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THE DISTRIBUTION OF THE GENUS *DAPHNE* L. (*THYMELAEACEAE*) IN MEDVEDNICA NATURE PARK, CROATIA

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In order to develop the floristic map of Medvednica Nature Park, already existing data on the distribution of the genus *Daphne* were collected from literature and herbarium sources. Field observations were also carried out. Three species were recorded: *Daphne blagayana* Freyer, *Daphne laureola* L. and *Daphne mezereum* L. All recorded species have the IUCN status of endangered or low risk species. For the three species of the genus *Daphne* in Medvednica Nature Park, 159 localities were found and 124 (78%) of the localities were geocoded. The distribution of the species is presented on maps using a Central European grid for floristic mapping (MTB).

Key words: *Daphne*, Medvednica Nature Park, distribution maps, threat degree

Sočo, I., Nikolić, T., Hršak, V., Jelaska, S. D. & Plazibat, M.: Rasprostranjenost roda *Daphne* u Parku Prirode Medvednica (Hrvatska). Nat. Croat., Vol. 11, No. 2., 225–236, 2002, Zagreb.

U svrhu izrade florističke karte Parka Prirode Medvednica sabrani su postojeći podaci o rasprostranjenosti roda *Daphne* iz literaturnih i herbarskih izvora. Također su izvršena i terenska istraživanja. Zabilježene su tri vrste: *Daphne blagayana* Freyer, *Daphne laureola* L. i *Daphne mezereum* L. Sve zabilježene vrste prema IUCN kategorijama spadaju među ugrožene i nisko rizične vrste. Za ove tri vrste roda *Daphne* unutar Parka Prirode Medvednica ukupno je zabilježeno 159 lokaliteta od kojih je 124 (78%) lokaliteta geokodirano. Rasprostranjenost vrsta prikazana je kartama uz uporabu srednjoeuropske mreže za kartiranje flore (MTB).

Ključne riječi: *Daphne*, Park Prirode Medvednica, karte rasprostranjenosti, stupanj ugroženosti

INTRODUCTION

In the flora of Europe the genus *Daphne* is represented by 17 species and is distributed over most of Europe (BRICKELL & MATHEW, 1976; HALLIER, 1922; WEBB & FERGUSON, 1968). There are 5 species in the Croatian flora (REGULA-BEVILACQUA, 1997). Among them, four species have IUCN threat status and three are protected by law.

Systematic floristic mapping of Croatia has not been carried out yet, not even in protected areas such as national and nature parks. The distribution of the orchid family in Medvednica Nature Park was used in 1999 to test the Central European flora mapping method in smaller basic units, MTB 1/64, as a universal model for mapping smaller areas and was proved to be appropriate (HRŠAK *et al.*, 1999). Therefore, as a part of the study of the park flora, the distribution of the laurel genus on Mount Medvednica has been studied and distribution maps made.

Floristic data collected indicate that the following species are present: *Daphne blagayana* Freyer, *Daphne laureola* L. and *Daphne mezereum* L.

The range of *Daphne blagayana* Freyer, which belongs to the Illyrian-Carpathian floral element (BORHINI, 1963), encompasses south-eastern Europe and some adjacent regions (DERGANC, 1902; FRITSCH, 1902; MARTINI & POLDINI, 1990; MEUSEL, 1969; WRABER & MIKULETIČ, 1965). Locations in Croatia, apart from Medvednica, include the Samobor Hills and Palačnik (GJURAŠIN, 1890; ŠUGAR, 1972; TRINAJSTIĆ, 1995; UNGAR & REGULA-BEVILACQUA, 1994). According to the new IUCN classification Blagay's Daphne is marked as an endangered species (EN) and as such is listed in the new Red Book of Plant Species of the Republic of Croatia (in preparation, personal communication NIKOLIĆ). Blagay's Daphne was also listed in the old Red Book of Plant Species of the Republic of Croatia (UNGAR & REGULA-BEVILACQUA 1994) as an endangered and rare species (according to 1972 IUCN categories). In Croatia it is also protected by the Nature Conservation Law.

Daphne laureola L. is a species generally distributed throughout the west, south and east of Europe in beech, oak and fir forests while it is distributed eastwards all the way to Asia Minor and is also found in northern Africa (DOMKE, 1934; PULEVIĆ, 1976; ŠUGAR *et al.*, 1993/1994). In Croatia it can be found in north coastal and central Croatia as well as in the eastern continental part (GJURAŠIN, 1920; HIRC, 1914; 1915; REGULA-BEVILACQUA, 1978; 1994; SCHULZER *et al.*, 1866; ŠUGAR & TRINAJSTIĆ, 1970). It belongs to the sub-Mediterranean-sub-Atlantic floral element (PIGNATTI, 1982). The spurge laurel is, like elsewhere in Europe, an endangered species in Croatia and has thus been protected by law since 1952. In the old Red Book of Plant Species of the Republic of Croatia (REGULA-BEVILACQUA, 1994) it was classed as a rare species (R) but in the new Red Book it is classed in a lower risk (LR) category (personal communication NIKOLIĆ).

