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FLORA OF THE ISLAND OF OBONJAN (ŠIBENIK ARCHIPELAGO, CROATIA)

MILENKO MILOVIĆ

Medical and Chemical School, Ante Šupuka Street (no number), HR-22000 Šibenik, Croatia (mmilovic@inet.hr)

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Research into the vascular flora of Obonjan, a small island (0,7 km^2) of the Šibenik archipelago, was carried out from 2000 to 2003. A total of 230 species and subspecies classified into 163 genera and 53 families were registered. Only three species, *Conyza bonariensis*, *C. canadensis* and *C. sumatrensis* had been found previously while 227 plant taxa are reported in this paper for the first time.

The results of the analysis of the flora show that *Therophyta* (46.96%) are dominant in the flora, as are plants of the Mediterranean floral element (53.04%), indicating the Mediterranean character of the flora of the island.

Key words: flora analysis, island of Obonjan, Šibenik archipelago, Croatia

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U razdoblju 2000.–2003. godine istraživana je vaskularna flora Obonjana, malog otoka (0,7 km^2) u šibenskom arhipelagu. Pronađeno je ukupno 230 vrsta i podvrsta svrstanih u 163 roda i 53 porodice. Tri vrste su zabilježene nedavno, *Conyza bonariensis*, *C. canadensis* and *C. sumatrensis*, dok se 227 vrsta i podvrsta navodi po prvi put u ovom radu.

Rezultati analize flore pokazuju dominaciju terofita (46,96%) i biljaka mediteranskog flornog elementa (53,04%) što ukazuje na mediteranski karakter flore istraživanog otoka.

Ključne riječi: analiza flore, otok Obonjan, šibenski arhipelag, Hrvatska

INTRODUCTION

The island of Obonjan is located 6 miles from Šibenik, west of the island of Zlarin and south of the island of Prvić (Fig. 1). It is a very small (0, 7 km^2) and uninhabited island, 1800 m long and with the highest point of 62 meters above sea level.

In 1972, when the scouts of Croatia took over Obonjan and gave it a new name, Island of Youth, conversion of the island into a summer youth camp was started.

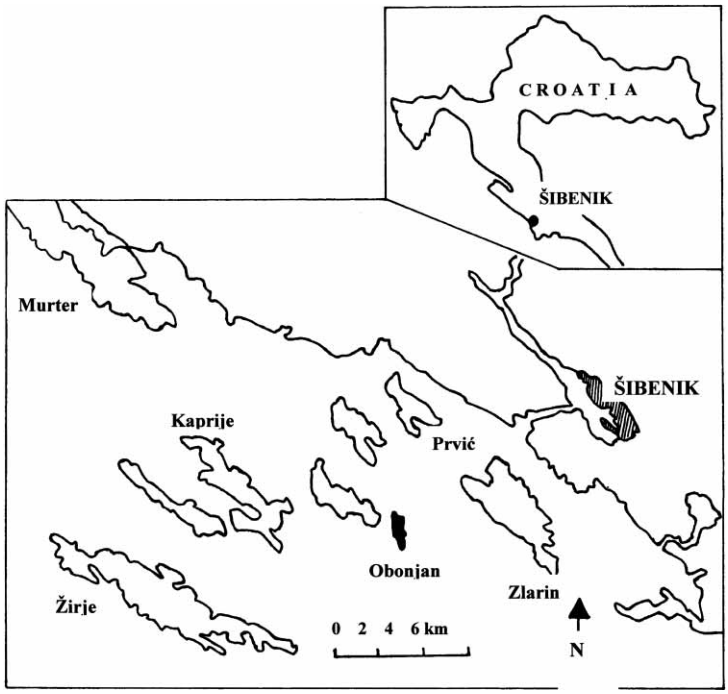

Fig. 1. Geographical position of the island of Obonjan

Once a deserted island in the Šibenik archipelago, the island of Obonjan is now a well-regarded summer tourist destination mostly for young people.

According to the measurements of the nearest weather station in Šibenik, for the period from 1986–1996 the average annual temperature was 15.5 °C and the average annual precipitation 711.7 mm which indicates the Mediterranean climate of this area.

Limestones of Cretaceous-Palaeolithic age and great compactness are dominant in the petrographic structure (MAMUŽIĆ *et al*., 1966). From the phytogeographic point of view the island of Obonjan belongs to the Mediterranean proper vegetation zone of the *Quercion ilicis* alliance as do the other islands of the Šibenik archipelago. The island is mostly overgrown by maquis and planted Aleppo pine forest that propagates sub-spontaneously, thus superseding the natural vegetation.

The vascular flora of the inhabited islands of the Šibenik archipelago (Kaprije, Krapanj, Murter, Prvić, Zlarin and Žirje) has been thoroughly investigated (FRANJIĆ & PANDŽA, 1996; PANDŽA, 1998a; 1998b; 1998c; 2003; TRINAJSTIĆ & PAVLETIĆ, 1999) while floristic research into the uninhabited islands and islets began a few years ago (PANDŽA *et al*., 2002; PANDŽA, 2002; 2003). So far, findings of only three plant taxa, *Conyza bonariensis*, *C. canadensis* and *C. sumatrensis*, have been registered for the island of Obonjan (MILOVIĆ, 2004, in press). Accordingly, the other plant taxa given in this paper have been recorded for the island for the first time.

METHODS

Research into the vascular flora of the island of Obonjan was carried out in the period from 2000 to 2003 in different seasons (from February to October). The floristic research will be continuous with special attention to the hibernal aspect of the flora of the island.

