

ADDITION TO THE VASCULAR FLORA IN THE REGION OF BOKOVO (DALMATIA, CROATIA)

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Šilić, Č. & Šolić, M. E.: Addition to the vascular flora in the region of Biokovo (Dalmatia, Croatia). *Nat. Croat.*, Vol. 11, No. 3., 341–363, 2002, Zagreb.

During the period between 1996 and 2001 we made fundamental floristic explorations of the region of the Biokovo. The higher places were explored from early spring until late autumn, and the coastal slopes of Mt Biokovo (called Podbiokovlje) during the winter months.

The purpose of our explorations was to complete the collection »Herbarium of the Biokovo area« (MAKAR), inventory of the vascular flora of the Biokovo region and the Biokovo Nature Park. An important part of the collected material has been examined in detail and included as documentary material within the collection of the Mountain and Sea Institute in Makarska.

During our explorations 193 additional vascular plant taxa have been itemized. With this number of plant taxa, knowledge about the biological diversity (biodiversity) of this spacious and especially interesting region is even more growing.

In this paper we provide a report on the results the investigation.

During the next period we will carry on with the identification and inventory. There is good reason to suppose that more novelties will be found in the collected materials and in new explorations.

Key words: vascular flora, Biokovo region

Šilić, Č. & Šolić, M. E.: Dopuna vaskularnoj flori biokovskog područja (Dalmacija, Hrvatska). *Nat. Croat.*, Vol. 11, No. 3., 341–363, 2002, Zagreb.

Na biokovskom području, u periodu od 1996. do 2001., vršili smo sustavna terenska floristička istraživanja. Istraživanje je bilo obavljeno od ranog proljeća do kasne jeseni u višim položajima, a u Podbiokovlju i u zimskim mjesecima.

Cilj je bio kompletiranje herbarske zbirke »Herbar Biokovskog područja« (MAKAR) te inventarizacija flore biokovskog područja i Parka prirode Biokovo. Znatno dio prikupljenog materijala je

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detaljno obrađen i kao dokumentacijski materijal, uložen u navedenu zbirku u Institutu »Planina i more« u Makarskoj.

Prilikom ovih istraživanja konstatirali smo još 193 taksona vaskularnih biljaka. Ovim brojem biljnih taksona se još više povećava spoznaja biološke raznolikosti (biodiverzitet) ovog prostranog i nadasve interesantnog područja.

U ovome radu priopćavamo rezultate spomenutih istraživanja.

U narednom periodu bit će nastavljena determinacija i inventarizacija. To nam daje pravo za pretpostaviti kako će biti još noviteta u prikupljenom materijalu i u novim istraživanjima.

Ključne riječi: vaskularna flora, područje Biokova

INTRODUCTION

The main and most exhaustive descriptions and analyses of Biokovo vascular flora, described in a larger or more limited sense, can be found in the following works: »Biljni pokrov Biokova« (KUŠAN, 1969) and »Bilje Biokova« (RADIĆ, 1976).

There are also numerous flora- and vegetation research works in which the flora of the Biokovo has been fairly well completed.

Although it is not the purpose of our paper to discuss the history of the explorations of the Biokovo flora, starting with Host (HOST, 1802; the translation of this work 1993), PORTENSCHLAG (1824), and Visiani at different times (VISIANI, 1826, 1829, 1830, 1840 and 1852) and ending with the latest numerous contributions, we are able to find, after having referred to all these works, that this huge region contains about 1400 taxa of vascular plants. We deliberately did not want to mention an exact number for the registered indigenous plants of the Biokovo massif, for the reason that several research works have been published recently in which numerous taxa are mentioned, the presence of which in this region needs to be critically analysed, which is not the purpose of this work.

During our five-year explorations (1996–2001) we have given the names of 193 supplementary taxa of vascular flora which were not previously recorded for this region.

We have taken in consideration the massif of the Biokovo in the largest sense, spreading from the valley of the Cetina river (from the mouth, up to Trilj) in the north-western part, to the mouth of the Neretva river in the south-east, as some other authors have done (SANTRIĆ, 1977 a. o.). Our explorations in the interior of this area have covered the area from Kozica, across the Turija Pass, to Zagvozd and also part of Kozička Poljica (Fig. 1). Most of the new taxa belong to indigenous species, some of them newly introduced, like: *Mespilus germanica* L., *Populus canadensis* Moench, *Populus afghanica* (Aitch. & Hemsl.) Schneid.

It should be pointed out that we have used the nomenclature used in the work »Flora Europaea« 1–5 (TUTIN & HEYWOOD /eds./, 1964–1980) in the taxative listing of species in this work, which is at one with the practice of the work »Index florae Croatiae« (NIKOLIĆ /ed./, 1994; 1997; 2000).

The only difference in this prospect concerns the taxon *Populus afghanica* (Aitch. & Hemsl.) Schneid., as we particularly wanted to point out the presence of the



Fig. 1. The map with the position of the region of Biokovo

white bark (female) poplar in the whole area of the continental and coastal part of the Biokovo. In this respect we used and cited one of the latest dendrological works dealing with this problem (JANJIĆ, 1991).

Aiming at floristic completeness we have also given some quotations from the phytocenological works for this area (e.g. TRINAJSTIĆ, 1983, 1993, 1994; VRDOLJAK, 1983) as well as quotations from a lesser known work written during a field trip in a part of the Biokovo area (GARNWEIDNER, 1987).

