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Dedicated to Prof. dr. MERCEDES WRISCHER
on the occasion of her 70th birthday.

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# DISTRIBUTION AND ECOLOGICAL RELATIONSHIPS OF THE SPECIES *MATTEUCCIA STRUTHIOPTERIS* (L.) TOD. (*ATHYRIACEAE*) IN CROATIA

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The species *Matteuccia struthiopteris* Tod. (*Athyriaceae*) was noted in Croatia (in the Gorski kotar region) as early as in the previous century (1869). Some authors, however, considered its presence in Croatian flora doubtful. Since 1966, when it was noted in Hrvatsko zagorje (NW Croatia) with certainty, this species has been found in over ten other localities, mostly in Gorski kotar (SW Croatia).

In this paper, in addition to data published already, the authors present a list of new, as yet unpublished localities of the species *M. struthiopteris*, as well as its distribution and ecological relationships in Croatia. Also, a map of its range in Europe is included, showing the Croatian localities on its southern border.

**Key words:** flora, geobotany, Matteuccia, distribution, ecology, Croatia

## Introduction

The species *Matteuccia struthiopteris* (L.) Tod. (Basion.: *Osmunda struthiopteris* L., Syn.: *Onoclea struthiopteris* (L.) Roth, *O.germanica* (Willd.) Hook., *Struthiopteris filicastrum* All., *S. germanica* Willd., *Pteretis struthiopteris* (L.) Nieuwland) sensu lato has circumpolar distribution in the northern hemisphere (comp. MEUSEL et al. 1965:207, DOSTÁL 1984: 210). Its area spreads

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from North America, through Europe to East Asia. According to WALTER-STRAKA (1970: 290) the plant belongs to the boreal floral element (comp. also HORVAT et al. 1974: 72). In South East Asia this species is replaced by *Matteuccia orientalis* Trev.

North American populations were distinguished by MORTON as *Matteuccia struthiopteris* var. *pensylvanica* (Willd.) Morton, while some other authors consider it a distinct species, *M. pensylvanica* (Willd.) Raymond (*Struthiopteris pensylvanica* Willd., *Pteretis pensylvanica* (Willd.) Fern., *Matteuccia nodulosa* (Michx) Fern. (DOSTÁL 1984: 210, SLAVÍK 1997: 261). If the American taxon is excluded as a distinct one then *Matteuccia struthiopteris* has an Eurasian range.

Some authors, such as HULTÉN (1964: 124, Map 115, cit. MAYER 1975: 23) think that the differences between the European and American populations could be considered only in the light of a variability within the species *M. struthiopteris*, or LLOYD "unterscheidet sie nicht einmal als Varietät" (DOSTÁL 1984: 210).

According to LAWALRÉE (1993: 26) *M. struthiopteris* is distributed in Europe in "N.E. and C. Europe, extending to Belgium, S.W. Alps and C. Yugoslavia". The data about "C. Yugoslavia" refers to former Yugoslavia, probably to Bosnia where it was noted as early as the previous century (comp. MURBECK 1891: 20, BECK 1917: 335-336, cit. MAYER 1975: 24) but also recently (RITTER-STUDNIČKA 1973: 258).

Curiously, LAVALRÉE (l.c.) notes *M. struthiopteris* only in "C. Yugoslavia", although it was noted as early as the previous century in Croatia (SCHLOSSER and VUKOTINOVIĆ 1869: 1320-1321) as well as in Slovenia (comp. VOSS 1883: 309, MAYER 1952: 23, MAYER and HORVATIĆ 1967: 121-122), both republics being in the western part of former Yugoslavia (W. Yugoslavia).

Recently, the species was also noted in Serbia, (MAYER 1975: 25), i.e. former E. Yugoslavia, while in Monte Negro (MAYER and HORVATIĆ 1967: 123) and in Macedonia (MICEVSKI 1985) no samples of it were found.