The taxa were determined by standard flora keys (HORVATIĆ & TRINAJSTIĆ eds., 1967–1981; TUTIN *et al*. eds., 1968–1980; 1993; TRINAJSTIĆ ed., 1975–1986; PIGNATTI, 1982; DOMAC, 1994). Nomenclature in this paper is made to comply with TUTIN *et al*. eds. (1968–1980; 1993). Families, genera, species and subspecies in the list of flora are listed in alphabetical order within the higher systematic taxa.

Life forms are interpreted according to HORVAT (1949) and PIGNATTI (1982) and the following abbreviations are given in front of the name of each species and subspecies: **Ch –** *Chamaephyta*, **G –** *Geophyta*, **H** – *Hemicryptophyta*, **P –** *Phanerophyta* and **T –** *Therophyta*.

After the name of each species and subspecies, types of habitats and floral element are given. The habitats are marked by letters in this way:

a = maquis
b = garrigue
c = Aleppo pine forests
d = rocky grasslands
e = rocky ground by the sea
f = along the roads and paths
g = flower beds
h = trash dump

With some modifications, the division of the plants into floral elements and lower categories has been performed according to HORVATIĆ (1963) and HORVATIĆ *et al.* (1967/1968) in the following way (abbreviations in brackets are applied in the flora list):

1. CULTIVATED & ADVENTITIOUS PLANTS (CUAD)
2. EURASIAN FLORAL ELEMENT (EUAS)
3. EUROPEAN FLORAL ELEMENT (EU)
4. ILLYRIAN-BALKAN FLORAL ELEMENT
- **A.** Balkan-Apennine plants (BAP)
- B. Illyrian-Balkan endemic plants (IBE)

5. MEDITERRANEAN FLORAL ELEMENT
- **A. Circum-Mediterranean plants (CME)**
- **B. East-Mediterranean plants (EME)**
- **C. European-Mediterranean plants (EUME)**
- **D. Illyrian-Mediterranean plants**
  - D.1. Illyrian-Adriatic plants
    - *D.1.1. Illyrian-Adriatic endemic plants* **(IADE)**
    - *D.1.2. Illyrian-Apennine plants* **(IAP)**
  - D.2. Illyrian-South European plants **(ISEU)**
- **E. Mediterranean-Atlantic plants (MEAT)**
- **F. Mediterranean-Pontic plants (MEPO)**

G. West-Mediterranean plants (WME)

6. SOUTHEAST-EUROPEAN FLORAL ELEMENT (SEEU)

7. SOUTH EUROPEAN FLORAL ELEMENT

A. South European-Atlantic plants (SEUAT)

B. South European-Mediterranean plants (SEUME)

C. South European-Pontic plants (SEUPO)

8. WIDESPREAD PLANTS (WSP)

Detailed designations of finding sites have not been given because of the small surface of the island which belongs in its entirety in quadrant 2360.2 of MTB 1/4 grid. The specimens of plant taxa collected during this research are deposited in the Herbarium Croaticum in Zagreb (ZA).

THE LIST OF FLORA

GYMNOSPERMAE : CONIFEROPSIDA

C u p r e s s a c e a e

P *Juniperus oxycedrus* L. subsp. *macrocarpa* (Sm.) Ball; b,d,c; **CME**

P *Juniperus oxycedrus* L. subsp. *oxycedrus*; b,d,c; **CME**

P *Juniperus phoenicea* L. subsp. *phoenicea*; b,d; **CME**

P i n a c e a e

P *Pinus halepensis* Mill.; c,b; **CME**

ANGIOSPERMAE : DICOTYLEDONES

A n a c a r d i a c e a e

P *Pistacia lentiscus* L.; c,a,b; **CME**

A p o c y n a c e a e

P *Nerium oleander* L.; g; **CME**

A s c l e p i a d a c e a e

G *Vincetoxicum hirundinaria* Medicus subsp. *adriaticum* (G. Beck) Markgraf; b,d,c; **IADE**

B o r a g i n a c e a e

T *Echium plantagineum* L.; f,d; **MEAT**

C a p r i f o l i a c e a e

P *Lonicera implexa* Aiton; a,b,c; **CME**

P *Viburnum tinus* L.; b,a,c; **CME**

C a r y o p h y l l a c e a e

T *Arenaria serpyllifolia* L. subsp. *leptoclados* (Reichenb.) Nyman; f,d; **EUAS**
T *Cerastium ligusticum* Viv. subsp. *ligusticum*; d,b,f; **CME**
T *Cerastium pumilum* Curtis. subsp. *pumilum*; d,b,f; **WSP**?
H *Petrorhagia saxifraga* (L.) Link; d,b,f,c; **SEUME**
T *Sagina maritima* G.Don.; e; **MEAT**
H *Silene vulgaris* (Moench) Garcke subsp. *angustifolia* Hayek; d,e,f; **SEUME**
T *Spergularia marina* (L.) Griseb.; e; **WSP**

C h e n o p o d i a c e a e

Ch *Arthrocnemum macrostachyum* (Moric.) C. Koch; e; **SEUME**
T *Atriplex prostrata* Boucher ex DC. (=*A. hastata* auct., non L.); e; **WSP**
H *Beta vulgaris* L. subsp. *maritima* (L.) Arcangeli; e,f; **MEAT**
T *Chenopodium album* L.; f,h; **WSP**
T *Chenopodium murale* L.; f,h; **WSP**
T *Salsola kali* L.; e; **WSP**
T *Salsola soda* L.; e; **SEUPO**
T *Suaeda maritima* (L.) Dumort. subsp. *maritima*; e; **WSP**