Daphne mezereum L. belongs to the Euro-Siberian floral element, and is distributed in Europe, south-western and northern Asia (ŠILIĆ, 1983). In Croatia it is present in the northern coastal region and central Croatia (DEGEN, 1937; HULINA, 1994b; SCHLOSSER & VUKOTINOVIĆ, 1869; TOMAŠEVIĆ, 1998). In the old Red Book of Plant Species of the Republic of Croatia (HULINA, 1994b) *D. mezereum* was marked as vul-

nerable species, but according to the IUCN classification in the new Red Book of Plant Species of the Republic of Croatia it has lower risk (LR) threat status (personal communication NIKOLIĆ).

STUDY AREA

Mount Medvednica, approximately 40 km in length and 9 km in width, stretches from south-west to north-east between 15°49′45″ and 16°07′45″ east longitude and 45°49′00″ and 45°59′00″ north latitude (Fig. 1). Below its southern border lies the Croatian capital of Zagreb. In the centre of the massif is its highest peak Sljeme, at 1035m (BÖHM *et al.*, 1979). In 1981, according to Nature Protection Act, the western part of the Medvednica massif was declared a Nature Park, within which eight special reserves of forest vegetation (approx. 1000 ha) are contained. The total area of Medvednica Nature Park is 228.26 km² and it is mostly covered by forest (63.6%) while the rest are green areas, settlements and roads.

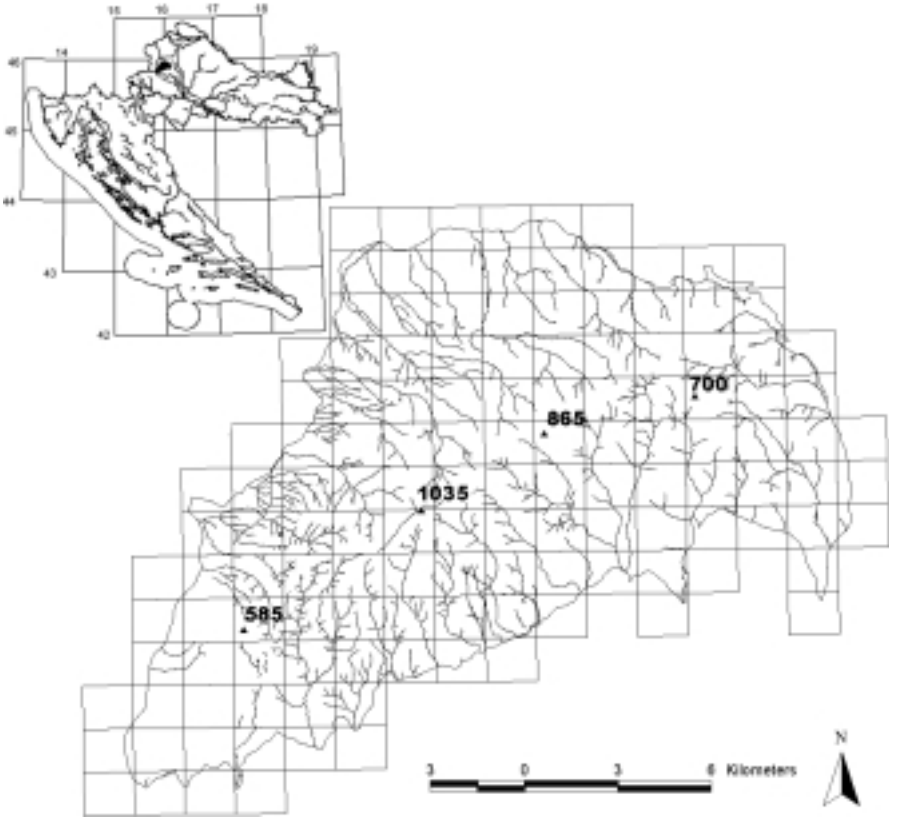

Fig. 1. The position of the research area in Medvednica Nature Park.

The entire massif is characterized by the typical contour of elongated hills, numerous ridges and stream valleys (BÖHM *et al.*, 1979). The dominant vegetation types include oak, beech and beech-fir forests, although thermophilous hornbeam woods are also present.

Medvednica is situated in a moderate continental climate with an average temperature of 6.2 °C (BÖHM *et al.*, 1979) while the annual precipitation (during the period between 1948 and 1960) for Sljeme is 1238 mm (HRŠAK, 1993).

