

FLORA AND VEGETATION OF SVETI ANDRIJA ISLAND, SOUTHERN CROATIA

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The first record of as many as 160 vascular plant taxa, 134 genera and 61 families on Sveti Andrija Island (5.38 hectares), southern Adriatic, was established on the basis of floristic research in 2005. An analysis of the life-forms and floral elements was also carried out and comparisons were made with other Dubrovnik islands. Altogether, four associations were determined: *Quercus ilicis-Pinetum halepensis*, *Posidonietum oceanicae*, *Limonietum anfracti* and *Lavateretum arboreae*.

Key words: flora, vegetation, Sveti Andrija Island, southern Adriatic, Croatia

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Na temelju istraživanja u 2005. godini, na otoku Sveti Andrija (5,38 ha) u južnom Jadranu zabilježeno je 160 svojiti vaskularnih biljaka, svrstanih u 134 roda i 61 porodicu. Analizirani su životni oblici i florni elementi, te uspoređeni s ostalim dubrovačkim otocima. Na otoku su utvrđene četiri biljne zajednice: *Quercus ilicis-Pinetum halepensis*, *Posidonietum oceanicae*, *Limonietum anfracti* i *Lavateretum arboreae*.

Ključne riječi: flora, vegetacija, otok Sveti Andrija, južni Jadran, Hrvatska

INTRODUCTION

The first data on the flora of the Dubrovnik islands comes from VISIANI (1842–1852). The flora of the Elaphite Islands, as well as that of the islands of Lokrum, Mrkan and Bobara has been investigated in detail (M. HEĆIMOVIĆ, 1981; M. & S. HEĆIMOVIĆ, 1986, 1987, 1989; S. HEĆIMOVIĆ, 1982; LOVRIC & ANTONIĆ, 1995). Phytosociological research has been carried out on the islands of Šipan (M. HEĆIMOVIĆ,

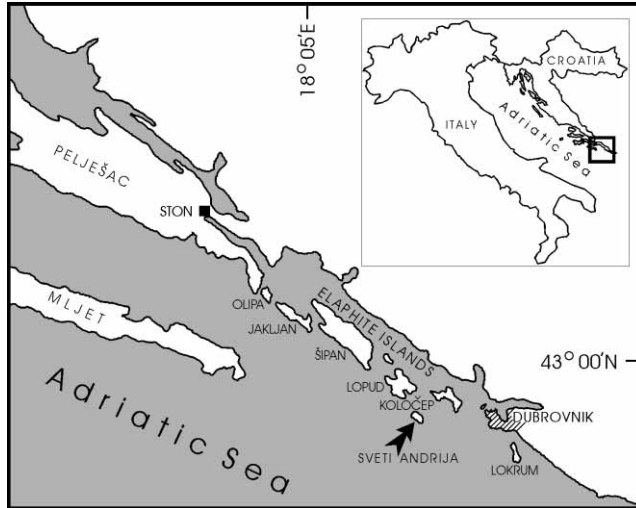


Fig. 1. Geographical position of Sveti Andrija Island, southern Adriatic

1980, 1982), Lokrum (S. HEĆIMOVIĆ, 1981; ILIJANIĆ & S. HEĆIMOVIĆ, 1982), as well as Bobara and Mrkan (S. HEĆIMOVIĆ, 1984), but only partially on the island of Lopud (TRINAJSTIĆ & JASPRICA, 1998).

The flora and the vegetation of Sveti Andrija Island have hitherto been unknown. This study presents the flora and the vegetation of the island for the first time, as well as a comparison of them with those of surrounding islands.

Study area

The surface area of Sveti Andrija Island is 5.38 ha (53757 m²), its maximum length is 475 m, and maximum width is 130 m. The coastline is 1129.97 m long. The geographical position of the island at its central point is N 42°38.677', E 17°57.052' (Fig. 1). The highest altitude is 57 m. Sea depths off the southern shores of the island (below the cliffs) are 44–45 m, and on the northern side of the island 15–27 m.

Phytogeographically, the island belongs to the steno-Mediterranean vegetation zone of the *Oleo-Ceratonion* alliance (TRINAJSTIĆ, 1995a).