C i s t a c e a e

P *Cistus salviifolius* L.; b,d; **CME**
Ch *Fumana ericoides* (Cav.) Gand.; b,d; **CME**

C o m p o s i t a e
Subfam. Asteroideae (=Asteraceae)

T *Bombycilaena erecta* (L.) Smolj.; b,d,f; **SEUPO**
H *Carduus pycnocephalus* L.; d,b,f; **CME**
H *Carlina corymbosa* L.; d,f; **CME**
T *Carthamus lanatus* L. subsp. *lanatus*; f,d; **CME**
T *Conyza bonariensis* (L.) Cronq.; f; **CUAD**; (Milović, 2004)
T *Conyza canadensis* (L.) Cronq.; f; **CUAD**; (Milović, 2004)
T *Conyza sumatrensis* (Retz.) A. Walker; f; **CUAD**; (Milović, 2004)
T *Filago pyramidata* L.; d,b,f; **SEUME**
Ch *Helichrysum italicum* (Roth) G. Don fil.; d,b; **CME**
H *Inula conyza* DC.; d,b,c; **SEUPO**
Ch *Inula crithmoides* L.; e; **MEAT**
Ch *Inula verbascifolia* (Willd.) Hausskn. subsp. *verbascifolia*; d,b,e; **IADE**
T *Pallenis spinosa* (L.) Cass. subsp. *spinosa*; d,b,f; **CME**
Ch *Senecio cineraria* DC.; e; **WME**
T *Senecio vulgaris* L.; f,g; **WSP**
Ch *Tanacetum cinerariifolium* (Trev.) Shultz Bip.; d,b; **IADE**

Subfam.Cichorioideae (=Cichoriaceae)

T *Crepis foetida* L. subsp. *foetida*; f,d; **SEUME**
T *Crepis sancta* (L.) Babcock; d,f,g; **EME**
T *Crepis vesicaria* L. subsp. *hanseleri* (Boiss ex DC.) P.D. Sell; f,d; **SEUME**
H *Hieracium heterogynum* (Froelich) Guterm. (=*H. stupposum* Reichenb.); d,b,c; **IBE**
H *Lactuca serriola* L.; f,d; **WSP**
H *Lactuca viminea* (L.) J. & C. Presl.; f,g; **SEUPO**
H *Leontodon crispus* Vill. subsp. *rossianus* (Degen & Lengyel) Hayek; d,b; **SEUME**
H *Picris hieracioides* L. subsp. *spinulosa* (Bertol. ex Guss.) Arcangeli; d,b,f; **EUAS**
H *Reichardia picroides* (L.) Roth.; d,e,b,f; **CME**
H *Scorzonera villosa* Scop. subsp. *villosa*; d,b; **ISEU**
T *Sonchus asper* (L.) Hill subsp. *glaucescens* (Jordan) Ball; f; **CME**
T *Sonchus oleraceus* L.; f; **WSP**
T *Sonchus tenerrimus* L.; d,b,f; **CME**
H *Tragopogon porrifolius* L.; f,c; **CME**
T *Urospermum picroides* (L.) Scop. ex Schmidt.; d,b,f; **CME**

C o n v o l v u l a c e a e

H *Convolvulus althaeoides* L. subsp. *tenuissimus* (Sibith. & Sm.) Stace; d,b; **EME**
G *Convolvulus arvensis* L.; f,g; **WSP**
H *Convolvulus cantabrica* L.; d,b; **SEUME**

C r u c i f e r a e (=Brassicaceae)

Ch *Aethionema saxatile* (L.) R. Br. subsp. *saxatile*; d,b,c,f; **SEUME**
Ch *Aurinia sinuata* (L.) Griseb.; f,d,b; **IAP**
T *Diplotaxis erucoides* (L.) DC.; f; **WME**
H *Diplotaxis tenuifolia* (L.) DC.; f; **WSP**
T *Sisymbrium officinale* (L.) Scop.; f; **WSP**
T *Sisymbrium orientale* L.; f; **MEPO**

C u c u r b i t a c e a e

Ch *Ecballium elaterium* (L.) A. Richard; h,f; **CME**

E u p h o r b i a c e a e

T *Euphorbia exigua* L.; d,b; **SEUME**
Ch *Euphorbia fragifera* Jan.; b,d; **IADE**
T *Euphorbia paralias* L.; e; **WSP**
Ch *Euphorbia pinea* L.; e,d,f; **CME**
Ch *Euphorbia spinosa* L.; b,d; **CME**
T *Mercurialis annua* L.; f,h; **WSP**

F a g a c e a e

P *Quercus ilex* L.; b,a,c; **CME**

G e n t i a n a c e a e

T *Blackstonia perfoliata* (L.) Hudson subsp. *perfoliata*; d,b; **MEAT**
T *Centaurium erythraea* Rafn.; d,b,f; **WSP**

G e r a n i a c e a e

T *Erodium cicutarium* (L.) L´Her.; f,d; **WSP**
T *Erodium malacoides* (L.) L´Her.; f; **CME**
T *Geranium columbinum* L.; d,b,c; **EUAS**
T *Geranium purpureum* Vill.; b,d,c,a,f; **SEUME**
T *Geranium pusillum* L.; f; **EU**
T *Geranium rotundifolium* L.; f; **EUAS**