RESULTS OF THE INVESTIGATION

LIST OF THE NEWLY REGISTERED TAXA

LYCOPSIDA

Equisetaceae

Equisetum fluviatile L.

(Syn.: *E. limosum* L., *E. heleocharis* Ehrh.)

Makarska: lower part of the camping site, water meadows ca 2 m a.s.l., mouth of the Neretva River

Equisetum pratense Ehrh.

Valley of the Cetina: near Radmanove mlinice

MAGNOLIOPSIDA (DYCOTILEDONEAE)

Acanthaceae

Acanthus balcanicus Heywood & I. B. K. Richardson

(Syn.: *A. longifolius* Host, non Poir.)

Saranač, ca 850 m a.s.l.

Amaranthaceae

Amaranthus albus L.

Very often found on ruderal habitats in the whole littoral of Makarska (Makarska, Promajna and other places)

Amaranthus deflexus L.

(Syn.: *A. prostratus* Bellardi)

On ruderal habitats in Makarska

Amaranthus graecizans L.

(Syn.: *A. angustifolius* Lam., *A. sylvestris* Vill.)

On ruderal habitats in Makarska

Amaranthus hybridus L.

(Syn.: *A. chlorostachys* Willd.)

On ruderal habitats in Makarska

Amaranthus lividus L.

(Syn.: *A. blitum* L.)

On ruderal habitats in Makarska

Apiaceae (=Umbelliferae)

Angelica sylvestris L.

Valley of the Cetina: near Radmanove mlinice

Conium maculatum L.

Valley of the Cetina

Scandix pecten-veneris L.

Makarska and other places (common in the whole area)

Torilis arvensis (Hudson) Link. subsp. *purpurea* (Ten.) Hayek

(Syn.: *T. heterophylla* Guss., *T. arvensis* subsp. *heterophylla* (Guss.) Thell.)

Valley of the Cetina

Aristolochiaceae

Aristolochia clematitis L.

Valley of the Cetina: near Radmanove mlinice

Asteraceae

Aster sedifolius L. subsp. *illyricus* (Murb.) Merxm.

(Syn.: *Aster illyricus* (Murb.) K. Maly; *Galatella rigida* subsp. *illyrica* Murb.)

Biokovo: Stegoša, 1058 m a.s.l.

Cirsium eriophorum (L.) Scop. subsp. *erriophorum*

Biokovo: Lokva

Crupina vulgaris Cass.

Baško Polje and other places

Dittrichia graveolens (L.) Greuter

(Syn.: *Inula graveolens* (L.) Desf.)

Valley of the Cetina, near the mouth (not far from Omiš), ca 10 m a.s.l.; in rud.

Eupatorium adenophorum Sprengel

Valley of the Cetina, near the mouth; ass. *Juncetum maritimo – acuti* H-ić

Eupatorium cannabinum L. subsp. *cannabinum*

Region of Vošac and other places

Inula salicina L. subsp. *aspera* (Poiret) Hayek

(Syn.: *Inula aspera* Poiret)

Valley of the Cetina: above Radmanove mlinice

Ptilostemon strictus (Ten.) Greuter

(Syn.: *Cnicus* s. Ten., *Cirsium* s. (Ten.) Link)

Valley of the Cetina, near Radmanove mlinice

Boraginaceae*Heliotropium supinum* L.

Makarska

In the General Herbarium of the Botanical Department of the World Museum in Sarajevo, one paper is available with three examples of this species, with the mention:

FLORA EXICATA AUSTRO – HUNGARICA

169. *Heliotropium supinum* L., Sp. Pl. ed. I. p. 130,

Dalmatia: In locis incultis arenosis ad mare Macarscam, P i c h l e r

Neatostema apulum (L.) I. M. Jonston(Syn.: *Lithospermum apulum* (L) Vahl., *Myosotis apula* L.)

Podbiokovlje (the foot of Mt Biokovo): between St. Martin and Kotišina

Brassicaceae (=Cruciferae)*Alyssum alyssoides* (L.) L.(Syn.: *A. calicinum* L.)

Near Gornje Igrane, ca 550 m a.s.l.

Alyssum minus (L.) Rothm.(Syn.: *A. campestre* auct. pro max. parte)

Top of Staza, behind St Elias Chapel, ca 920 m a.s.l.

Arabis caucasica Schlecht. in Wild.(Syn.: *A. albida* Steven)

Between Lađana and Vošac, ca 1380 m a.s.l.

Arabis hirsuta (L.) Scop.

Gornje Igrane, Šošići hamlets, Saranač, Rudeži above Kozica, above St Elias Chapel (top of Staza, between Lađana and Vošac and other places)

(Species mentioned in one floristic list, GARNWEIDNER, E. (1987: 274) on the line from Kozica to Gornje Igrane and TRINAJSTIĆ, I. (1993: 39) in the association of the sub-Alpine beech forest).

Arabis nova Vill.(Syn.: *A. saxatilis* All., *A. auriculata* Lam.)

Gornje Igrane, near Šošići hamlets, littoral of Makarska

Barbarea stricta Andrz.

Valley of the Cetina (mouth), near Radmanove mlinice and other places

Calepina irregularis (Asso) Thell. in Schinz & Keller(Syn.: *C. corvini* (All.) Desv.)