MATERIAL AND METHODS

Flora

The taxa in the list of flora are given in alphabetical order of families, genera and species. The nomenclature of plant species follows the *Index Florae Croatiae* (NIKOLIĆ, 1994, 1997, 2000). The life form abbreviations (P – Phanerophytes, Ch – Chamaephytes, H – Hemicryptophytes, G – Geophytes, T – Therophytes, Hy – Hydrophytes) are given in the flora list after the names of species. The floral element in

the flora list has been indicated after the life form. The analysis of life forms and floral elements has been made according to JASPRICA & KOVAČIĆ (1997a, b), RUŠČIĆ (2002), KUO & DEN HARTOG (2001), and references in these articles.

Vegetation

Data collection in the field follows the approach of the Zurich-Montpellier school (BRAUN-BLANQUET, 1964). The system of characteristic species and nomenclature of higher taxa (Appendix 1) was accepted from HORVAT *et al.* (1974) and TRINAJSTIĆ (1995b). We also refer to MUCINA (1997), and DEN HARTOG (2003).

RESULTS

List of species

P T E R I D O P H Y T A

FILICOPSIDA

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

Asplenium ceterach L. (H, South European-Mediterranean)

Asplenium onopteris L. (H, Circum-Mediterranean)

S P E R M A T O P H Y T A

GYMNOSPERMAE

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

Cupressus sempervirens L. (P, Cult. & adv.)

Juniperus phoenicea L. (P, Circum-Mediterranean)

E p h e d r a c e a e

Ephedra fragilis Desf. subsp. *campylopoda* (C. A. Meyer) Asch. & Graeb. (Ch, East-Mediterranean)

P i n a c e a e

Pinus halepensis Miller (P, Circum-Mediterranean)

Pinus pinea L. (P, Circum-Mediterranean)

A N G I O S P E R M A E

DICOTYLEDONES

A m a r a n t h a c e a e

Amaranthus album L. (T, Cult. & adv.)

Amaranthus deflexus L. (T, Cult. & adv.)

Amaranthus graecizans L. (T, Cult. & adv.)

Amaranthus retroflexus L. (T, Cult. & adv.)

*A n a c a r d i a c e a e**Pistacia lentiscus* L. (P, Circum-Mediterranean)*Pistacia terebinthus* L. (P, Circum-Mediterranean)*A p i a c e a e**Chaerophyllum coloratum* L. (H, Illyrian-Adriatic endemic)*Crithmum maritimum* L. (Ch, Mediterranean-Atlantic)*Daucus carota* L. subsp. *hispidus* (Arcang.) Heywood (H, South European-Mediterranean)*Ferula communis* L. (H, South European-Mediterranean)*Ferulago campestris* (Besser) Grec. (H, South European-Pontic)*Foeniculum vulgare* Miller (H, Circum-Mediterranean)? *Peucedanum schottii* Bess. ex DC. (H, South European-Mountain)*Smyrniolum oluastrum* L. (H, South European-Mediterranean)*A p o c y n a c e a e**Nerium oleander* L. (P, Cult. & adv.)*A r a l i a c e a e**Hedera helix* L. (P, European)*A s t e r a c e a e**Artemisia absinthium* L. (T, Widespread)*Bellis sylvestris* Cyr. (H, Circum-Mediterranean)*Carduus micropterus* (Borbás) Teyber (H, Illyrian-Adriatic endemic)*Carduus pycnocephalus* L. (T, Circum-Mediterranean)*Carlina corymbosa* L. (T, Circum-Mediterranean)*Carthamus lanatus* L. (T, Circum-Mediterranean)*Centaurea glaberrima* Tausch (H, Illyrian-Adriatic endemic)*Conyza bonariensis* (L.) Cronq. (T, Cult. & adv.)*Conyza canadensis* (L.) Cronq. (T, Cult. & adv.)*Dittrichia viscosa* (L.) W. Greuter (H, Circum-Mediterranean)*Erigeron annuus* (L.) Pers. subsp. *annuus* (T, Cult. & adv.)*Helianthus tuberosus* L. (G, Cult. & adv.)*Helichrysum italicum* (Roth.) G. Don fill. (Ch, Illyrian-Appennine)*Inula conyza* DC. (H, South European-Pontic)*Inula verbascifolia* (Willd.) Hausskn. subsp. *verbascifolia* (Ch, Illyrian-Appennine)*Pallenis spinosa* (L.) Cass. (T, Circum-Mediterranean)*B o r a g i n a c e a e**Heliotropium europaeum* L. (T, Mediterranean-Pontic)*B r a s s i c a c e a e**Aethionema saxatile* (L.) R. Br. (Ch, South European-Mediterranean)*Alyssanthus sinuatus* (L.) Trinajstić (Ch, Illyrian-Adriatic endemic)*Cardaria draba* (L.) Desv. (H, Widespread)*Matthiola incana* (L.) R. Br. (Ch, Cult. & adv.)*Sisymbrium officinale* (L.) Scop. (T, Widespread)