H y p e r i c a c e a e

H *Hypericum perforatum* L. (incl. *H. veronense* Schrank); f,d; **SEUME**

L a b i a t a e (=Lamiaceae)

T *Acinos arvensis* (Lam.) Dandy; d,b,f,c; **EU**
T *Ajuga chamaepitys* (L.) Schreber; d,c,f; **CME**
H *Calamintha nepeta* (L.) Savi subsp. *nepeta* (=*C. nepetoides* Jordan); f,d; **SEUPO**
Ch *Micromeria juliana* (L.) Bentham ex Reichenb.; b,d,c; **CME**
Ch *Prasium majus* L.; a,c,b; **CME**
P *Rosmarinus officinalis* L.; g; **CME**
Ch *Salvia officinalis* L.; b,d; **EUME**
Ch *Satureja montana* L. subsp. *variegata* (Host.) Ball; b,d; **MEPO**
T *Sideritis romana* L.; b,d,f; **CME**
Ch *Teucrium chamaedrys* L.; d,b; **SEUPO**
Ch *Teucrium flavum* L.; b,c,d; **CME**
Ch *Teucrium montanum* L.; b,d,c; **SEUME**
Ch *Teucrium polium* L.; d,b,c; **CME**

L e g u m i n o s a e (=Fabaceae)

H *Anthyllis vulneraria* L. subsp. *praepropera* (A. Kerner) Bornm.; d,b; **EUME**
Ch *Argyrolobium zanonii* (Turra) P.W. Ball; b,d,c; **WME**
T *Astragalus hamosus* L.; f; **CME**
P *Colutea arborescens* L.; b,c; **CME**
P *Coronilla emerus* L. subsp. *emeroides* (Boiss. & Spruner) Hayek; b,c,a; **EME**
T *Coronilla scorpioides* (L.) Koch; d,b,f; **CME**
P *Coronilla valentina* L. subsp. *valentina*; e,f; **WME**
Ch *Dorycnium hirsutum* (L.) Ser.; d,b,e; **CME**
T *Lotus edulis* L.; f,c; **CME**
Ch *Lotus cytisoides* L. (=*L. alionii* Desv.); e; **CME**
T *Medicago lupulina* L.; d,f; **WSP**
T *Medicago minima* (L.) Bartal.; d,b,c,f; **WSP**

T *Medicago orbicularis* (L.) Bartal.; f; **CME**
T *Medicago rigidula* (L.) All.; f,d; **MEPO**
T *Medicago truncatula* Gaertner; f,d; **CME**
T *Melilotus italica* (L.) Lam.; f,d; **SEUME**
H *Melilotus officinalis* (L.) Pallas; f; **EUAS**
T *Melilotus sulcata* Desf.; d,b,f; **CME**
T *Ononis ornithopodioides* L.; c,f; **CME**
H *Ononis pusilla* L.; d,b,c; **SEUME**
T *Ononis reclinata* L.; d,b,c; **CME**
T *Scorpiurus muricatus* L.; d,b,c,f; **CME**
P *Spartium junceum* L.; b,c; **CME**
T *Trifolium campestre* Schreber; d,b,f,c; **WSP**
T *Trifolium scabrum* L.; d,b,f; **CME**
T *Trigonella monspeliaca* L.; b,d,f; **MEPO**
T *Vicia sativa* L. subsp. *nigra* (L.) Ehrh.; f,b,d; **EU**

Linaceae

T *Linum strictum* L. subsp. *corymbulosum* (Reichenb.) Rouy; d,b; **MEPO**
T *Linum strictum* L. subsp. *strictum*; d,b,c; **CME**
Ch *Linum tenuifolium* L.; d,b; **SEUPO**

Malvaceae

T *Althaea hirsuta* L.; f,d; **SEUME**
T *Hibiscus trionum* L.; f; **SEUPO**

Moraceae

P *Ficus carica* L.; b,d,c; **CME**

Myrtaceae

P *Myrtus communis* L.; a,b,c; **CME**

Oleaceae

P *Olea europaea* L. (incl. var. *sylvestris* Brot.); b,c,a; **CME**
P *Phillyrea latifolia* L. (incl. *P. media* L.); b,a,c; **CME**

Orobanchaceae

T *Orobanche minor* Sm.; b,d; **SEUME**

Oxalidaceae

G *Oxalis deppei* Loddiges ex Sweet; f,g,h; **CUAD**

Papaveraceae

T *Fumaria capreolata* L.; c,h,f; **MEAT**
T *Fumaria officinalis* L.; f; **WSP**
T *Fumaria petteri* Reichenb. subsp. *petteri*; f; **IBE**

H *Glaucium flavum* Crantz; e; **MEAT**
T *Papaver rhoeas* L.; f,g,h; **WSP**

P l a n t a g i n a c e a e

T *Plantago afra* L.; d,b,f; **CME**
T *Plantago coronopus* L. *coronopus*; e; **EUAS**
H *Plantago lanceolata* L.; d,f; **WSP**

P l u m b a g i n a c e a e

H *Limonium cancellatum* (Bernh. ex Bertol.) O. Kuntze; e; **IAP**

P o l y g o n a c e a e

H *Rumex conglomeratus* Murray; f; **WSP**

P r i m u l a c e a e

T *Anagallis arvensis* L.; d,f,c; **WSP**
T *Anagallis foemina* Miller (=*A. caerulea* Schreber, non L.); d,c,f; **WSP**
T *Asterolinon linum-stellatum* (L.) Duby; d,b; **CME**
G *Cyclamen repandum* Sibith. et Sm.; c,a; **EUME**