MATERIAL AND METHODS

Data on taxa distribution within the Nature Park were collected from three sources: field observations, literature and herbaria.

The field observations were conducted between 1997 and 1998 on multiple field trips throughout the vegetation season. The positioning and identification of the boundaries of the basic units in the field were done with a GPS receiver and 1:25000 topographic maps.

Literature references used to gather data on localities were: BÖHM *et al.*, 1979; BULIĆ, 1952; EGIĆ, 1978; FORENBACHER, 1908; 1911; GLIGOROVIĆ, 1955; GUSSIĆ, 1918; HIRC, 1900; 1906; HRŠAK, 1987; HULINA, 1994a; 1994b; KAMENAROVIĆ, 1958; 1965; KEVO, 1961; KLINGGRÄFF, 1861; KOVAČEVIĆ, 1999; KUIŠ, 1955; MIHELJ, 1982; NEILREICH, 1868; PAVLICA, 1953; PETRAČIĆ & ANIĆ, 1952; PLAVŠIĆ-GOJKOVIĆ & BRITVEC, 1990; REGULA-BEVILACQUA, 1994; ŠUGAR *et al.*, 1993/1994; ŠUTIĆ-SUHIĆ, 1952; URLIĆ-IVANOVIĆ, 1952; VUKELIĆ, 1991; VUKELIĆ & ORŠANIĆ, 1994.

The herbarium specimens that were studied belong to the herbarium of Ivo and Marija Horvat (ZAHO) and Herbarium Croaticum (ZA) in Zagreb.

The data collected from literature and hebaria was grouped into three age categories: data originating before 1950, data collected between 1950 and 1980 and data collected after 1980.

The nomenclature of plant taxa was given after WEBB & FERGUSON (1968). The threat (vulnerability) levels were determined according to the new Red Book of Plant Species of the Republic of Croatia (personal communication NIKOLIĆ).

The distribution of the genus *Daphne* in the Medvednica Nature Park was mapped using the MTB fields of the Central European grid for flora mapping. The basic units, MTB 1/64, having on average dimensions of 1.5×1.4 km and an average area of 2.1 km^2 were used according to the standard proposed for the mapping of Croatian flora for the protected areas (HRŠAK *et al.*, 1999).

Literature data were geocoded, with a centroid, on the basis of locality description, while herbarium specimens were geocoded according to the data on labels. For geocoding, topographic maps, 1:25000, were used. Toponyms not precise enough for ascribing data to a corresponding basic field were not geocoded, but were included in the data analysis. The geocoding of the field observations was carried out in the field.

All the collected data from field lists, literature and herbaria were recorded in the CROFlora 2.0 database (NIKOLIĆ *et al.*, 2001) and were afterwards used for drawing distribution maps using the Arc View 3.2 tool.

RESULTS

Floristic mapping within Medvednica Nature Park recorded three taxa of the genus *Daphne*: *D. blagayana* Freyer, *D. laureola* L. and *D. mezereum* L. All three taxa were recorded in the literature and the presence of *D. laureola* and *D. mezereum* was confirmed by herbaria samples and field observations.

A total of 159 data of findings was recorded for all three species, the majority (63.5%) based on field observations, followed by literature (30.8%) and herbaria (5.7%) (Fig. 2). The total number of the geocoded locations was 124 (78%) (Tab. 1).

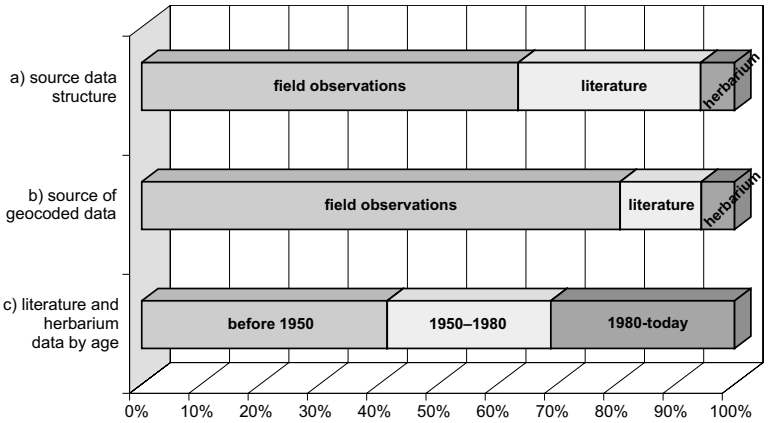

Fig. 2. (a) Structure of data by source, (b) Structure of geocoded data by source, (c) Structure of literature and herbarium data by age.

Tab. 1. Chorological data according to the number of species and corresponding source. Values in parentheses represent the number of localities with toponyms that could not be ascribed to an MTB field.