*C a p p a r i d a c e a e**Capparis spinosa* L. (Ch, Circum-Mediterranean)*C a r y o p h y l l a c e a e**Arenaria leptoclados* (Reichenb.) Guss. (T, Eurasian)*Polycarpon tetraphyllum* (L.) L. (T, South European-Mediterranean)*Silene vulgaris* (Moench.) Garcke subsp. *angustifolia* (Miller) Hayek (H, South European-Mediterranean)*Spergularia marina* (L.) Griesb. (T, Widespread)*C h e n o p o d i a c e a e**Atriplex littoralis* L. (T, Eurasian)*Atriplex patula* L. (T, Widespread)*Beta vulgaris* L. subsp. *maritima* (L.) Arcangeli (H, Mediterranean-Atlantic)*Chenopodium album* L. (T, Widespread)*Chenopodium murale* L. (T, Widespread)*Chenopodium vulvaria* L. (T, South European-Mediterranean)*Halimione portulacoides* (L.) Aellen (Ch, Widespread)*C i c h o r i a c e a e**Chamomilla recutita* (L.) Rauschert (T, Widespread)*Cichorium endivia* L. subsp. *divaricatum* (Schousb.) P.D.Sell (T, Mediterranean-Atlantic)*Lactuca viminea* (L.) J. & C. Presl. (H, South European-Pontic)*Leontodon crispus* Vill. (H, South European-Mediterranean)*Reichardia picroides* (L.) Roth. (Ch, Circum-Mediterranean)*Sonchus asper* (L.) Hill subsp. *glaucescens* (Jordan) Ball (T, Circum-Mediterranean)*Sonchus oleraceus* L. (T, Widespread)*C l u s i a c e a e**Hypericum perforatum* L. var. *angustifolium* DC. (H, Widespread)*C o n v o l v u l a c e a e**Convolvulus arvensis* L. (G, Widespread)*C r a s s u l a c e a e**Sedum acre* L. (Ch, Eurasian)*Sedum album* L. (Ch, Widespread)*Sedum dasyphyllum* L. (Ch, South European-Mediterranean)*Sedum telephium* L. subsp. *maximum* (L.) Krockner (H, Eurasian)*Sempervivum tectorum* L. (Ch, Central European)*Umbilicus horizontalis* (Guss.) DC. (Ch, Circum-Mediterranean)*C u c u r b i t a c e a e**Colocynthis citrullus* (L.) Fritsch (T, Cult. & adv.)*Cucurbita pepo* L. (T, Cult. & adv.)*Ecballium elaterium* (L.) A. Richard (T, Circum-Mediterranean)