R a n u n c u l a c e a e

G *Anemone hortensis* L.; b,d,c; **CME**
P *Clematis flammula* L.; b,a,c; **CME**

R e s e d a c e a e

H *Reseda lutea* L.; f,d,b; **WSP**
T *Reseda phyteuma* L.; b,d,f; **SEUME**

R h a m n a c e a e

P *Rhamnus alaternus* L.; b,c,a; **CME**

R o s a c e a e

P *Prunus mahaleb* L.; b,c,a; **SEUPO**
P *Rubus caesius* L.; f,h; **EUAS**

R u b i a c e a e

H *Asperula aristata* L. subsp. *scabra* (J. & C. Presl.) Nyman; b,d,c; **SEUME**
T *Crucianella latifolia* L.; b,d,c,a; **CME**
H *Galium corrudifolium* Vill.; d,b,c,f; **SEUME**
P *Rubia peregrina* L.; b,a,c; **CME**
T *Sherardia arvensis* L.; b,d,f; **WSP**
T *Valantia muralis* L.; b,d,c,f; **CME**

R u t a c e a e

Ch *Ruta chalepensis* L. (=*R. bracteosa* DC.); b,d; **SEUME**

S c r o p h u l a r i a c e a e

T *Chaenorrhinum minus* (L.) Lange subsp. *litorale* (Willd.) Hayek; f,e,d; **IAP**
T *Linaria simplex* (Willd.) DC.; d,b,f; **CME**
T *Odontites lutea* (L.) Clairv.; b,d; **SEUME**
H *Scrophularia canina* L.; b,d,f; **SEUME**

S o l a n a c e a e

T *Datura innoxia* Miller; f,h; **CUAD**
T *Solanum luteum* Miller subsp. *alatum* (Moench) Dostál; f,h; **EUAS**
T *Solanum lycopersicum* L.; h; **CUAD**
T *Solanum nigrum* L.; f,h; **WSP**

U m b e l l i f e r a e (=Apiaceae)

T *Bupleurum baldense* Turra subsp. *gussonei* (Arcang.) Tutin; d,b; **ISEU**
Ch *Crithmum maritimum* L.; e; **MEAT**
H *Daucus gingidium* L.; e,f; **MEAT**

U r t i c a c e a e

H *Parietaria judaica* L.; f,b,h; **SEUME**

V e r b e n a c e a e

H *Verbena officinalis* L.; f,d; **WSP**

V i t a c e a e

P *Vitis vinifera* L.; b,a; **WSP**

ANGIOSPERMAE : MONOCOTYLEDONES

A g a v a c e a e

P *Agave americana* L.; g; **CUAD**

A m a r y l l i d a c e a e

G *Narcissus tazetta* L. subsp. *tazetta*; b,d,c; **WME**

C y p e r a c e a e

G *Carex flacca* Schreber subsp. *flacca* (=*C. glauca* Scop.); d,f,c; **WSP**
H *Carex hallerana* Asso; c,b,d; **SEUME**

D i o s c o r e a c e a e

G *Tamus communis* L.; b,c,a; **SEUME**

G r a m i n e a e (=Poaceae)

T *Aegilops geniculata* Roth; d,f; **CME**
T *Avena barbata* Pott.; f; **WSP**
T *Avena sterilis* L.; f; **SEUPO**
T *Brachypodium distachyon* (L.) Beauv.; d,b,f; **CME**

H *Brachypodium retusum* (Pers.) Beauv.; d,b,c; **CME**
T *Briza maxima* L.; b,d,c; **CME**
H *Bromus erectus* Hudson subsp. *condensatus* (Hackel) Ascherson & Graebner; d,b; **SEUME**
T *Bromus hordaceus* L. subsp. *molliformis* (Lloyd) Maire & Weiller; f; **SEUME**
T *Bromus madritensis* L.; f; **MEAT**
T *Bromus rigidus* Roth; f; **SEUAT**
T *Bromus sterilis* L.; f; **WSP**
H *Chrysopogon gryllus* (L.) Trin.; d,b; **MEPO**
G *Cynodon dactylon* (L.) Pers.; f,e; **WSP**
T *Cynosurus echinatus* L.; d,b,c; **SEUME**
H *Dactylis glomerata* L. subsp. *hispanica* (Roth) Nyman; d,b,c; **CME**
T *Desmazeria marina* (L.) Druce (=*Catapodium loliaceum* (Hudson) Link); d,b,f; **MEAT**
T *Desmazeria rigida* (L.) Tutin; d,b,f,c; **MEAT**
G *Elymus pycnanthus* (Godron) Melderis (=*Agropyron litorale* Dumort., nom. illeg.); e; **CME**
T *Gastridium ventricosum* (Gouan) Sch. et Th.; d; **MEAT**
H *Helictotrichon convolutum* (C. Presl.) Henrard (=*Avena convoluta* C. Presl.); d,b; **WME**
T *Hordeum murinum* L. subsp. *leporinum* (Link) Arcangeli; d,b,f; **CME**
H *Koeleria splendens* C. Presl.; d,b,f; **SEUME**
T *Lagurus ovatus* L.; d,b; **CME**
T *Lolium rigidum* Gaudin. subsp. *lepturoides* (Boiss.) Sennen & Mauricio; f,e; **EME**
T *Lolium rigidum* Gaudin subsp. *rigidum*; f,e; **SEUME**
T *Lophochloa cristata* (L.) Hyl.; f,d; **WSP**
H *Melica ciliata* L.; d,b,f; **EUAS**
T *Pholiurus incurva* (L.) C.E. Hubbard (=*Lepturus incurvatus* Trin.); e; **WSP**
H *Piptatherum miliaceum* (L.) Cosson; f,c; **SEUME**
T *Psilurus incurvus* (Gouan) Schinz & Thell. (=*P. aristatus* (L.) Duval-Jouve); b,d,c; **CME**
H *Sesleria tenuifolia* Schrader subsp. *tenuifolia*; b,d,c; **BAP**
H *Stipa bromoides* (L.) Dörfler; d,b,c; **CME**
T *Vulpia ciliata* Dumort.; d,b,c,f; **SEUME**