Species / Data source	Field observation	Literature	Herbarium	Total
Daphne blagayana	0	(1)	0	(1)
Daphne laureola	49	6 (+17)	5	60 (+17)
Daphne mezereum	51 (+1)	11 (+14)	2 (+2)	64 (+17)
Grand total	100 (+1)	17 (+32)	7 (+2)	124 (+35)

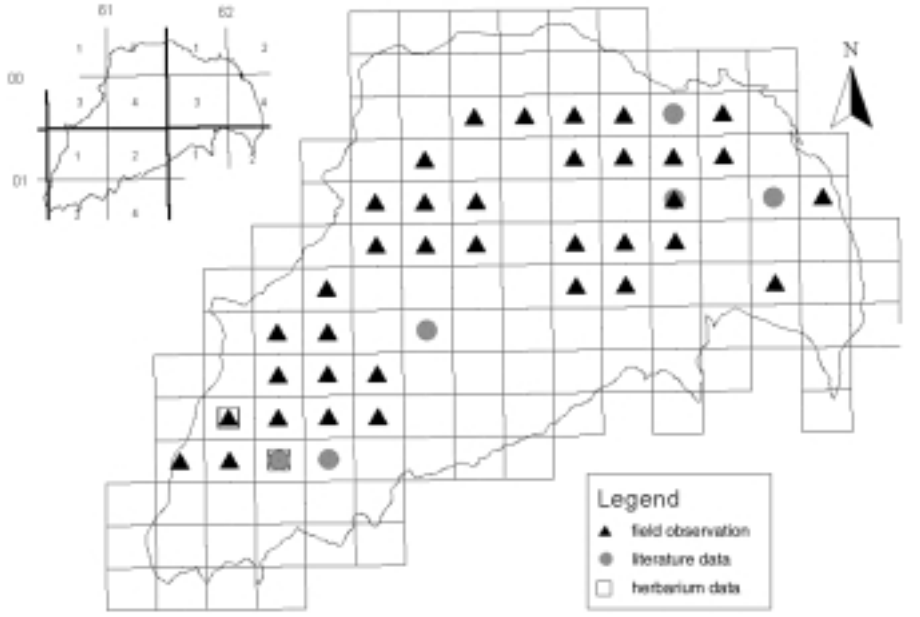

Fig. 3. Distribution of the species *Daphne laureola* L. in Medvednica Nature Park.

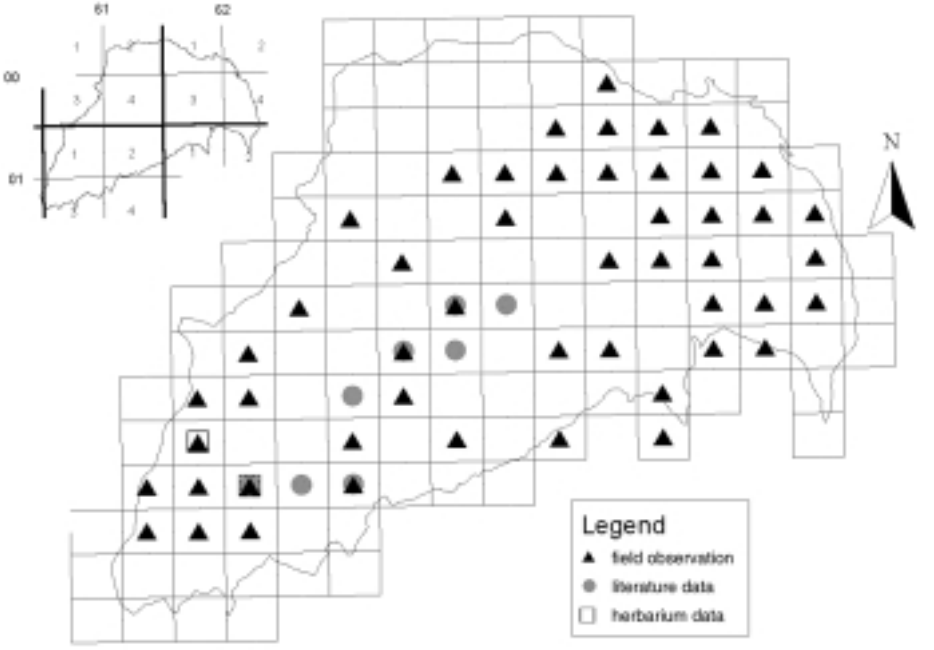

Fig. 4. Distribution of the species *Daphne mezerum* L. in Medvednica Nature Park.