As mentioned before, *M. struthiopteris* (as *Struthiopteris germanica* W.) was noted in Croatia in previous century by SCHLOSSER and VUKOTINOVIĆ (1869: 1320-1321) and also by NEILREICH (1869: 769). At the end of last century the species (as *Onoclea struthiopteris* Hoffm.) was noted in Gorski kotar (West Croatia) by HIRC (1896: 17 and 58). Nine years later the very same HIRC (1905: 51-152) in his Revision of Croatian Flora denied the quotes of SCHLOSSER and VUKOTINOVIĆ (l.c. 1869) stating that this species "has to be erased from Croatian flora". However, he forgot that he himself (comp. HIRC 1896: 17 and 58) noted this species. Because of HIRC's statement, some later authors doubted the existence of this species in Croatia (comp. JAVORKA 1924: 7, MAYER 1963: 64, 1964: 20), while others, obviously according to SCHLOSSER and VUKOTINOVIĆ, noted it in Croatia (comp. HAYEK 1927: 29, DOMAC 1950: 22, 1994: 17, ŠILIĆ 1983: 22, HRŠAK 1994: 35).

With the finding of the species *M. struthiopteris* along the river Sutla, on the border between Croatia and Slovenia, on both sides, Croatian and Slovenian (SERGAR 1966: 49), any doubt about the occurrence of the species in Croatia was

definitively removed. It was also confirmed by the findings of this species in the area of Kordun, central Croatia (PERŠIN 1979: 27), as well as by yet unpublished data of E. MAYER in 1978 in Gorski kotar and M. TORTIĆ in 1980 in Hrvatsko zagorje (comp. list of localities).

After 1997, when the first author found *M. struthiopteris* at a new locality on the Kupa River near Vukova gorica village (ALEGRO 1998: 18, 73), we investigated this species more closely to determine its distribution and ecological relationships in Croatia.

## Results and discussion

### Localities of the species *Matteuccia struthiopteris* in Croatia

In addition to the list of our most recent findings of *M. struthiopteris,* all known localities in Croatia, both published and unpublished, are listed below in chronological order, followed by the UTM quadrant (Universal Transverse Mercator) for each locality. The distribution of the species in Croatia is shown on the map (Fig. 1).

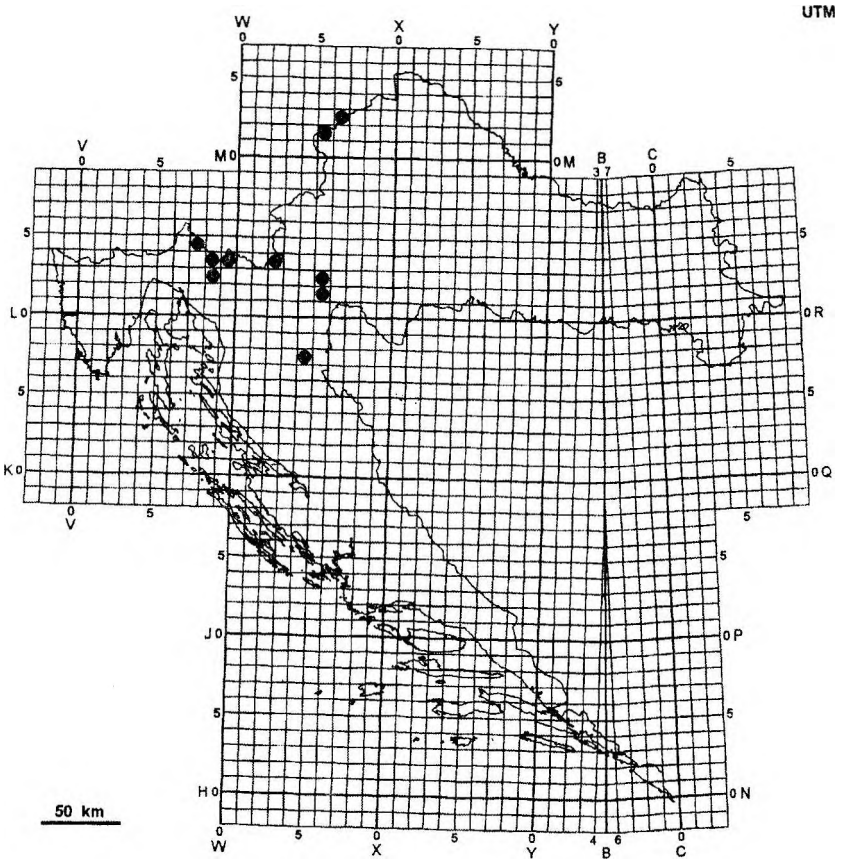


Fig. 1. Localities of *Matteuccia struthiopteris* in Croatia.