I r i d a c e a e

G *Iris illyrica* Tommasini; b,c; **IADE**

L i l i a c e a e

G *Allium flavum* L.; d,b; **CME**
G *Allium paniculatum* L. subsp. *fuscum* (Waldst. & Kit.) Arcangeli; d,f; **IBE**
G *Allium paniculatum* L. subsp. *paniculatum*; d,f; **SEUME**
G *Allium sphaerocephalon* L. subsp. *sphaerocephalon*; d; **SEUME**
G *Allium subhirsutum* L.; d,c; **CME**

G *Asparagus acutifolius* L.; b,d,c,a; **CME**
G *Asphodeline liburnica* (Scop.) Reichenb.; d; **ISEU**
G *Asphodelus aestivus* Brot. (=*A. microcarpus* Viv.); b,c,a; **CME**
G *Muscari comosum* (L.) Miller; b,d,f; **SEUME**
G *Muscari neglectum* Guss. ex Ten. (=*M. racemosum* (L.) Lam. & DC.); f,d; **EUME**
G *Ornithogalum comosum* L.; b,d; **SEEU**
G *Ruscus aculeatus* L.; b,c,a; **MEPO**
P *Smilax aspera* L.; b,c,a,d; **CME**

O r c h i d a c e a e

G *Ophrys sphegodes* Miller; c,b; **EUM**

ANALYSIS OF THE FLORA

The list of vascular flora of the island of Obonjan contains a total of 230 species and subspecies. All of them were included in the taxonomic, ecological and phytogeographical analysis and the results are presented in tables 1-3 and figure 2.

Tab. 1. Taxonomic analysis of the flora

Taxa	*Pteridophyta*	*Gymnospermae*	*Angiospermae*		**Total**
			Dicotyled.	*Monocotyled.*	
Families	0	2	43	8	53
Genera	0	2	122	39	163
Species	0	1	140	41	182
Subspecies	0	3	33	12	48
Species and subspecies	0	4	173	53	**230**
%	0	1,74	75,22	23,04	**100**

Tab. 2. A list of families with more than 10 species and subspecies

Families	**No. of species and subspecies**	**% of total flora (230)**
Gramineae	**33**	**14,35**
Compositae	**31**	**13,48**
– Asteroideae	*– 16*	*– 6,96*
– Cichorioideae	*– 15*	*– 6,52*
Leguminosae	**27**	**11,74**
Labiatae	**13**	**5,65**
Liliaceae	**13**	**5,65**

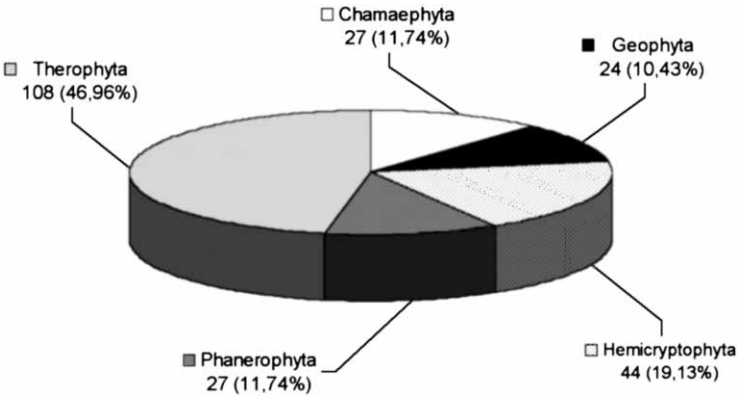

Fig. 2. Spectrum of life forms

Tab. 3. Analysis of the floral elements of the island of Obonjan

Floral element		No. of taxa and percentage
1.	**CULTIVATED & ADVENTITIOUS (CUAD)**	**7 (3.04%)**
2.	**EUROASIAN (EUAS)**	**9 (3.91%)**
3.	**EUROPEAN (EU)**	**3 (1.30%)**
4.	**ILLYRIAN-BALKAN**	**4 (1.74%)**
	A. Illyrian-Balkan endemic plants (**IBE**)	3 (1.30%)
	B. Balkan-Apennine plants (**BAP**)	1 (0.43%)
5.	**MEDITERRANEAN**	**122 (53.04%)**
	A. Circum-Mediterranean plants (CME)	76 (33.04%)
	B. West-Mediterranean plants (**WME**)	6 (2.61%)
	C. East-Mediterranean plants (**EME**)	4 (1.74%)
	D. Illyrian-Mediterranean plants	11 (4.78%)
	D.1. Illyrian-South European plants (**ISEU**)	3 (1.30%)
	D.2. Illyrian-Adriatic plants	8 (3.48%)
	D.2.1. Illyrian-Adriatic endem. (**IADE**)	*5 (2.17%)*
	D.2.2. Illyrian-Apennine plants (**IAP**)	*3 (1.30%)*
	E. Mediterranean-Atlantic plants (**MEAT**)	13 (5.65%)
	F. European-Mediterranean plants (**EUME**)	5 (2.17%)
	G. Mediterranean-Pontic plants (**MEPO**)	7 (3.04%)
6.	**SOUTHEAST-EUROPEAN (SEEU)**	**1 (0.43%)**
7.	**SOUTH EUROPEAN**	**47 (20.43%)**
	A. South European -Mediterranean (**SEUME**)	36 (15.65%)
	B. South European-Pontic plants (**SEUPO**)	10 (4.35%)
	D. South European-Atlantic plants (**SEUAT**)	1 (0.43%)
8.	**WIDESPREAD PLANTS (WSP)**	**37 (16.09%)**
T O T A L		230 (100.00%)