Above Kozica, ca 300 m a.s.l.; N-exp., Saranač, ca 600 m a.s.l.

Cardamine hirsuta L.

Littoral of Makarska, surroundings of Kozica, Saranač and other places

Coronopus squamatus (Forsk.) Ascherson

(Syn.: *C. procumbens* Gilib.)

Valley of the Cetina; in rud.

Draba muralis L.

Between Kozica and Slivno

Erophila verna (L.) Chevall. subsp. *praecox* (Steven) Walters

(Syn.: *Draba verna* L.)

Makarska: cemetery, passage of Turija (above the tunnel)

Erophila verna (L.) Chevall. subsp. *spathulata* (A. F. Lang) Walters

(Syn.: *Draba verna* L.)

Saranač, ca 850 m a.s.l.

Lepidium graminifolium L.

Often ruderal plant in Makarska and its surroundings

Lunaria annua L. subsp. *pachyrhiza* (Borbás) Hayek

(Syn.: *L. pachyrhiza* Borbás)

Above Gornja Podgora and other places

Thlaspi perfoliatum L.

Often in the lower parts in the whole region

Campanulaceae

Campanula erinus L.

To the spring and early summer, this tiny and insignificant species of *Campanula* gives a specific stamp, because the phenophase of its flowering is in this period. It grows in the fissures of dry walls, fissures of rocks and similar habitats in the whole area at the foot of Biokovo.

(This species is mentioned by I. TRINAJSTIĆ (1994) in one phytocenological table as being in the vegetation of dry walls in Kotišina above Makarska.)

Campanula rapunculus L.

Valley of the Cetina: Zadvarje and surrounding

Campanula sibirica L. subsp. *divergentiformis* (Jav.) Domin

Staza, Vošac, Zabiokovlje, valley of the Cetina and other places

(This taxon is mentioned by GARNWEIDNER, E. (1987: 271).

Legousia falcata (Ten.) Fritsch

(Syn.: *Specularia falcata* (Ten.) A. DC.)

Igrane, ca 20 m a.s.l., above Donja Brela, ca 300 m a.s.l.

(the species is rare in the explored area)

Legousia hybrida (L.) Delarbe

(Syn.: *Specularia hybrida* (L.) A.DC.)

Common in the lower locations of the whole area of Podbiokovlje.

(Species noted for the Biokovo by GARNWEIDNER, E. (1987: 272) during a botanic field trip.)

Caryophyllaceae

Cerastium pumilum Curtis

Littoral of Makarska: plateau between Kravica and Kuk ca 100 m a.s.l.

(Species mentioned for the explored area, in a floral list by GARNWEIDNER, E. (1987: 272).)

Herniaria incana Lam.

Rocky grounds around Gornje Igrane

Petrorhagia prolifera (L.) P. W. Ball. & Heywood

(Syn.: *Dianthus prolifer* L., *Tunica prolifera* (L.) Scop., *Kohlrauschia prolifera* (L.) Kunth.)

Kozica, hamlet of Rudeži above Kozica and other places

Petrorhagia velutina (Guss.) P. W. Ball & Heywood

(Syn.: *Dianthus velutinus* Guss., *Tunica velutina* (Guss.) Fischer & C.A.Meyer)

Hamlet of Rudeži above Kozica

Polycarpon tetraphyllum (L.) L. subsp. *alsinifolium* (Biv.) Ball.

(Syn.: *P. alsinifolium* (Biv.) DC.)

Taxon is present on the lower areas in the littoral of Makarska

Silene multicaulis Guss. subsp. *multicaulis*

(Syn.: *S. saxifraga* L. var. *multicaulis* (Guss.) Fiori)

Vošac, Troglav, Lokva, (under) Sv. Jure and other places

(Det.: Dr Fabio Conti)

Silene noctiflora L.

(Syn.: *Melandryum noctiflorum* (L.) Fries)

Valley of the Cetina: surroundings of Radmanove mlinice

Stellaria media (L.) Vill.

Zaostrog: monastery garden, valley of the Cetina, Makarska and other places (fallow fields and gardens)

Chenopodiaceae

Chenopodium ambrosioides L.

Makarska, in rud.

Chenopodium hybridum L.

Živogošće Strn, in rud.

Chenopodium murale L.

Makarska: at the start of Osejava, W-exp., ca 6 m a.s.l.

Cichoriaceae

Chondrilla juncea L.

Hamlet Rudeži above Kozica and other places

Crepis sancta (L.) Babč.

(Syn.: *Lagoseris sancta* (L.) Maly)

Littoral of Makarska: Makarska, Kravica, ca 120 m a.s.l. and other places

Crepis vesicaria L. subsp. *vesicaria*

Makarska: Osejava, around Gornje Igrane and other places

Hyoseris scabra L.

Makarska: Osejava and other places

Lactuca quercina L. subsp. *quercina*

Kozica, near cemetery, ca 500 m a.s.l., S-exp.

Lactuca saligna L.

Kozica, around cemetery, ca 500 m a.s.l.; S-exp.

Lactuca serriola L.

(Syn.: *L. scariola* L.)

Gornje Živogošće: cemetery

Lactuca virosa L.

Stipkovac (area of Vošac, ca 1400 m a.s.l.)

Leontodon tuberosum L.

(Syn.: *Thrinchia tuberosa* (L.) DC.)