a) Published data

1. "In convallibus montium altiorum ad rivulos montis Snježnik prope Čubar (Klinggräff herb. muzei Zagrabiensis)" (SCHLOSSER and VUKOTINOVIĆ 1869: 1320–1321), UTM VL 74
2. Surroundings of Brod na Kupi, the Gorski kotar region (HIRC 1896: 17), UTM VL 83
3. Surroundings of the Crni Lazi village near Tršće in Gorski kotar (HIRC 1896: 58), UTM VL 74
4. By the Sutla River, near Trlično village, Hrvatsko zagorje, 250 m a.s. (STRGAR 1966: 49), UTM WL 51
5. Jurjevac in the surroundings of Vukmanić village (Kordun, Central Croatia) by the Trebinja brook (PERŠIN 1979: 27, 1999: 23), UTM WL 52
6. Vukova Gorica, by the Kupa River, ca 150 m a. s. (ALEGRO 1998: 18, 73), UTM WL 23
7. Surroundings of Gornji Vojnić (Kordun), by the Radonja rivulet (PERŠIN 1999: 23), UTM WL 51

b) Still unpublished data

8. "Croatia (ad confines Sloveniae): ad ripam dexteram fluvii Čabranka infra oppidum Čabar – in locis humidis fruticosis ad viam publicam, solo argillaceo, cca 450 m s.m., 1. 6. 1978 et 2. 8. 1978, leg. et det. E. et M. MAYER" (Herbarium Ernest Mayer, No 10426 and 10428, Ljubljana), UTM VL 74
9. "Croatia (ad confines Sloveniae): prope pagum Plešce ad ripam dexteram fluvii Čabranka in ditione oppidi Čabar – ad silvarum margines et in pratis subhumidis, cca 330 m s.m., sollo argillaceo, 2. 8. 1978, leg et det. E. et M. MAYER (Herbarium Ernest Mayer, No 10433, Ljubljana), UTM VL 74
10. Macelj (Hrvatsko zagorje), along the brook, 1980, M. TORTIĆ, in Herbarium M. and I. Horvat, Bot. Inst., Fac. of Sci., Zagreb (ZAHO), UTM WM 62
11. By the Iševnica rivulet, between Zeleni vir and Iševnica village, ca 240 m a. s. (Gorski kotar), A. L. ALEGRO, J. TOPIĆ , LJ. ILIJANIĆ, June 1997, UTM VL 93
12. Golubinjak, protected park-forest near Lokve village, ca 750 m a. s. (Gorski kotar), J. TOPIĆ , LJ. ILIJANIĆ, 25. August 1997., UTM VL 82
13. On the bottom of a doline in a beech wood north of Plitvice Hotel, NP Plitvice Lakes, N. ŠEGULJA, 22. July 1998, UTM WK47
14. Right bank of the Kupa River, on the border between Croatia and Slovenia, about 200 m upstream from Hrvatsko village, ca 290 m a. s. (Gorski Kotar), J. TOPIĆ, A. ALEGRO , LJ. ILIJANIĆ, 11. August 1998, UTM VL 74
15. Left bank of the Čedanj brook, about 300 m upstream from Čedanj village toward Brod Moravice, cca 210 m a. s. (Gorski kotar), J.TOPIĆ, LJ. ILIJANIĆ, 24. September 1998, UTM VL 9

16. Along the road near Čedanj brook, about 250 m downstream from Čedanj village toward Brod na Kupi ca 210 m a. s. (Gorski kotar), J. TOPIĆ, LJ. ILIJANIĆ, 24. September 1998, UTM VL 93

The list clearly shows that the species *Matteuccia struthiopteris* has so far been noted in Croatia in 16 localities. Most of them (10) are in Gorski kotar (South West Croatia), one is in the Kupa canyon near Vukova Gorica village on the border of the Gorski kotar region, two localities are in Hrvatsko zagorje (Northwest Croatia), another two in Kordun (Central Croatia) and one in the Plitvice Lakes (Lika region). Except the localities in Kordun and the one in Plitvice, which make a "bridge" towards the Bosnian localities, all the others are in the vicinity of the Slovenian border (comp. Fig. 1), making a natural extension of the range in Slovenia, where this plant is more frequent and more widely distributed (comp. MAYER 1950, 1952, 1954, 1963, 1964; WRABER, T., 1960, 1967, 1969; STRGAR 1966; VREŠ 1987). The distribution of the species in Slovenia, with the addition of the most recent findings, has been presented thoroughly by TRPIN (1994).