DISCUSSION AND CONCLUSION

The flora of vascular plants of the island of Obonjan includes 230 species and subspecies classified into 163 genera and 53 families (Tab. 1). With exception of three American neophytes, *Conyza bonariensis*, *C. canadensis* and *C. sumatrensis*, the plant taxa given in this paper have been recorded for the island of Obonjan for the first time. The total number of plant taxa found on the island is not very different from those registered on some other islands in the Croatian littoral that occupy a similar area (Tab. 4). It may be expected that on detailed floristic research in the next period (especially in winter season) the number of 230 taxa will be somewhat increased but not significantly because the island of Obonjan is uninhabited and without cultivated land and not many plants of the group of cultivated, ruderal and segetal plants that are numerous and very common on other Adriatic islands grow on the island of Obonjan.

Tab. 4. Comparative survey of the number of plant taxa from the island of Obonjan and from some other small Adriatic islands (N: northern, M: middle, S: southern Adriatic)

Island	Position	Area (km^2)	No. of taxa	Source
Murter	M	17,9	734	PANDŽA, 1998a
Unije	N	16,77	629	TRINAJSTIĆ, 1988
Šipan	S	15,8	555	HEĆIMOVIĆ, M., 1981
Žirje	M	16,16	469	PANDŽA, 2003
Koločep	S	2,35	444	HEĆIMOVIĆ, M. & S., 1987
Zlarin	M	8,19	444	PANDŽA, 1998b; TRINAJSTIĆ & PAVLETIĆ, 1999
Lopud	S	4,63	427	HEĆIMOVIĆ, M. & S., 1986
V. Drvenik	M	12,07	405	BEDALOV, 1976
Lokrum	S	0,72	400	HEĆIMOVIĆ, S., 1982
Biševo	M	5,84	389	PAVLETIĆ, 1975
Badija	M	1	379	BARČIĆ, 1974
Svetac	M	4,34	344	PAVLETIĆ, 1979
Molat	N	22,82	308	DOMAC, 1963
Plavnik	N	8,8	279	HORVATIĆ, 1927
Kaprije	M	6,97	278	FRANJIĆ & PANDŽA, 1996
Prvić	M	2,37	272	PANDŽA, 1998c
Krapanj	M	0,36	268	PANDŽA, 1998c
Obonjan	**M**	**0,7**	**230**	
Daksa	S	0,59	225	HEĆIMOVIĆ, M. & S., 1989
Palagruža	M	-	220	PAVLETIĆ, 1978
Mrkan	S	0,29	179	HEĆIMOVIĆ, S., 1982
V. Kluda	M	0,12	137	VLADOVIĆ *et al.*, 2001
Bobara	S	0,08	86	HEĆIMOVIĆ, S., 1982
Brusnik	M	0,05	41	PAVLETIĆ, 1983

Tab. 5. Comparative survey of the spectrum of life forms for the island of Obonjan and the spectra of life forms of some other islands of the Šibenik archipelago and the Mediterranean (%)

Localities	Ch	H	G	P	T	Source
Murter	8,12	30,96	8,97	9,98	41,12	PANDŽA, 1996
Zlarin	9,33	25,95	6,12	11,95	46,65	PANDŽA, 1998b
Krapanj & Prvić	9,39	21,83	9,39	11,05	48,34	PANDŽA, 1998c
Žirje	7,89	25,37	8,32	7,89	49,89	PANDŽA, 2003
Kaprije	11,15	20,51	8,27	12,59	47,48	FRANJIĆ & PANDŽA, 1996
Obonjan	**11,74**	**19,13**	**10,43**	**11,74**	**46,96**	
Mediterranean	6	29	11	12	42	HORVAT, 1949

The *Gramineae* family with 33 plant taxa, *Compositae* family with 31 plant taxa (*Asterideae* 16 and *Cichorideae* 15) and *Leguminosae* family with 27 plant taxa are prominent in the greatest number of plant taxa (Tab. 2) in the flora of the island of Obonjan, which coincides with the results of the analysis of the flora of some other areas in the Croatian littoral (DOMAC, 1955; 1963; REGULA-BEVILACQUA & ILIJANIĆ, 1984; HEĆIMOVIĆ, M. & S., 1982; 1986; 1987; MILOVIĆ, 2002; PANDŽA, 2003)

In the spectrum of life-forms (Fig. 2), *Therophyta* are dominant with 108 taxa (46.96%) followed by *Hemicryptophyta* with 44 taxa (19,13%). The dominance of *Therophyta* and the significant proportion of *Chamaephyta* (11.74%) in the flora of the island of Obonjan indicate that this area has a dry, Mediterranean climate. The spectrum of life forms of the island coincides generally with the spectra of some other islands of the Šibenik archipelago as well as with the spectrum of the Mediterranean (Tab. 5). There is somewhat larger proportion of *Therophyta* and *Chamaephyta* and smaller proportion of *Hemicryptophyta* in the spectrum of the island of Obonjan than those in the spectrum of the Mediterranean.