Common in the littoral part of Makarska

Scorzonera villosa Scop. subsp. *villosa*

(Syn.: *Gelasia villosa* Cas., *S. angustifolia* Waldst. & Kit.)

Makarska: Osejava, ca 60 m a.s.l., Živogošće Strn, above Veliko Brdo and other places.

(This species is mentioned for the massif of Biokovo in the flora list of GARNWEIDNER, E. (1987: 273).)

Sonchus oleraceus L.

Kotišina (fallow fields and gardens)

Taraxacum hoppeanum Griseb.

Makarska: (meadows)

Taraxacum illyricum Dahlst. ex Van Soest

(Syn.: *T. palustre* agr.)

Turija Pass, swampy meadows

Dipsacaceae

Scabiosa silenifolia Waldst. & Kit.

Region of Troglav (rarely)

Succisella inflexa (Kluk) G. Beck

(Syn.: *Succisa australis* (Wulfen) Reichenb.)

Water meadows behind the Turija tunnel, ca 570 m a.s.l. (rarely).

Euphorbiaceae

Euphorbia exigua L.

Above Veliko Brdo

Euphorbia nutans Lag.

Gornji Tučepi

Euphorbia peplus L.

Lawn in the garden of the Mountain and Sea Institute, Osejava and other places

Fabaceae (=Papilionaceae)

Amorpha fruticosa L.

Valley of the Cetina, above Radmanove mlinice

Argyrolobium zanonii (Turra) P. W. Ball.

(Syn.: *A. linnaeanum* Walpers, *A. argenteum* (L.) Willk. non (Jacq.) Ecklon & Zeyher, *Cytisus argenteus* L., *C. zanonii* Turra)

Often found in the vegetation of the rocky grounds and garrigue in the whole coastal belt of the littoral of Makarska.

(It is interesting to note that this species is mentioned by VRDOLJAK Ž. (1983:252) in the two »ogledne plohe« (»experimental surfaces«) (4 & 5); for the area above Vepric and Sutvid (Staza), while exploring the forest vegetation of the Biokovo.)

Astragalus glycyphyllos L.

Forest in the valley of the Cetina

Astragalus muelleri Steud & Hochst.

(Syn.: *A. vegliensis* Sadler ex Ascherson & Graebner)

Between Ravna Vlačka and Lađana (leg. dr. fra Jure Radić, 05. VI. 1982.)

(The species was mentioned by VRDOLJAK, Ž. (1983: 255) for Baško Polje in the wood of Aleppo pine (*Pinus halepensis*) in one phytocenological table, and also GARNWEIDNER, E. (1987: 272) on one locality in Biokovo).

Astragalus sesameus L.

Podbiokovlje: under Veliko Brdo (pr. urb. Makarska)

Chamaecytisus triflorus (Lam.) Skalická

(Syn.: *Cytisus hirsutus* subsp. *hirsutissimus* (C. Koch) Pouert, *C. hirsutus* subsp. *leuco-trichus* (Schur.) Aschers. & Graebn., *C. triflorus* Lam.)

Valley of the Cetina: near Kučiće village

Coronilla emerus L. subsp. *emerus*

Often and plentifully represented in the lower parts of the whole region

Cytisus procumbens (Waldst. & Kit. ex Willd.) Sprengel

(Syn.: *Genista procumbens* Waldst. & Kit. ex Willd.)

Lemišini doci, on rocky blocks (rarely)

Galega officinalis L.

Mouth of the Neretva

Lathyrus latifolius L.

(Syn.: *L. megalanthus* Steudel)

Kozica and other places

Species mentioned for this region by GARNWEIDNER, E. (1987: 272).

Lathyrus pannonicus (Jacq.) Garcke subsp. *collinus* (Ortmann) Soó

(Syn.: *L. pannonicus* var. *versicolor* auct. pro parte)

Saranač, ca 830 m a.s.l., Kozička Poljica (near Slivno, ca 800 m a.s.l. (rarely)

Lathyrus setifolius L.

Above Donja Brela (»highest houses«), ca 300 m a.s.l.

Lathyrus sphaericus Retz

Above Rudeži hamlets, (above Kozica), ca 800 m a.s.l.

Lathyrus vernus (L.) Bernhardt subsp. *vernus*

(Syn.: *Orobus vernus* L.)

Valley of the Cetina: above Radmanove mlinice (village Kučiće)

Lens ervoides (Brign.) Grande

(Syn.: *L. lenticula* (Schreber) Alef., *Ervum ervoides* (Brign.) Hayek)

Above Baška Voda, ca 120 m a.s.l. above Donja Brela (»highest houses«),
ca 300 m a.s.l.

Lens nigricans (Bieb.) Godr.

(Syn.: *Ervum n.* Bieb., *Vicia n.* (Bieb.) Coss. & Germ.)

Above Baška Voda, ca 120 m a.s.l.; S – exp., Donja Brela (»highest houses«),
ca 300 m a.s.l.

Lotus edulis L.

It is often found at lower elevations above sea-level in the coastal line (e.g. Kravica, ca 2–3 m and other places, but are also in higher elevations above sea-level in Podbiokovlje, e.g. between Makarska and Kotišina and other places)

Lotus ornithopodioides L.

Krvavica, towards Ćurilo (next to sea)

(Species found in Vepric, in one phytocenological tab. of VRDOLJAK, Ž. (1983: 252),
in the same way, it is mentioned by GARNWEIDNER, E. (1987: 274.)