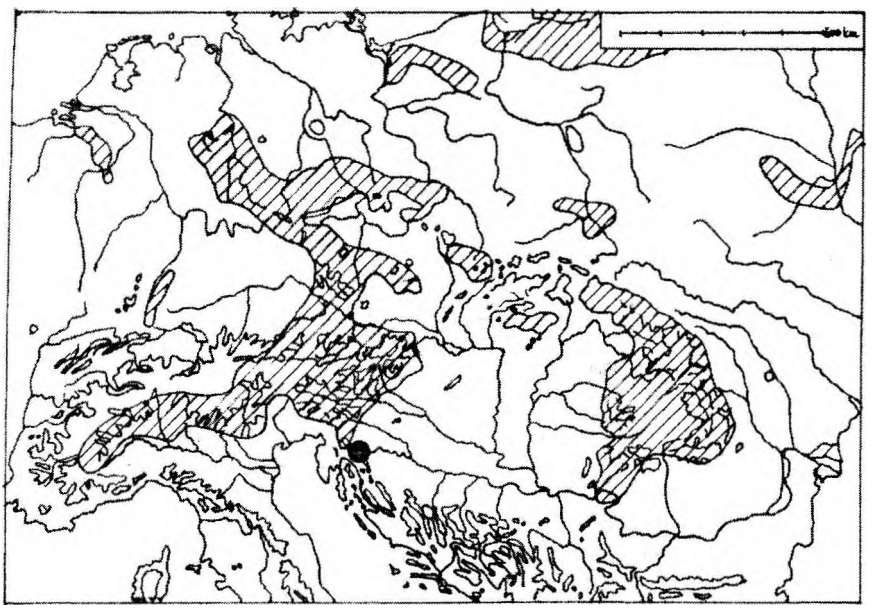

Fig. 2. Distribution of *Matteuccia struthiopteris* in Europe (after HENDRYCH 1984) with added localities in Croatia. (bar = 500 km)

Discussing the southern border of the range of *Matteuccia struthiopteris* DOSTÁL (1984: 210) wrote: "Die Südgrenze lauft durch die Poebene, Slowenien, Rumänien bis in die Südukraine". He did not mention either Croatia or Bosnia and Herzegovina or Serbia (all the parts of former Yugoslavia), although the southern border of the area passes through these parts (Fig. 2). However, localities confirming that fact were known long before (comp. cited lit.), even the lat-

est one from Serbia (MAYER 1975) having been published nine years before the new edition of HEGI (comp. DOSTÁL, l.c. 1984).

**Ecological relationships of the species *Matteuccia struthiopteris***

According to literature data in Central Europe the species *Matteuccia struthiopteris* mostly grows in the communities of the *Alno-Ulmion* Br.-Bl. et Tx. 1948 alliance*. In Germany OBERDORFER (1957: 396, 1994: 74-75) as well as ELLENBERG (1982: 915) consider *M. struthiopteris* a characteristic species of this alliance. PHILIPPI (1993: 159) noted this species in the communities of the same alliance in the area of Baden-Würtemberg: "v.a. in aufgelichteten *Alnus glutinosa*-Bachsäumen (*Stellario-Alnetum*), gegen Beschattung empfindlich, im Osten Mitteleuropas auch im *Alnetum incanae*".

WALLNÖFER et al. (1993: 91) mark the species as "Kenntaxa" of the *Alnion incanae* alliance in Austria, where it also grows in the *Carici pendulae-Aceretum pseudoplatani* Oberd. 1957 association from the *Tilio platyphylli-Acerion pseudoplatani* Klika 1955 alliance (WALLNÖFER et al. 1993: 106-107).

According to SEDLÁČKOVÁ (1982: 243-257) and SLAVÍK (1997: 261-262) *M. struthiopteris* grows in Bohemia and Moravia (Czech Republic) within the communities of the *Alnenion glutinoso-incanae* suballiance (*Alnion incanae* alliance). The same situation is found in Poland where MEDWECKA-KORNAŚ et al. (1972: 294) note the species as characteristic of the *Alno-Padion* Knapp 1942 em. Medw.-Korn. 1957 alliance, i.e. a regionally characteristic species of the *Alnetum incanae* Aichinger et Siegrist 1930 association (MEDWECKA-KORNAŚ 1972: 402). COLDEA and WAGNER (1997: 365) noted *Matteuccia struthiopteris* in the *Telekio-Alnetum glutinosae* Coldea 1990 association in the East Carpathians.