Distribution maps were drawn on the basis of locations in all three data sources that were possible to geocode (Fig. 3 & Fig. 4). It was impossible to draw a map for *D. blagayana* due to inaccurate location data. *D. laureola* was found in 41 quadrants while *D. mezereum* appears in 54 quadrants.

DISCUSSION

First investigations of the flora of Mount Medvednica date from the 19th century and even then laurel species, *D. laureola* and *D. mezereum*, were noted (KLINGGRAFF, 1861).

Considering that Medvednica is situated in the proximity of the largest city and Croatia's capital, anthropogenic influence has been extremely large and continuous for a number of years. The entire area of the park has never been systematically researched, so most of the data found in the literature and herbaria relate to the taxa collected in the more accessible parts of the park, which also tend to be the most frequently visited ones. Also data more than 20 years old and relating to the park's borders need to be ignored due to the changes urban development has brought about in those parts (Fig. 2).

The age of literature data is evenly distributed in all three age categories but more than 50% of the geocoded data dates from after 1980. All herbarium specimens that were geocoded date to before 1950 and encompass MTB fields on the distribution charts of both species (Fig. 2).

D. blagayana is mentioned in only a single literature reference (PLAVŠIĆ-GOJKOVIĆ & BRITVEC, 1990), for Medvednica as a whole, without a precise location. Field observations conducted in this research did not confirm this finding. Thus, regardless of the recent date of this literature reference, the existence of the plant in the area is very doubtful due to the lack of any corroborating findings. However, the possibility of *Daphne blagayana*'s presence on Medvednica cannot be completely ruled out since its existence on a nearby Samobor Hills has been recorded (ŠUGAR, 1972; TRINAJSTIĆ, 1995).

On the basis of floristic literature it can be deduced that in Croatia *D. laureola* is usually associated with vegetation types such as beech forests (HORVAT, 1962), while in the Istria region it spreads almost to the coast as a part of the thermophilous forests (ŠUGAR & TRINAJSTIĆ, 1970). Considering that beech forests cover a large portion of the park's area (BÖHM *et al.*, 1979), a wide spread of the species is expected – it appears in 30% of basic units located in the Medvednica Nature Park. Most quadrants are associated with field observations, 6 quadrants are linked to literature findings and only two with herbaria. Only three MTB 1/64 quadrants are related to more than one data source. Most quadrants in which spurge laurel appears are situated on the northern, western and eastern side of Mount Medvednica.

D. mezereum is a frequent and typical species of forest vegetation of the order *Fagetalia sylvaticae* Pawl. 1928 (HORVAT, 1962). The associations of this order, such as *Abieti-Fagetum »pannonicum«* Rauš 1969, cover large areas of Mount Medvednica. Therefore *D. mezereum* is found in 40% of the Nature Park's basic units, mainly cor-

roborated by field findings while literature data suggest its presence in 8 quadrants and herbaria in only 2. Only one MTB 1/64 quadrant is linked to all three data sources and four MTB quadrants are related to two data sources. All quadrants in which *D. mezereum* is found are evenly distributed all over Nature Park.

A simple comparison of find locations of the *Daphne* species on Mt. Medvednica and a pedologic map derived no visible relations. Nor could any connection be established from comparative analysis of *Daphne* localities and a geology map.

CONCLUSION

Floristic data collected for the mapping of Medvednica Nature Park indicated the presence of three species of the genus *Daphne*: *D. blagayana* Freyer, *D. laureola* L. and *D. mezereum* L.

For the species *D. laureola* and *D. mezereum* localities were noted from all three data sources (field observations, literature and herbaria) while the data concerning the presence of *D. blagayana* on Mt. Medvednica came from only one literature reference. Therefore the existence of *D. blagayana* in the researched area is very questionable and until its presence is confirmed by a new finding it should be excluded from the flora of Medvednica Nature Park.

On the basis of geocoded field observations, literature and herbarium data two distribution maps have been made. It was established that the species *D. laureola* and *D. mezerum* were frequent in the research area: *D. laureola* was found in 41 and *D. mezereum* in 54 out of total 135 basic units.

Most of the data on the maps are the result of recent field observations, thus the maps depict the true presence of the species in Medvednica Nature Park. Therefore, the antiquity of both literature and herbarium data did not cause a significant problem.

All species found belong to IUCN threat levels in the new Red Book of Plant Species of the Republic of Croatia (personal communication NIKOLIĆ) and *D. blagayana* and *D. laureola* are protected by the Nature Conservation Law (16. 04. 1952, Official Gazette 6/62). Although the distribution maps of *D. laureola* and *D. mezereum* show that they are relatively common on Medvednica, due to their threat status and the strong human impact, measures need to be taken to ensure that their natural habitats, the forests, are conserved and not allowed to be changed.