*E r i c a c e a e**Arbutus unedo* L. (P, Circum-Mediterranean)*E u p h o r b i a c e a e**Euphorbia chamaesyce* L. (T, South European-Mediterranean)*Euphorbia helioscopia* L. (T, Widespread)*Euphorbia pinea* L. (H, Circum-Mediterranean)*Mercurialis annua* L. (T, Widespread)*F a b a c e a e**Ceratonia siliqua* L. (P, West-Mediterranean)*Lotus ornithopodioides* L. (T, Circum-Mediterranean)*Medicago orbicularis* (L.) Bartal. (T, Circum-Mediterranean)*Trifolium campestre* Schreber (T, Widespread)*Trifolium dalmaticum* Vis. (T, Illyrian-South European)*Vicia sativa* L. (T, Widespread)*F a g a c e a e**Quercus ilex* L. (P, Circum-Mediterranean)*F u m a r i a c e a e**Fumaria officinalis* L. (T, Widespread)*G e r a n i a c e a e**Erodium malacoides* (L.) L'Her. (T, Circum-Mediterranean)*Geranium purpureum* Vill. (T, South European-Mediterranean)*Geranium rotundifolium* L. (H, Eurasian)*L a m i a c e a e**Ajuga chamaepytis* (L.) Schreber (T, Widespread)*Calamintha nepeta* (L.) Savi (Ch, South European-Pontic)*Lavandula spica* L. (Ch, Cult. & adv.)*Micromeria juliana* (L.) Benth. ex Rchb. (Ch, Circum-Mediterranean)*Prasium majus* L. (Ch, Circum-Mediterranean)*Rosmarinus officinalis* L. (P, Circum-Mediterranean)*Sideritis romana* L. (T, Circum-Mediterranean)*L a u r a c e a e**Laurus nobilis* L. (P, Circum-Mediterranean)*M a l v a c e a e**Lavatera arborea* L. (P, European-Mediterranean)*Malva sylvestris* L. (H, Widespread)*M e l i a c e a e**Melia azedarach* L. (P, Cult. & adv.)*M o r a c e a e**Ficus carica* L. (P, Circum-Mediterranean)

*N y c t a g i n a c e a e**Mirabilis jalapa* L. (G, Cult. & adv.)*O l e a c e a e**Olea europaea* L. (P, Circum-Mediterranean)*Phillyrea latifolia* L. (P, Circum-Mediterranean)*Phillyrea media* L. (P, Circum-Mediterranean)*O r o b a n c h a c e a e**Orobanche purpurea* Jacq. (T, Eurasian)*P i t t o s p o r a c e a e**Pittosporum tobira* Ait. (P, Cult. & adv.)*P l u m b a g i n a c e a e**Limonium anfractum* (Salmon) Salmon (H, Illyrian-Adriatic endemic)*P o l y g o n a c e a e**Rumex crispus* L. (H, Widespread)*P o r t u l a c a c e a e**Portulaca oleracea* L. (T, Widespread)*P u n i c a c e a e**Punica granatum* L. (P, Circum-Mediterranean)*R a n u n c u l a c e a e**Clematis flammula* L. (P, Circum-Mediterranean)*Clematis vitalba* L. (P, European)*R o s a c e a e**Rubus ulmifolius* Schott (P, Mediterranean-Atlantic)*R u b i a c e a e**Rubia peregrina* L. (P, Circum-Mediterranean)*Vaillantia muralis* L. (T, Circum-Mediterranean)*R u t a c e a e**Ruta graveolens* L. (Ch, South European-Mediterranean)*S c r o p h u l a r i a c e a e**Linaria vulgaris* Miller (T, Eurasian)*Misopates orontium* (L.) Rafin. (T, Eurasian)*Scrophularia peregrina* L. (T, Circum-Mediterranean)*Veronica cymbalaria* Bodard (T, South European-Mediterranean)*S o l a n a c e a e**Hyoscyamus albus* L. (T, Circum-Mediterranean)*Solanum nigrum* L. (T, Widespread)*T a m a r i c a c e a e**Tamarix dalmatica* Baumg. (P, West-Mediterranean)

*U r t i c a c e a e**Parietaria diffusa* Mert. ex Koch (Ch, South European-Mediterranean)*V e r b e n a c e a e**Vitex agnus-castus* L. (P, Circum-Mediterranean)*Z y g o p h y l l a c e a e**Tribulus terrestris* L. (T, South European-Mediterranean)**MONOCOTYLEDONES***A g a v a c e a e**Agave americana* L. (H, Cult. & adv.)*Yucca gloriosa* L. (P, Cult. & adv.)*A r a c e a e**Arisarum vulgare* Targ.-Tozz. (G, Circum-Mediterranean)*Arum italicum* Miller (G, Mediterranean-Atlantic)*C y p e r a c e a e**Carex divulsa* Stokes (H, Widespread)*D i o s c o r e a c e a e**Tamus communis* L. (G, South European-Mediterranean)*I r i d a c e a e**Iris pseudopallida* Trinajstić (G, Illyrian-Adriatic endemic)*L i l i a c e a e**Allium commutatum* Guss. (G, Circum-Mediterranean)*Allium roseum* L. (G, Circum-Mediterranean)*Allium sphaerocephalon* L. (G, Widespread)*Allium subhirsutum* L. (G, Circum-Mediterranean)*Asparagus acutifolius* L. (P, Circum-Mediterranean)*Asphodelus aestivus* Brot. (H, Circum-Mediterranean)*Asphodelus fistulosus* L. (H, Circum-Mediterranean)*Smilax aspera* L. (P, Circum-Mediterranean)*Ruscus aculeatus* L. (P, Mediterranean-Pontic)*P o a c e a e**Alopecurus rendlei* Eg. (T, South European-Mediterranean)*Avena sterilis* L. (T, South European-Mediterranean)*Brachypodium retusum* (Pers.) Beauv. (H, Circum-Mediterranean)*Cynodon dactylon* (L.) Pers. (H, Widespread)*Dactylis glomerata* L. subsp. *hispanica* (Roth) Nyman (H, Circum-Mediterranean)*Desmazeria rigida* (L.) Tutin (T, Mediterranean-Atlantic)*Elymus pungens* (Pers.) Melderis (H, Widespread)