Ononis reclinata L.

(Syn.: *O. laxiflora* Viv.)

Often on Podbiokovlje (Krvavica, above Baško Polje and other places)

Ononis viscosa L. subsp. *breviflora* (DC.) Nyman

(Syn.: *O. breviflora* DC, *O. viscosa* Vis.)

We found some examples in the wood of Aleppo pine (*Pinus halepensis*) in Krvavica near Makarska, next to the sea and plenty in the area of Kotišina above Makarska

Securigera securidaca (L.) Degen & Doerfler

(Syn.: *Bonaveria securidaca* (L.) Reichenb.)

Often in Podbiokovlje, in the lower parts, valley of the Cetina above Radmanove mlinice.

(The species is mentioned by VRDOLJAK, Ž. (1983: 254, 272) in the phytocenologic tables, in the description of the forest vegetation of Biokovo, and GARNWEIDNER, E. (1987: 272) in one floristic list for the region of the foot of Biokovo.)

Trifolium rubens L.

Valley of the Cetina, near village Kučiće

(The species is mentioned by TRINAJSTIĆ, I. (1983: 31) in the association *Ostryo – Abietetum* (Fukarek) Trinajstić from Mt. Biokovo).

Trifolium tomentosum L.

Gornji Tučepi, mouth of the Cetina and other places

Trigonella monspeliaca L.

Often in the lower parts in the whole Pobiokovlje, above Saranač

Vicia hybrida L.

(Syn.: *V. spuria* Raf.)

Donja Brela (»highest houses«) ca 300 m a.s.l.

Gentianaceae

Blackstonia perfoliata (L.) Huds. subsp. *serotina* (Koch ex Reichenb.) Vollmann

(Syn.: *B. perfoliata* subsp. *acuminata* (Koch et Ziz) Dostál, *B. serotina* (Koch ex Reichenb.) Beck, *Chlora serotina* Koch ex Reichenb.)

Osejava pr. urb. Makarska

Centaurium pulchellum (Swartz) Druce

(Syn.: *Erythraea pulchella* (Swartz) Fries)

Osejava near Makarska

Centaurium spicatum (L.) Fritsch

(Syn.: *Erythraea spicata* (L.) Pers.)

Valley of the Cetina, at the mouth; ass. *Juncetum maritimo – acuti* H-ić

Geraniaceae

Erodium malacoides (L.) L' Her.

Often in the coastal line of the littoral of Makarska

Lamiaceae (=Labiatae)

Ballota nigra L. subsp. *foetida* Hayek

Promajna; in rud.

Calamintha nepeta (L.) Savi

Often in the lower parts of the whole region

Calamintha sylvatica Bromf. subsp. *sylvatica*

Behind the Turija tunnel, valley of the Cetina and other places

Galeopsis angustifolia Ehrh. ex Hoffm.

(Syn.: *G. ladanum* L. subsp. *angustifolia* Gaudin)

Lađena, Lemišni doci, between Kozica and Slivno, Tučepski stanovi (Tučepi mountain shephard houses) and other places

Galoopsis bifida Boenn.

Vošac, ca 1300 m a.s.l.; (fallow fields and gardens)

Galeopsis tetrahit L.

Vošac, ca 1380 m a.s.l.; (fallow fields and gardens)

Lamium bifidum Cyr. subsp. *bifidum*

Kozička Poljica (near Slivno) ca 750 m a.s.l.

Lycopus europaeus L. subsp. *menthifolius* (Mabille) Skalicky

Valley of the Cetina, near the mouth; ass. *Juncetum maritimo* – *acuti* H-ić.

Melissa officinalis L. subsp. *altissima* (Sibth. & Sm.) Arcangeli

(Syn.: *M. altissima* Sibth. & Sm., *M. romana* Miller)

Valley of the Cetina: near Radmanove mlinice

Mentha pulegium L.

(Syn.: *Pulegium vulgare* Miller)

Field near the Matica, near the village of Umčane, ca 26 m a.s.l.

Stachys annua (L.) L.

Kozica, behind the Turija tunnel, Župa Biokovska (fallow fields and gardens, vineyards)

Stachis menthifolia Vis.

(Syn.: *S. grandiflora* Host)

Above the bridge over the Matica, to under the village Vina (near Vrgorac), going from 30 to 145 m a.s.l. above the sea level; Plina near Ploče, ca 60 m a.s.l.

Linaceae

Linum nodiflorum L.

Common along the littoral of Makarska (coastal region)

Linum trigynum L.

(Syn.: *L. gallicum* L.)

Common species on the coastal part of Podbiokovlje

Loranthaceae

Loranthus europaeus L.
Zabiokovlje (on oak-trees)

Malvaceae

Abutilon theophrasti Medicus
(Syn.: *A. avicennae* Gaertner)
Numerous in ruderal habitats at the mouth of the Cetina river

Oleaceae

Fraxinus angustifolia Vahl. subsp. *angustifolia*
Valley of the Cetina

Onagraceae (=Oenotheraceae)

Epilobium dodonaei Vill.
(Syn.: *Chamaenerion angustissimum* (Weber) D. Sosn., *Ch. dodonaei* (Vill.) Schur,
E. rosmarinifolium Haenke)
Between Kozica and Slivno, Krstalice near Zagvozd

Orobanchaceae

Orobanche gracilis Sm.
Valley of the Cetina, hamlet of Šošići, above Kozica (hamlet of Rudeži),
ca 800 m a.s.l. and other places

Orobanche ramosa L.
(Syn.: *Phelypaea ramosa* (L.) C.A.Meyer)
Podbiokovlje: between Makarska and Kotišina, Kotišina

Plantaginaceae

Plantago afra L.
(Syn.: *P. psyllium* L. 1762., non L. 1753.)
Blato near Živogošće, ca 20 m a.s.l.