In order to compare ecological relationships of the species *M. struthiopteris* in Croatia and Central Europe we made a vegetation record by the standard phytosociological method (BRAUN-BLANQUET 1964, MUELLER-DOMBOIS 1974) in every stand where we found the plant. The plant names were taken from "Flora Europaea".

Floristic composition, shown in phytosociological table (Tab. 1), was made on the basis of 8 vegetation records from the following localities:

Rec. 1. Čedanj (locality no. 15 in the list of localities)
Rec. 2. Čedanj (loc. 16)
Rec. 3. Vukova Gorica (loc. 6)
Rec. 4. Hrvatsko (loc. 14)
Rec. 5. Ševnica (loc. 11)
Rec. 6. Ševnica (loc. 11)
Rec. 7. Golubinjak (loc. 12)
Rec. 8. Golubinjak (loc. 12)

According to vegetation records from Gorski kotar one can conclude that the ecological relationships are similar to those in Central Europe. *M. struthiopteris* grows on wet habitats, mostly along brooks, rivulets and rivers, in semi-shady

* After WALLNÖFER et al. 1933:91 valid name is *Alnion incanae* Pawł. in Pawłowski et Wallisch 1928, Syn. *Alno-Padion* Knapp. ex Matuszkiewicz et Borowik 1957.

groves of black and white alder (Tab. 1, Rec. 1–5). The vegetation could be described as a fragmentarily developed *Alnetum glutinoso-incanae* Br.-Bl. 1915 association (after HORVAT belonging to the *Alno-Quercion roboris* Horv. (1937) 1938 alliance, syn. *Alno-Ulmion* Br.-Bl. et Tx. 1943, comp. HORVAT 1962: 123).

In Golubinjak (Tab. 1, Rec. 7 and 8) *M. struthiopteris* grows on the border of the Lokve valley, in a small doline under high, vertical cliffs which surround the doline on three sides. Although these stands are outside the forest, in the clearing on the bottom of the doline, they are sometimes, during the day, in the shadow of high cliffs or trees of *Abies alba, Picea abies, Ulmus glabra, Acer pseudoplatanus,* growing around the doline. The habitat is visibly fresh, with long lasting snow cover.

According to floristic composition this is an atypically developed *Telekietum speciosae* Tregubov 1941 association (*Atropion belladonnae, Atropetalia*) mixed up with the elements of vegetation of *Adenostyletalia* (comp. HORVAT 1962: 73–74 and 103–104).

HENDRYCH (1984) considers the species *Matteuccia struthiopteris* in the Czech Republic, and probably in other parts of Central Europe, to originate from cultivation in gardens and parks. This conclusion is based on the localities in nature positioned in the Czech Republic in the vicinity of parks at castles, settlements and water mills, as well as on the fact that these plants do not develop fertile fronds.

The opposite situation from that in the Czech Republic can sometimes be seen in Croatia for example on 1 May 1999 in the Ïsevnica valley, when a few people collected some specimens of *Matteuccia struthiopteris* to decorate their gardens. Our opinion is that *M. struthiopteris* is an indigenous species in all the localities inspected so far in Croatia. The specimens were vigorously developed, with both sterile and fertile fronds (Fig. 3).

Fig. 3: Spring sterile fronds (green) and autumn fertile fronds (brown) of *Matteuccia struthiopteris* in the population at the Ïsevnica valley (1999, May 1st).

Tab. 1. Floristic composition of stands with *Matteuccia struthiopteris*.