Eragrostis minor Host. (T, Widespread)
Hordeum murinum L. subsp. *leporinum* (Link) Arcangeli (T, Circum-Mediterranean)
Melica ciliata L. (H, Mediterranean-Pontic)
Piptatherum miliaceum (L.) Cosson (H, South European-Mediterranean)
Polypogon maritimus Willd. (T, Circum-Mediterranean)
Setaria viridis (L.) P.B. (T, Eurasian)
Vulpia ciliata Dumort (T, South European-Mediterranean)
P o t a m o g e t o n a c e a e
Posidonia oceanica (L.) Delile (Hy, Widespread)

Analysis of the flora

Tab. 1 presents the number of taxa, and a comparison with those on other Dubrovnik islands. *Dicotyledones* (122 taxa or 76%) dominated the material, *Monocotyledones* (31 taxa or 20%) ranked second, followed by *Gymnospermae* (5 taxa or 3%) and *Pteridophyta* (2 taxa or 1%). *Asteraceae* (16 taxa) and *Poaceae* (14 taxa) are the families characterized by the highest number of taxa.

Tab. 1. Number of taxa (species and lower units) on the southern Adriatic islands

Island	Surface area (km ²)	Altitude (m)	Taxa	Genera	Families	References
Mljet	101	514	716	363	87	REGULA-BEVILACQUA & ILIJANIĆ 1984; TRINAJSTIĆ 1985, 1995b
Šipán	15.8	243	617	326	82	M. HEĆIMOVIĆ 1981
Lopud	4.63	216	429	277	76	M. & S. HEĆIMOVIĆ 1986; TRINAJSTIĆ & JASPRICA 1998
Koločep	2.4	125	444	299	80	M. & S. HEĆIMOVIĆ 1987
Daksa	0.59	24	225	169	66	M. & S. HEĆIMOVIĆ 1989
Lokrum	0.72	91	400	259	71	S. HEĆIMOVIĆ 1982
Mrkan	0.28	65	179	150	58	S. HEĆIMOVIĆ 1982
Bobara	0.075	45	86	78	35	S. HEĆIMOVIĆ 1982
Supetar	0.039	8	39	36	19	JASPRICA & KOVAČIĆ 2002
Sveti Andrija	0.053	57	160	134	61	This study

Therophytes prevailed with 36.4% (Tab. 2). The Mediterranean floral element dominated (46.2%), see Tab. 3. The following Illyrian-Adriatic endemic plants are present within the Mediterranean floral element: *Chaerophyllum coloratum*, *Carduus micropterus*, *Centaurea glaberrima*, *Alyssanthus sinuatus*, *Limonium anfractum* and *Iris pseudopallida*.

Tab. 2. Life forms (%)

Island	T	H	P	Ch	G	Hy
Mljet	45.3	19.87	11.92	11.26	10.59	0.83
Šipan	46	25	11	7	11	–
Lopud	45.67	23.42	13.12	10.3	7.49	–
Koločep	46.4	20.95	14.41	11.04	6.98	0.22
Daksa	41.33	19.11	17.33	11.56	10.67	–
Lokrum*	42	25	13	8	12	–
Sveti Andrija	36.4	25.31	18.18	12.98	6.49	0.64

T – therophytes, H – hemicryptophytes, P – phanerophytes, Ch – chamaephytes, G – geophytes, Hy – hydrophytes. * Data for Lokrum Island includes those for the Mrkan and Bobara islands.