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REFERENCES

BORHIDI, A., 1963: Die Zönologie des Verbandes Fagion illyricum. Acta Bot. Acad. Scient. Hung. **9**, 259–297.

BÖHM, D., I. BRALIĆ, J. BUDAK-RAJČIĆ, R. DEŽELIĆ, M. KAMENAROVIĆ, Z. MIKULIĆ, D. ORŠIĆ, M. RUKAVINA & A. ŠOBAT, 1979: Park prirode »Medvednica« – studija zaštite okoliša. Republički zavod za zaštitu prirode, Zagreb.

BRICKELL, C. D. & B. F. MATHEW, 1976: *Daphne*. The genus in the wild and in cultivation. St. John's Woking, Alpine Garden Society, Surrey.

BULIĆ, V., 1952: Prilog poznavanju flore jednog dijela Zagrebačke i Bistranske gore s općim prikazom vegetacije. B. Sc. Thesis, Faculty of Science, University of Zagreb.

DEGEN, A., 1937: Flora Velebitica, II Band. Ungar. Akad. Wiss., Budapest.

DERGANC, L., 1902: Geographische Verbreitung der *Daphne blagayana* Freyer. All. Bot. Z. Syst. **8** (11–12), 176–179, 195–197.

DOMKE, W., 1934: Untersuchungen über die systematische und geographische Gliederung der Thymelaeaceen. Biblioth. Bot. **111**, 1–151.

EGIĆ, J., 1978: Floristička karta najvišeg dijela Zagrebačke gore (od 800 do 1035 m). B. Sc. Thesis, Faculty of Science, University of Zagreb.

FORENBACHER, A., 1908: Vegetacione formacije zagrebačke okoline. Rad Jugoslav. Akad. Znan. **175**, 1–80.

FORENBACHER, A., 1911: Mediteranski elementi u zagrebačkoj flori. Rad Jugoslav. Akad. Znan. **185**, 160–167.

FRITSCH, K., 1902: Die Auffindung von *Daphne blagayana* Freyer in Steiermark. Versammlung am 3. Juli 1901. Oesterr. Bot. Z. **52**, 168–170.

GJURAŠIN, S., 1890: *Daphne blagayana* Frey. u Hrvatskoj. Glasn. Hrvatsk. Nar. Društva **5**, 183–184.

GJURAŠIN, S., 1920: Prilog hrvatskoj flori. Glasn. Hrvatsk. Prir. Društva **32**, 71–85.

GLIGOROVIĆ, Z., 1955: Prilog poznavanju flore i vegetacije jednog dijela Zagrebačke gore. B. Sc. Thesis, Faculty of Science, University of Zagreb.

GUSSIĆ, N., 1918: Nova nalazišta *Primulae auriculae* L. u Hrvatskoj. Glasn. Hrvatsk. Prir. Društva **30** (4), 157–158.

HALLIER, H., 1922: Beiträge zur Kenntnis der Thymelaeaceae und ihrer natürlichen Umgrezung. Meded. Rijks. Herb. Leiden **44**, 1–31.

HIRC, D., 1900: Nekoje šumsko drveće i grmlje iz domaće flore. Šum. list **24** (1), 1–25.

HIRC, D., 1906: Revizija hrvatske flore (Revisio florae croaticae). Rad Jugoslav. Akad. Znan. **167**, 8–128.

HIRC, D., 1914: Floristička izučavanja u istočnim krajevima Istre. I Kastav i Kastavština. Rad Jugoslav. Akad. Znan. **204**, 21–75.

HIRC, D., 1915: Floristička izučavanja u istočnim krajevima Istre. II Učka gora i njezina okolica. Rad Jugoslav. Akad. Znan. **210**, 6–92.

HORVAT, I., 1962: Vegetacija planina zapadne Hrvatske. Prir. istraž. ser. Acta. biol. **30** (2), 5–173.

HRŠAK, V., 1987: Istraživanje dinamike dušika u tlima nekih biljnih zajednica na Medvednici. M. Sc. Thesis, Faculty of Science, University of Zagreb.

HRŠAK, V., 1993: Mineralizacija dušika u tlu nekih travnjačkih fitocenoza u okolici Zagreba. Ph. D. Thesis, Faculty of Science, University of Zagreb.

HRŠAK, V., T. NIKOLIĆ, M. PLAZIBAT, S. D. JELASKA & D. BUKOVEC, 1999: Orchids of Medvednica Natural Park, Croatia. Acta Biol. Slovenica **42** (4), 13–37.

HULINA, N., 1994a: Flora istočnog dijela Medvednice. In TRINAJSTIĆ, I. (ed.): Simpozij – Pevalek. Zbornik radova, Koprivnica 20.–22. svibnja 1993. Šumarski fakultet Sveučilišta u Zagrebu, Koprivnica.