Plantago indica L.
(Syn.: *Plantago arenaria* Waldst. & Kit.)
Podbiokovlje: between Makarska and Kotišina

Plantago major L. subsp. *intermedia* (DC.) Arcangeli
(Syn.: *P. intermedia* DC., *P. major* L. subsp. *pleiosperma* Pilger)
Valley of the Cetina, at the mouth; ass. *Juncetum maritimo – acuti* H-ić.

Polygonaceae

Fallopia convolvulus (L.) Holub
(Syn.: *Polygonum convolvulus* L., *Fagopyrum convolvulus* (L.) H. Gross,

Bilderdykia convolvulus (L.) Dumort)

Under Puharić above Makarska (in olive groves), region Vošac (fallow fields and gardens)

Polygonum hydropiper L.

Valley of the Cetina, at the mouth; ass. *Juncetum maritimo – acuti* H-ić).

Primulaceae

Asterolinon linum-stellatum (L.) Duby in DC.

(Syn.: *A. stellatum* Hoffmanns & Link)

Makarska: Osejava (it is very often, but hardly visible in the vegetation aspect of the month of May, in the species of Aleppo pine (*Pinus halepensis*)), between the sports stadium and Dugiš.

Ranunculaceae

Consolida regalis S. F. Gray subsp. *regalis*

(Syn.: *Delphinium consolida* L.)

Stupica (above Podgora) and in the whole of Podbiokovlje

Delphinium fissum Waldst. & Kit.

Kozička Poljica (between Kozica and Slivno), ca 800 m a.s.l. (rare)

Helleborus multifidus Vis.

Kozička Poljica (near Slivno), ca 800 m a.s.l.; in the Oriental hornbeam wood (*Carpinetum orientalis illiricum*)

Ranunculus bulbosus L.

Makarska: Dugiš

Ranunculus ficaria L. subsp. *ficariiformis* (F. V. Schultz) Rouy & Fouc.

(Syn.: *R. ficariiformis* F. W. Schultz)

Kozička Poljica (near Slivno), ca 750 m a.s.l. and other places

Ranunculus marginatus D'Urv.

Makarska: Dugiš

Resedaceae

Reseda phyteuma L.

It is often found in the lower parts of the whole region of Biokovo.

(Species was mentioned by GARNWEIDNER, E. 1987: 274, from Kozica to Gornje Igrane)

Rosaceae

Mespilus germanica L.

It is sometimes cultivated in gardens (eg. Gornji Tučepi)

Prunus avium L.

(Syn.: *Cerasus avium* (L.) Moench)

It is often in the oak woods in Zabiokovlje

Sorbus torminalis (L.) Crantz

(Syn.: *Crataegus torminalis* L.)

Above Kozica, ca 450 m a.s.l.; N-exp.

(This species mentions VRDOLJAK, Ž. (1983: 267) in one phytocenologic table, during presentation of the wood vegetation of the Biokovo (region behind the mountain: Bukova draga below Čubrijana).

Rubiaceae

Asperula beckiana Degen

(Syn.: *A. wettsteinii* Adamović var. *beckiana* (Degen) Hayek)

Lokva

Cruciata laevipes Opiz

(Syn.: *Galium cruciata* (L.) Scop.)

Valley of the Cetina: near Radmanove mlinice, the mouth and other

Galium aparine L.

Makarska

Sherardia arvensis L.

It is often in the spring floristic aspect in the whole region

Rutaceae

Haplophyllum patavinum (L.) G. Don fil.

(Syn.: *Ruta patavina* L.)

RADIĆ, J. (1976: 101) mentions this species under the name *H. linifolium* A. Juss (= *H. hispanicum* Spach). But the mentioned species is represented in some regions of the Iberian peninsula and in our region the species, which is represented, is *H. patavinum* (L.) G. Don fil.

Salicaceae

Populus x canadensis Moench (= *P. deltoides* Marshall × *P. nigra* L.)

Cultivated exemplars (about 30 years old) are scattered on the small groups in the whole region of the Biokovo (Saranač, on Staza, Turija and other places). Most likely is represented cv. »Marilandica«

Populus afghanica (Aitch. & Hemsl.) Schneid. cv. »Afghanica«

White bark poplar (female) is represented singularly or in small groups in the whole Podbiokovlje (coastal part) and of Zabiokovlje (continental part) behind the mountain

Salix purpurea L. subsp. *purpurea*

Valley of the Cetina, above Radmanove mlinice and other

Santalaceae

Thesium divaricatum Jan. ex Mert. et Koch

Between Kozica and Slivno, above Veliko Brdo, valley of the Cetina (the village of Kučiće) and other

Scrophulariaceae

Kickxia spuria (L.) Dumort.