In the spectrum of the flora of the island of Obonjan (Tab. 3) plants of the Mediterranean floral element account for the greatest percentage (53.04%), following by plants of the South European floral element (20.65%) and widespread plants (16.09%). Circum-Mediterranean plants are dominant within the Mediterranean floral element (33.04%). It is important to point out the presence of Illyrian-Adriatic endemic plants (5 taxa; 2.17%): *Euphorbia fragifera*, *Inula verbascifolia* subsp *verbascifolia*, *Iris illyrica*, *Tanacetum cinerariifolium*, and *Vicetoxicum hirundinaria* subsp. *adriaticum*. The amounts of Mediterranean and South European floral element and widespread plants in the flora of Obonjan coincide with those in the total flora of some other islands of the Šibenik archipelago (Fig. 3).

The domination of plants of the Mediterranean floral element and significant presence of the South European plants are the result of the geographic location of the islands of the Šibenik archipelago in the Mediterranean region of South Europe.

The group of cultivated and adventitious plants in the flora of the island is not numerous (7 taxa; 3.04%). So far, only four neophyte species are found on the island, three species of *Conyza* and *Diplotaxis erucoides*, but not some neophytes that

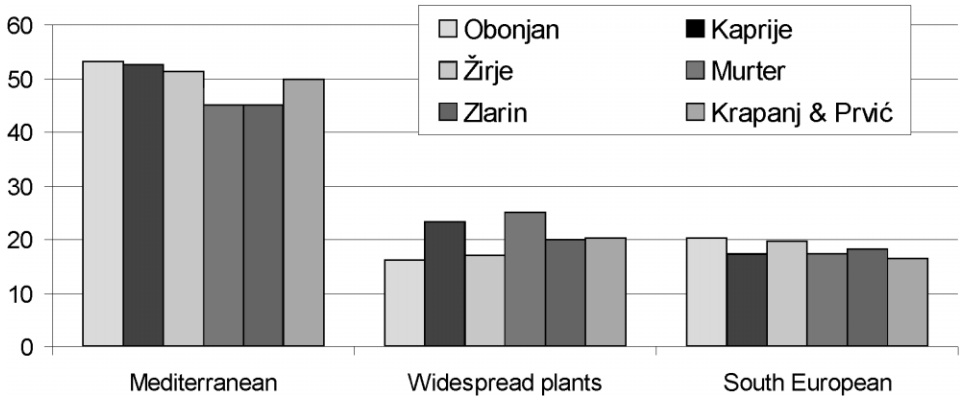

Fig. 3. Comparative survey of the prevalent floral elements in the flora of some islands of the Šibenik archipelago (%).

became widespread on the islands and the coast of the wider area of Šibenik: *Aster squamatus*, *Bidens subalternans*, *Datura innoxia* and *Euphorbia prostrata* (PANDŽA, 1996; 1998a; 1998b, 1998c; 2003; PANDŽA *et al.*, 2001; MILOVIĆ 2001; 2002). It may be expected that the number of plants from this group will be somewhat increased in years to come as a consequence of the increased tourist industry on the island.

The floristic research into the flora of the island of Obonjan will be continued with special accent on the hibernal aspect of the flora, which has been poorly investigated so far.

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SAŽETAK

Flora otoka Obonjana (šibenski arhipelag, Hrvatska)

M. Milović

Flora Obonjana, malog nenaseljenog otoka u šibenskom arhipelagu (0,7 km^2), istraživana je od 2000. do 2003. godine. Zabilježeno je ukupno 230 svojti vaskularnih biljaka svrstanih u 163 roda i 53 porodice. Tri amerikanoneofita iz roda *Conyza* (*C. bonariensis*, *C. canadensis* i *C. sumatrensis*) zabilježena su nedavno dok se 227 svojti navodi prvi put u ovom radu.

Najzastupljenije porodice su *Gramineae* (33 svojte, 14,35%), *Compositae* (31 svojta, 13,48%) i *Leguminosae* (27 svojti, 11,74%). Analiza životnih oblika ukazuje na dominaciju terofita (108 svojti, 46,96%), zatim slijede hemikriptofiti (44 svojte, 19,3%), fanerofiti i hamefiti (27 svojte, 11,74%) te geofiti (24 svojte, 10,43%). Fitogeografska analiza flore pokazuje prevladavajuću zastupljenost biljaka mediteranskog flornog elementa (122 svojte, 53,04%) među kojima je najzastupljenija skupina općemediteranskih biljaka (76 svojti, 33,04%). Brojno su zastupljene i biljke južnoeuropskog elementa (47 svojti, 20,43%) i biljke široke rasprostranjenosti (37 svojti, 16,9%). Dominacija terofita (46,95%) i biljaka mediteranskog flornog elementa (53,04%) ukazuje na mediteranski karakter flore Obonjana.

Rezultati taksonomske, ekološke i fitogeografske analize flore Obonjana se u velikoj mjeri podudaraju s rezultatima analize flore drugih otoka i područja u hrvatskom primorju. U florama navedenih područja uočljiva je dominacija terofita i biljaka mediteranskog flornog elementa a porodice s najvećim brojem vrsta su *Gramineae*, *Compositae* i *Leguminosae*.