HULINA, N., 1994b: *Daphne mezereum* L. In ŠUGAR, I. (ed.): Crvena knjiga biljnih vrsta Republike Hrvatske. Ministarstvo graditeljstva i zaštite okoliša, Zavod za zaštitu prirode, Zagreb.

KAMENAROVIĆ, M., 1958: Zaštita prizemne flore Zagrebačke okolice. Hortikultura **4** (2), 6–7.

KAMENAROVIĆ, M., 1965: Zaštićeni i evidentirani objekti prirode Zagreba. Hortikultura **11** (2–3), 90–92.

KEVO, R., 1961: Prirodne karakteristike Medvednice i izbor odgovarajuće kategorije zaštite. Hortikultura **7** (1–2), 3–14.

KLINGGRÄFF, H., 1861: Die in der Umgegend von Agram in Croatien vorkommenden Pflanzen. Linnaea **31** (1), 6–62.

KOVAČEVIĆ, G., 1999: Park prirode Medvednica. Priroda **89** (869), 28–30.

KUIŠ, K., 1955: Prilog poznavanju flore i vegetacije sjevernog dijela zagrebačke okoline. B. Sc. Thesis, Faculty of Science, University of Zagreb.

MARTINI, F. & L. POLDINI, 1990: *Daphne blagayana* Freyer (*Thymelaeacaea*), nuova per la flora d'Italia. Webbia **44** (2), 295–306.

MEUSEL, H., 1969: Zur ökogeographischen Stellung von *Daphne blagayana*. Rev. Roumaine Biol., Sér. Bot. **14** (1), 51–56.

MIHELJ, D., 1982: Biljni pokrov dijela Medvednice kod Adolfovca pogođenog olujnim nevremenom 1973. godine. B. Sc. Thesis, Faculty of Science, University of Zagreb.

NEILREICH, A., 1868: Die Vegetationsverhältnisse von Croatien. W. Braumüller Wien.

NIKOLIĆ, T., K. FERTALJ, T. HELMAN, V. MORNAR & D. KALPIĆ, 2001: CROFlora, a database application to handle the Croatian vascular flora. Acta Bot. Croat. **60** (1), 31–48.

PAVLICA, S., 1953: Prilog poznavanju flore jednog dijela Zagrebačke i Bistranske gore s općim prikazom vegetacije. B. Sc. Thesis, Faculty of Science, University of Zagreb.

PETRAČIĆ, A. & M. ANIĆ, 1952: Obični jasen (*Fraxinus excelsior*) u Zagrebačkoj gori. Glas. za šum. pok. **10**, 25–62.

PIGNATTI, S., 1982: Flora d'Italia 2. Edagricole, Bologna.

PLAVŠIĆ-GOJKOVIĆ, M. & M. BRITVEC, 1990: Povijesno i prirodoznanstveno značenje parka prirode Medvednica. In BOŽIČEVIĆ, J. (ed.): Zbornik radova. Znanstveno savjetovanje Zelenilo grada Zagreba. Znanstveni savjet za promet Jugoslav. Akad. Znan, Zagreb, 67–69.

PULEVIĆ, V., 1976: *Daphne laureola* L. – rijetka vrsta u dendroflori Crne Gore. Poljopr. Šumarstvo **22** (4), 45–48.

REGULA-BEVILACQUA, Lj., 1978: Biljni pokrov Strahinščice u Hrvatskom Zagorju. Ph. D. Thesis, Faculty of Science, University of Zagreb.

REGULA-BEVILACQUA, Lj., 1994: *Daphne laureola* L. In ŠUGAR, I. (ed.): Crvena knjiga biljnih vrsta Republike Hrvatske. Ministarstvo graditeljstva i zaštite okoliša, Zavod za zaštitu prirode, Zagreb.

REGULA-BEVILACQUA, Lj., 1997: *Thymelaeaceae*. In NIKOLIĆ, T. (ed.): Index Florae Croaticae. Pars 2. Nat. Croat. **6**, Suppl. 1, 91.

SCHLOSSER, J. C. & Lj. F. VUKOTINOVIĆ, 1869: Flora Croatica. Apud Fr. Župan, Zagrabiae.

SCHULZER, S., A. KANITZ & A. KNAPP, 1866: Die bischer bekannten Pflanzen Slawoniens. Verh. K. K. Zool-Bot. Ges. Wien **16**, 3–172.

ŠILIĆ, Č., 1983: Atlas drveća i grmlja. Svjetlost. Sarajevo 9–175.

ŠUGAR, I., 1972: Biljni svijet Samoborskog gorja. Ph. D. Thesis, Faculty of Science, University of Zagreb.

ŠUGAR, I., K. HAZLER & D. BRKIĆ, 1993/1994: Medvednica i njezin biljni svijet. Ekol. glas**. 3** (9–10), 5–23.