(Syn.: *Antirrhinum spurium* L., *Linaria spuria* Miller, *Elatinoides spurium* Wettst.)

Above Bast, ca 300 m a.s.l.; S-exp., Blato near Živogošće, Kotišina, Osejava and other

Linaria chalepensis (L.) Miller

(Syn.: *Antirrhinum album* Lam., *A. chalepense* L.)

Podbiokovlje: the area of Kotišina

Veronica anagallis – aquatica L.

Kotišina, near water

Veronica arvensis L.

Often in the whole region, on fallow gardens and ruderal habitats.

Veronica persica Poiret in Lam.

(Syn.: *V. byzantina* (Sybth. & Sm.) Degen)

Under the hamlets of Antunovići (above Kozica), ca 380 m a.s.l.

Solanaceae

Datura innoxia Miller

Igrane, Makarska cemetery (cult.). In Makarska we observed it out of culture

Solanum dulcamara L.

Valley of the Cetina: near Radmanove mlinice

Theligonaceae

Theligonum cynocrambe L.

(Syn.: *Cynocrambe prostrata* Gaertner)

This is the only representative of this family in the flora of Europe, and so the only species of this genus in our flora.

We found it in the whole region of the Podbiokovo belt, in the fissures of dry walls and in similar places, from the sea to the height of few hundred meters.

(This species mentions TRINAJSTIĆ, I. (1994: 95–99) in two phytocenologic table on the dry stone walls in Kotišina above Makarska.)

Tiliaceae

Tilia cordata Miller

(Syn.: *T. parvifolia* Ehrh. ex Hoffm.)

Valley of the Cetina, between Svinišće and the village of Kučiće

Ulmaceae

Ulmus laevis Pallas

(Syn.: *U. effusa* Willd., *U. pedunculata* Foug.)

Valley of the Cetina, near Radmanove mlinice

Valerianaceae

Valeriana tripteris L.

Region of Troglav, on the edge of deep beech wood.

(Species mentioned for the region of the Biokovo in one floristic list GARNWEIDNER, E. (1987: 273) and TRINAJSTIĆ, I. (1993: 38) in the association of the sub-Alpine beech forest from the Silni Grad area).

Valerianella coronata (L.) DC.

(Syn.: *V. hamata* Bastard)

Littoral of Makarska: above Donja Breła, ca 300 m a.s.l., above Gornja Podgora, ca 290 m a.s.l.

Valerianella discoidea (L.) Loisel.

Podbiokovlje: above St. Martin ca 290 m a.s.l.; above Gornja Podgora, 300 m a.s.l.

Valerianella echinata (L.) Lam. et DC.

Valley of the Cetina, near Omiš

Violaceae

Viola adriatica Freyn

Above Kozica, ca 300 m a.s.l.

Viola riviniana Reichenb.

Between Vošac and Troglav, ca 1450 m a.s.l.

LILIOPSIDA (MONOCOTYLEDONEAE)

Cyperaceae

Carex pendula Hudson

(Syn.: *C. maxima* Scop.)

Valley of the Cetina, near Radmanove mlinice and other places

Scirpus holoschoenus L.

(Syn.: *Holoschoenus vulgaris* Link)

Surrounding of Makarska, valley of the Cetina and other

Hyacinthaceae

Chouardia lakusicii (Šilić) Speta

(Syn.: *Scilla lakusicii* Šilić)

Kozička Poljica (on the way: Kozica – Slivno); ca 800 m a.s.l.

Prospero elisae Speta(Syn.: *Scilla autumnalis* auct. balc., non L.)

On a massive scale is represented on the massif of Biokovo, to the height of about around 1300 m a.s.l., then it is found in Podbiokovlje and Zabiokovlje

Liliaceae*Gagea lutea* (L.) Ker. – Gavler(Syn.: *G. sylvatica* (Pers.) Loud.)

Saranač, ca 750 m a.s.l.

Gagea villosa (Bieb.) Duby(Syn.: *G. arvensis* (Pers.) Dumort.)

Between Kozica, N-exp., ca 300 m a.s.l.; in vinetis

Tulipa sylvestris L. subsp. *sylvestris*

Kozička Poljica (near Slivno), ca 700 m a.s.l.

RADIĆ, J. (1976:194) mentions for Biokovo only *T. sylvestris* subsp. *grisebachiana* (Pant.)

Hayek. But KUŠAN, F. (1969:179) has already wondered which taxon exactly is present on the massif of Biokovo. Our experience tells that the subsp. *grisebachiana* is spread on the south-eastern part of the Dinarids (south-east part of Herzegovina, Crna Gora and other places). It is interesting to say that the species

T. sylvestris was mentioned for the Biokovo by HOST, J. as early as the beginning of the 19th century (1993: 272; translation)

Juncaceae*Juncus acutus* L.Valley of the Cetina, near the mouth; ass. *Juncetum maritimo – acuti* H -ić*Juncus maritimus* Lam.Valley of the Cetina, near the mouth; ass. *Juncetum maritimo – acuti* H-ić**Orchidaceae***Cephalanthera damasonium* (Miller) Druce(Syn.: *C. alba* (Crantz) Simonkai, *C. grandiflora* S. F. Gray)

We found a few examples at the locality of Žlib, near the hamlets of Baškovići (west of Veliko Brdo near Makarska), and near the village of Kučiće in the Valley of the Cetina.

