszczać, że zrealizowane działania czynne pozytywnie wpłynęły na rozwój gatunku, który zapewne w przeszłości występował w tym miejscu lub w jego bliskim otoczeniu. W analizowanej lokalizacji odnotowano jednego osobnika *D. ruyschiana* o wysokości około 40 cm z 15 pędami generatywnymi i 1 pędem wegetatywnym. Wymagania siedliskowe *D. ruyschiana* i niniejsza obserwacja w Nadleśnictwie Hajnówka wskazują na potrzebę czynnych działań na rzecz ochrony gatunku, polegających na utrzymywaniu siedlisk na odpowied-

nim etapie sukcesji poprzez usuwanie drzew, krzewów i bylin zacieniających stanowiska gatunku. Nowe odkrycie wskazuje na potrzebę kontynuacji badań nad wymaganiami siedliskowymi *D. ruyschiana*, jak również podjęcia czynnych działań w otoczeniu zlokalizowanego stanowiska, z uwagi na historycznie wykazywane stanowiska z oddziałów 634C oraz 667B.