ŠUGAR, I. & I. TRINAJSTIĆ, 1970: *Daphne laureola* L. (lovorolisni likovac) u biljnom pokrovu Istre. Acta Bot. Croat. **29**, 225–232.

ŠUTIĆ-SUHIĆ, V., 1952: Prilog poznavanju flore jednog dijela Zagrebačke gore s kratkim osvrtom na vegetaciju. B. Sc. Thesis, Faculty of Science, University of Zagreb.

TOMAŠEVIĆ, M., 1998: The analysis of the flora of the Požega Valley and the surrounding mountains. Nat. Croat. **7** (3), 227–274.

TRINAJSTIĆ, I., 1995: Samoborsko gorje, a refuge of various floral elements between the Alps and the Dinaric mountains. Acta Bot. Croat. **54**, 47–62.

UNGAR, S. & Lj. REGULA-BEVILACQUA, 1994: *Daphne blagayana*. In ŠUGAR, I. (ed.): Crvena knjiga biljnih vrsta Republike Hrvatske. Ministarstvo graditeljstva i zaštite okoliša, Zavod za zaštitu prirode, Zagreb.

URLIĆ-IVANOVIĆ, S., 1952: Prilog poznavanju flore i vegetacije istočnog dijela Medvednice. B. Sc. Thesis, Faculty of Science, University of Zagreb.

VUKELIĆ, J., 1991: Šumske zajednice i staništa hrasta kitnjaka (*Quercus petraea* Liebl.) u gorju sjeverozapadne Hrvatske. Glasn. za Šumske Pokuse, **27**, 1–82.

VUKELIĆ, J. & M. ORŠANIĆ, 1994: Vegetacijske i šumskouzgojne značajke specijalnog rezervata šumske vegetacije »Bablji zub-Ponikve« na Medvednici. In TRINAJSTIĆ, I. (ed.): Simpozij – Pevalek. Zbornik radova, Koprivnica 20.–22 svibnja 1993. godine. Šumarski fakultet Sveučilišta u Zagrebu, Koprivnica, 141–149.

WEBB, D. A. & I. K. FERGUSON, 1968: *Daphne* L. In TUTIN, T. G., V. H. HEYWOOD, N. A. BURGES, D. M. MOORE, D. H. VALENTINE, S. M. WALTERS & D. A. WEBB (eds.): Flora Europaea, Vol. 2. Cambridge University Press, Cambridge, pp. 256–258.

WRABER, T. & V. MIKULETIČ, 1965: *Daphne blagayana* Freyer na severozahodni meji svojeg areala. Biol. Vestn. **13**, 61–67.

S A Ž E T A K

Rasprostranjenost roda *Daphne* u Parku Prirode Medvednica (Hrvatska)

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U svrhu izrade floristične karte Parka Prirode Medvednica istraživana je rasprostranjenost roda *Daphne*. Prikupljeni floristički podaci ukazuju na prisutnost tri vrste roda *Daphne* na Medvednici: *D. blagayana* Freyer, *D. laureola* L. i *D. mezereum* L. Podaci o rasprostranjenosti potječu iz tri izvora: terenskih istraživanja (63.5%), literature (30.8%) i herbarija (5.7%). Ukupno je zabilježeno 159 lokaliteta od kojih je 124 lokaliteta bilo moguće geokodirati. Također je izvršena analiza prikupljenih podataka prema starosti.

Na temelju geokodiranih podataka kartama je prikazana rasprostranjenost vrsta *D. laureola* i *D. mezereum* uz uporabu srednjoeuropske mreže za kartiranje flore s osnovnim poljima MTB 1/64. Za vrste *D. laureola* i *D. mezereum* nalazišta su utvrđena iz sva tri izvora podataka, dok je za vrstu *D. blagayana* pronađen samo jedan literaturni podatak nepreciznog lokaliteta te nije bilo moguće napraviti kartu. Postojanje te vrste na Medvednici vrlo je upitno jer spominje se samo u jednoj referenci, a također nije zapažena tijekom opsežnih terenskih istraživanja provedenih tijekom 1997. i 1998. godine.

Sve zabilježene vrste imaju IUCN status ugroženosti prema novoj Crvenoj knjizi biljnih vrsta u Hrvatskoj, a *D. blagayana* i *D. laureola* su zaštićene zakonom.

Iako *D. laureola* i *D. mezereum* nisu rijetke vrste u Parku Prirode Medvednica, zbog njihovog općeg statusa ugroženosti kao i zbog snažnog antropogenog utjecaja unutar istraživanog područja, potrebno je aktivno osiguranje i očuvanje postojanosti njihovih prirodnih staništa.