As endangered species it is mentioned in the book »Crvena knjiga« (Red Book) of plants species of the Republic of Croatia, and according to the Law for the Protection of Nature it has been protected since 1972. (PEVALEK-KOZLINA, B. in ŠUGAR, I. (ed.) 1994: 111–113)

Ophrys scolopax Cav. subsp. *cornuta* (Steven) Camus(Syn.: *O. cornuta* Steven)

We found it in a large number of examples in the lower part of Staza, in the culture of Aleppo pine (*Pinus halepensis*)

Ophrys scolopax Cav. subsp. *scolopax*

Valley of the Cetina

Orchis provincialis Balbis subsp. *pauciflora* (Ten.) Camus

(Syn.: *O. pauciflora* Ten.)

Zabiokovlje: is largely represented on the rocky ground in the inner side of karst wood of oriental hornbeam (*Carpinetum orientalis illyricum*)

Orchis purpurea Hudson

Zabiokovlje, i.e., in a good number is represented in several localities in the valley of Cetina (near the village of Kučiče and other)

Orchis tridentata Scop.

(Syn.: *O. variegata* All.)

With its multitudes and blossoms, it provides a specific feature of the floristic aspect, during the month of May, to the open rocky grounds within karst woods of oriental hornbeam (*Carpinetum orientalis illyricum*), e.g. on the slopes of Biluše, Saranač, Kozička Poljica (near Slivno) and other localities at the height of ca 600 to 900 m.

Platanthera chlorantha (Custer) Reichenb. In Moesler

Valley of the Cetina, near the village of Kučiče; in the oak wood

Serapias lingua L.

Between Makarska and Kotišina

Poaceae (=Gramineae)

Anthoxanthum odoratum L.

Osejava and in other localities

(This species is mentioned by VRDOLJAK, Ž. (1983:266) in the continental part behind Biokovo in Raščani: between Stružine and Kmić at the height of 1120 m.)

Arrhenatherum elatius (L.) Beauv

Lađana

(Species mentioned by VRDOLJAK, Ž. (1983: 265) in the stratum of low plants, at the clearings in the wood of the spermatophyta abies (*Abies alba*), on the continental part behind Biokovo (in Župa: near Sutvid), and also GARNWEIDNER, E. (1987:274), above Podgora.)

Dactylis glomerata L.

In the whole coastal line of Makarska the species *D. hispanica* Roth. is dominant, while *D. glomerata* L. is found more rarely, on the cultivated fields (Makarska and other places)

Dasypirum villosum (L.) P. Candargy

(Syn.: *Triticum villosum* (L.) Bieb., *Haynaldia villosa* (L.) Schur.)

It is often present in the whole of Podbiokovlje

Desmazeria marina (L.) Druce

(Syn.: *Catapodium loliaceum* (Hudson) Link, *D. loliacea* (Hudson) Nyman, *Scleropoa loliacea* (Hudson) Gren & Godron)

Podbiokovlje: on the way from Promajna to Baško Polje

Eragrostis minor Host

Mouth of the Cetina: the village of Svinišće and other places

Holcus lanatus L.

Mouth of the Cetina near Omiš

Hordeum bulbosum L.

This is the only representative of the section *Bulbohordeum* Nevski in the flora of Europe, because at the end of its stalk it has a thicker bulb (name). In the flora of Podbiokovlje we found it in a good number in one olive grove in the place called Blato near Živogošće at the height of about 25 m.

Melica transsilvanica Schur

Osejava pro. urb. Makarska

Parapholis incurva (L.) C. E. Hubbard

(Syn.: *Pholiorus incurvatus* A. S. Hitchc., *P. incurvus* (L.) Schinz & Thell.,

Lepturus incurvatus Trin.)

Coastal line of Makarska: Krvavica, Promajna and other places

Phalaris minor Retz.

On the line from Šošići to Kozica

Phleum pratense L.

Under Stegovača, ca 800 m a.s.l.

Phragmites australis (Cav.) Trin. ex Steudel

(Syn.: *Ph. communis* Trin.)

Along the rivers Cetina and Neretva

Piptatherum miliaceum (L.) Cosson

(Syn.: *Oryzopsis miliacea* (L.) Bentham & Hooker ex Asch. & Gr.)

It is often to be found in the lower regions of coastal line of Makarska, mostly in ruderal habitats

ACKNOWLEDGEMENTS

We would like to give our thanks to the Ministry of Culture of the Republic of Croatia, the Croatian Natural History Museum, the City of Makarska, the Public Institution Biokovo Nature Park and Makarska Forestry for having supported this paper.

Received January 11, 2002

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S A Ž E T A K**Dopuna vaskularnoj flori biokovskog područja
(Dalmacija, Hrvatska)**

Č. Šilić & M. E. Šolić

Biološka raznolikost biokovskog područja u florističkom pogledu došla je do punog izražaja i potvrde kroz florističke radove brojnih autora. Iz objavljenih radova se može vidjeti da ovo područje ima preko 1400 autohtonih svojiti vaskularnih biljaka.

Tijekom naših petogodišnjih istraživanja na biokovskom području kroz sva četiri godišnja doba (1996–2001) otkrili smo i obradili 193 nova taksona vaskularnih biljaka koje donosimo u ovom radu.

Ovim novim biljnim taksonima upotpunjava se spoznaja biološke raznolikosti Biokova i biokovskog područja.