Tab. 3. Floral elements (%)*

Island	MED	SE	WS	EA	EURO	CULT	I-B	EEP	SEE	CE	CH
Mljet	51.99	19.7	15.07	6.29	3.31	1.82	0.16	0.16	0.84	0.5	0.16
Šipan	42.9	22.8	19.7	6.4	4.3	2.1	0.3	0.2	0.3	0.3	0.3
Lopud	47.07	22.95	19.91	4.22	2.58	1.88	0.47	0.23	0.23	0.23	0.23
Koločep	47.75	23.2	16.89	4.96	3.38	2.25	0.9	–	–	0.45	0.22
Daksa	56.45	20.89	14.22	4.89	1.78	1.33	0.44	–	–	–	–
Lokrum	50.2	17.2	19.7	7.3	2.9	1.9	0.2	0.2	–	–	–
Sveti Andrija	46.2	15.82	18.36	6.33	1.26	11.4	–	–	–	0.63	–

* Data for Lokrum includes those for the Mrkan and Bobara islands. Abbreviations: MED – Mediterranean plants, SE – South-European, WS – widespread plants, EA – Eurasian, EURO – European, CULT – cultivated and adventive plants, I-B – Illyrian-Balkan, EEP – East-European-Pontic, SEE – Southeast European, CE – Central European, CH – Circum-holarctic.

VEGETATION

Climazonal community

Climazonal vegetation is represented by the *Quercus ilicis*-*Pinetum halepensis* association. This forest is only fragmentarily developed, due to very great anthropogenic influence. This is shown through the significant cover of the species *Parietaria diffusa* and *Lavatera arborea* in the herb layer. A large number of species of xerothermic evergreen vegetation (the *Oleo-Ceratonion* and *Quercion ilicis* alliances) were absent. The floristic composition of the community was as follows (date 16.6.2005; plot surface 50 m²; altitude 10–20 m; aspect W; slope 45°; vascular plant cover: tree and shrub layer 70%, herb layer 80%; geological type: limestone; soil: brown littoral soil):

Tree and shrub layer:

Quercus ilex 4.5

Pinus halepensis +.1

Phillyrea latifolia +

Lavatera arborea +

Herb layer:

Parietaria diffusa 4.4

Lavatera arborea 2.1

Desmazeria rigida +.1

Vicia sp. +

Ruscus aculeatus +

Avena sterilis +

Vulpia ciliata +

Euphorbia pinea +

Sonchus asper +

Smilax aspera +

Asparagus acutifolius +

Seagrass community

Posidonietum oceanicae forms large meadows in the sublittoral. Extensive descriptions about the structure and the functioning of *Posidonia* beds have been produced by BUIA *et al.* (2000) and DEN HARTOG (2003). BOUDOURESQUE *et al.* (1994) reviewed the significance of Mediterranean seagrass beds, particularly those of *Posidonia*, from the viewpoint of their protection.

Halophytic community

The halophytic vegetation of the coastal rocks belongs to the association *Limonietum anfracti*. The community develops during the warmer months of the year, starting in early spring, and reaches its optimum during the autumn months after abundant rainfalls. The floristic composition of the *Limonietum anfracti* association was (date 16.6.2005; plot surface 20 m²; altitude 1–2 m; aspect W; vascular plant cover 15%; geological type: limestone):

Char. Ass.

Limonium anfractum 1.2

Char. All., O., Cl.

Crithmum maritimum 1.1

Silene vulgaris 2.1

Sonchus asper +

Companions

Atriplex patula +
Lotus ornithopodioides +
Euphorbia pinea +
Allium sphaerocephalon +
Elymus pungens +

Nitrophilous community

Seagulls (*Larus cachinnans*), which nest on Sveti Andrija Island, have a great influence on its vegetation. According to RUBINIĆ (2003), there are over 50 pairs. Through sedimentation, the guano enriches the soil with nitrogen and phosphorus, which favors the growth of nitrophilous plants. Favorable nesting conditions can be found on the eastern side of the island, in the *Lavatera arborea* community. The floristic composition of the *Lavateretum arboreae* association was (date 16.6.2005; plot surface 50 m²; altitude 38 m; aspect NE; slope 15°; vascular plant cover 100%, geological type: limestone; soil: brown littoral soil):

Char. Ass.