| No. of records | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| area ($m^2$) | 50 | 20 | 100 | 50 | 80 | 30 | 100 | 50 |
| | | | | | | | | |
| ***Matteuccia struthiopteris*** (L.) Tod. | **3** | **3** | **5** | **2** | 5 | 5 | 3 | 3 |
| | | | | | | | | |
| **Tree layer** | | | | | | | | |
| | | | | | | | | |
| ***Alnus glutinosa*** (L.) Gaertner | **3** | **3** | **1** | **1** | | | | |
| ***Alnus incana*** (L.) Moench | | | 1 | 2 | 2 | | | |
| *Fraxinus excelsior* L. | + | | 1 | 1 | | | | |
| *Acer campestre* L. | | | 1 | 1 | | | | |
| *Fagus sylvatica* L. | | | 1 | | | | | |
| *Picea abies* (L.) Karsten | | | | 1 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| **Shrub layer** | | | | | | | | |
| | | | | | | | | |
| *Sambucus nigra* L. | 1 | | 1 | 1 | 1 | + | | |
| *Rubus hirtus* Waldst. & Kit. | 1 | | + | | 3 | 3 | | |
| *Rubus caesius* L. | 1 | 2 | | 2 | | | | |
| *Corylus avellana* L. | 1 | | 1 | | | | | |
| *Crataegus monogyna* Jacq. | | + | 1 | | | | | |
| *Hedera helix* L. | | + | + | | | | | |
| *Cornus sanguinea* L. | | 1 | | | | | | |
| *Rubus idaeus* L. | | | | | | | + | + |
| | | | | | | | | |
| | | | | | | | | |
| **Herb layer** | | | | | | | | |
| | | | | | | | | |
| *Aegopodium podagraria* L. | 1 | + | 2 | + | + | + | | |
| *Urtica dioica* L. | + | + | | | 1 | + | 1 | 1 |
| *Dryopteris filix-mas* (L.) Schott | + | + | | + | + | | + | |
| ***Telekia speciosa*** (Schreber) Baumg. | + | | | + | | | **3** | **2** |
| *Lamiastrum galeobdolon* (L.) Ehrend. & Polatschek | + | + | | | + | + | | |
| *Stellaria nemorum* L. subsp. *glochidisperma* Murb. | | | + | | | + | 1 | 1 |
| *Stachys sylvatica* L. | 1 | | + | | | | 1 | |
| *Erigeron annuus* (L.) Pers. | + | | | 3 | | + | | |
| *Brachypodium sylvaticum* (Hudson) Beauv. | 1 | | | | | | + | + |
| *Angelica sylvestris* L. | + | | | | | + | | + |
| *Juncus effusus* L. | | + | 1 | | | 1 | | |
| *Doronicum austriacum* Jacq. | | | + | | | | 2 | 1 |
| *Geranium phaeum* L. | | | + | | | | 1 | 1 |
| *Cirsium oleraceum* (L.) Scop. | | | + | + | | | + | |
| *Ranunculus lanuginosus* L. | | | + | | | | + | + |
| *Petasites hybridus* (L.) Gaertner, B. Mayer & Scherb. | | | | 2 | | + | 1 | |
| *Humulus lupulus* L. | 2 | | + | | | | | |
| *Eupatorium cannabinum* L. | 1 | | | + | | | | |
| *Mentha longifolia* (L.) Hudson | | | | 3 | | + | | |
| *Anthriscus sylvestris* (L.) Hudson | | | | | | | 2 | 1 |
| *Cardamine amara* L. | | | | | | | 1 | 1 |
| *Galeopsis* sp. | + | + | | | | | | |
| *Lysimachia vulgaris* L. | + | + | | | | | | |
| *Lythrum salicaria* L. | | + | | 1 | | | | |

Tab. 1. - continued

| No. of records | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| area ($m^2$) | 50 | 20 | 100 | 50 | 80 | 30 | 100 | 50 |
| | | | | | | | | |
| *Equisetum arvense* L. | | + | | | | + | | |
| *Alliaria petiolata* (Bieb.) Cavara & Grande | | | – | + | | | | |
| *Equisetum sylvaticum* L. | | | + | + | | | | |
| *Sanicula europaea* L. | | | + | – | | | | |
| *Impatiens noli-tangere* L. | | | + | | | | 1 | |
| *Lunaria rediviva* L. | | | + | | | | | + |
| *Circaea lutetiana* L. | | | | + | | | | + |
| *Oxalis acetosella* L. | | | | + | | | | + |
| *Aruncus dioicus* (Walter) Fernald | | | | | | | + | – |
| *Homogyne sylvestris* Cass. | | | | | | | + | + |
| *Streptopus amplexifolius* (L.) DC. | | | | | | | + | + |
| *Galeopsis speciosa* Miller | | | | 2 | | | | |
| *Torilis japonica* (Hout.) DC. | | | | 1 | | | | |
| *Chrysosplenium alternifolium* L. | | | | | 2 | | | |
| *Pteridium aquilinum* (L.) Kuhn | | | | | | 2 | | |
| *Senecio nemorensis* L. subsp. *fuchsii* (C. C. Gmelin) Celak | | | | | | | 2 | |
| *Petasites albus* (L.) Gaertner | | | | | | | 1 | |
| *Ranunculus repens* L. | | | | | | | + | |
| *Filipendula ulmaria* (L.) Maxim. | | | | | | | | 1 |
| *Myosotis scorpioides* L. | | | | | | | | 1 |
| *Scopolia carniolica* Jacq. | | | | | | | | 1 |
| *Aconitum lycoctonum* L. subsp. *vulparia* (Reichenb.) Nyman | | | | | | | | + |
| *Arabis alpina* L. | | | | | | | | + |
| *Athyrium filix-femina* (L.) Roth. | | | | | | | | – |
| *Chaerophyllum hirsutum* L. | | | | | | | | + |
| *Veratrum lobelianum* Bernh. | | | | | | | | + |
| *Veronica urticifolia* Jacq. | | | | | | | | + |

The species *Matteuccia struthiopteris* is protected by law in the majority of Central European countries (DOSTAL 1984: 210). While some other boreal plants, rare and endangered in Croatia, are included in the Red Book of Plant Species of the Republic of Croatia (ŠUGAR 1994), such as *Calla palustris* L. (TOPIĆ and ILIJANIĆ 1989), *Drosera rotundifolia* L. (PERŠIN 1964, 1979; TRINAJSTIĆ 1973), *Eriophorum gracile* Koch ex Roth (ILIJANIĆ 1978) and others, *Matteuccia struthiopteris* is not among them, although rare and endangered. It is on the list for the Red Book of Bosnia and Herzegovina (ŠILIĆ 1996: 326). A drastic example of plant destruction was seen on 1 May 1999 in the Ilševnica rivulet valley (loc. no. 11). Pulling timber out of the wood, tractors "ploughed" the habitat there and destroyed the major part of the population. Now, we can only hope that the population can be successively revived from some remaining rhizomes, providing that the destruction is not repeated. A similar situation was also observed in the vicinity of Vukova Gorica (loc. no. 6). Such examples sharply point to the necessity not only of legislative protection, but also of active habitat protection.

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## Sažetak

**Rasprostranjenost i ekološke značajke vrste *Matteuccia struthiopteris* (L.) Tod. (*Athyriaceae*) u Hrvatskoj**

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*Matteuccia struthiopteris* (L.) Tod. je biljka široke cirkumholoarktičke rasprostranjenosti. Njezin areal seže od Sjeverne Amerike, preko Europe do istočne Azije, gdje ju zamjenjuje vrsta *M. orientalis* Trev. Neki su autori sjevernoameričke populacije izdvojili kao zaseban takson (*Struthiopteris pensylvanica* (Willd.) Raymond, *Matteuccia struthiopteris* var. *pensylvanica* (Willd.) Morton, *M. nodulosa* (Michx.) Fern., *Pteretis pensylvanica* (Willd.) Fern.). Prema takvom shvaćanju *M. struthiopteris* ima eurazijski areal.

U Hrvatskoj je *M. struthiopteris* zabilježena još u prošlom stoljeću (SCHLOSSER & VUKOTINOVIĆ 1869). Neki su je autori, međutim, smatrali dvojbenom za Hrvatsku, vjerojatno na temelju napomene HIRCA (1905: 151-152) da se ta vrsta "ima brisati iz hrvatske flore"!

Nakon gotovo jednog stoljeća od objavljivanja prvog nalaza, nađena je *M. struthiopteris* na više lokaliteta u Hrvatskoj (Hrvatsko zagorje, Gorski kotar, Kordun).

U ovom prilogu donosi se popis nalazišta, karta rasprostranjenosti u Hrvatskoj i prikaz europskog dijela areala vrste. Vidi se da je *M. struthiopteris* u Hrvatskoj rasprostranjena pretežito blizu hrvatsko-slovenske granice kao prirodan nastavak areala iz Slovenije, dok nalazišta na Kordunu i NP Plitvička jezera čine most prema nalazištima u Bosni. Našim područjem prolazi južna granica europskog dijela njena areala.

Fitocenološke snimke vegetacijskih sastojina na istraženim novim lokalitetima pokazuju da se fitocenološko-ekološke značajke te biljke u Hrvatskoj u velikoj mjeri podudaraju s analognim prilikama u srednjoeuropskom području.

Vrsta *M. struthiopteris* nije dosad bila uvrštena u "Crvenu knjigu biljnih vrsta Republike Hrvatske" kamo kao rijetka i ugrožena biljka svakako spada. Utvrđeno je da su na nekim lokalitetima stanište i veliki dio populacije *M. struthiopteris* već uništeni. Stoga zaslužuje da bude i zakonom zaštićena na svim lokalitetima u Hrvatskoj.