Lavatera arborea 5.5

Char. All., O., Cl.

Chenopodium album +.1
Atriplex patula +.1
Portulaca oleracea +
Ecballium elaterium +
Carduus pycnocephalus +
Sisymbrium officinale +
Ruta graveolens +

Companions:

Parietaria diffusa +
Olea europaea +
Piptatherum miliaceum +
Phillyrea media +
Cynodon dactylon +

DISCUSSION

The Dubrovnik islands have very similar floral characteristics. Therophytes provide the largest contribution in the life-spectrum on all the Dubrovnik islands. Among these islands, Sveti Andrija has the highest proportion of phanerophytes.

In the flora of the Dubrovnik islands, including Sveti Andrija, the Mediterranean floral element is the most important, with Circum-Mediterranean plants being the most frequent.

JASPRICA & KOVAČIĆ (2002) found a significant positive correlation between the number of taxa on the islands and their surface area, but also with the greatest altitude. According to LOVRIC & ANTONIĆ (1995), vascular flora richness is significantly correlated with an island's peak heights, surface area, and surface area/length ratios. On the other hand, sea depth, distance from the mainland and geographical latitudes have no influence on the number of taxa on islands. Šipan, the largest of the Elaphite Islands, has the highest number of taxa. Lopud and Koločep are one-third and one-fifth smaller than Šipan, respectively, but in proportion to their size they are floristically far richer.

After similar analyses of vascular endemism on Croatian islands, LOVRIC & ANTONIĆ (1995) presented no significant correlations with any of these physical parameters. The ecology of endemic taxa, mostly Illyrian-Adriatic, on the Dubrovnik islands has been elaborated in a paper by KOVAČIĆ & JASPRICA (2002).

The nitrophilous community with *Lavatera arborea* on Sveti Andrija is different from similar communities on the islands of Bobara and Mrkan. Specifically, the species *Lavatera arborea* is found on these islands within the halophytic vegetation of the *Limonietum anfracti lavateretosum arboreae* subassociation. On Sveti Andrija, *Lavatera arborea* forms a specific nitrophilous community, of which *Atriplex patula* is an even more important species. *Lavateretum arboreae* is similar to some of the halo-nitrophilous communities in the Mediterranean (RIVAS-MARTÍNEZ *et al.*, 2002).

CONCLUSIONS

1. Sveti Andrija Island has 160 vascular plant taxa, included into 134 genera and 61 families. The total number of taxa represents about 3% of the Croatian vascular flora.
2. The flora has a Mediterranean character. It is dominated by plants with a Mediterranean floral element (46.2%) and the life-forms are dominated by therophytes (36.4%).
3. The island has six Illyrian-Adriatic endemic plants. Four plant communities were determined: *Quercus ilicis-Pinetum halepensis*, *Posidonietum oceanicae*, *Limonietum anfracti* and *Lavateretum arboreae*.

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APPENDIX 1. SYNTAXONOMIC SCHEME

- Quercetea ilicis* BR.-BL. 1947
 Quercetalia ilicis H-IĆ 1958
 Oleo-Ceratonion BR.-BL. 1931
 Quercu ilicis – *Pinetum halepensis* LOISEL 1971
- Posidonietea* DEN HARTOG 1976
 Posidonietalia DEN HARTOG 1976
 Posidonium oceanicae BR.-BL. 1931, pro parte
 Posidonietum oceanicae FUNK 1927
- Crithmo-Limonietea* BR.-BL. 1947
 Crithmo-Limonietalia MOLINIER 1934
 Crithmo-Limonion MOLINIER 1934
 Limonietum anfracti ILIJANIĆ & HEĆIMOVIĆ 1982
 Limonietum anfracti lavateretosum arboreae ILIJANIĆ & HEĆIMOVIĆ 1982
- Chenopodietea* BR.-BL. 1952
 Cheopodietalia BR.-BL. (1931) 1936
 Chenopodion muralis BR.-BL. (1931) 1936
 Lavateretum arboreae GÉHU & GÉHU 1961

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