Flora of the South-Western Part of the National Park "Northern Velebit"

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Summary

This research was conducted in the South-Western part of the National park "Northern Velebit" and the coastal slopes along the border of the park (33.75 km^2) during the vegetation season 2006. A total of 241 taxa of vascular plants (216 species and 25 subspecies) were found. The taxa belonged to 158 genera and 58 families. In the life form spectrum hemicryptophytes were dominant (46.9%). Phytogeographical analysis showed that the most plants belong to the Euroasian floristic element (46.1%), followed by Mediterranean floristic element (23.2%). Out of the total number of the identified taxa, there were 13 endangered and three endemic taxa.

Key words

vascular flora, National park "Northern Velebit", Croatia

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Introduction

The National park "Northern Velebit" is the youngest National park in Croatia, established in 1999. The park is mostly located in the mountain area, and it covers many attractive and valuable natural segments in the Northern part of Velebit. The variations of the climate are drastic within small distances (10 km), from the sub Mediterranean climate in the Velebit canal to the mountain climate on the bare slopes. The biggest part of the National park is built of limestone and dolomite. The water partly dissolves carbonates, creating a special relief form – the karst (Rogić, 1956, 1958). The karst formation process on the rock surfaces causes special morphological creations known as karrens, dolinas and hips, while caves and caverns are found in the underground. The Northern Velebit area has a relatively big quantity of precipitations (the average annual quantity is over 2000 mm) and high air humidity, due to the permeability of the bedrock, the water transfers to the underground areas, where it flows through cavities of various sizes.

The park area totals 109 km^2, its total length is 18 km, and the width varies from 4 to 10 km. Thanks to its extreme variety of karst forms, life and landscapes found in a relatively small area, the Northern Velebit has been pronounced a National park in 1999. In 1978, the whole Velebit area was included in the World Network of Biosphere Reserves.

The vegetation cover shows two different sides of Velebit (Bertović, 1975). The coastal part belongs to the evergreen and deciduous Mediterranean forests, while the continental part belongs to the Eurosiberian region. Most of the park is covered by forests in vertical zonation. Starting with the sea, and going upwards to the mountain tops, the following communities are found: *Ostryo-Quercetum pubescentis* (Ht.) Trinajstić 1979, in which small fragments od Austrian black pine (*Pinus nigra* Arnold subsp. *dalmatica* (Vis.) Franco) can be found. This community is followed by dinaric broad-leaved forest the *Lamio orvalae-Fagetum* (Ht. 1938) Borhidi 1963. In the top areas, in extreme climate conditions, it can be found the *Lonicero borbasianae-Pinetum mugi* (Ht. 1938) Borhidi 1963 community, followed by the *Aremonio-Piceetum* Ht. 1938 in the continental side, and large complexes of the *Fago-Abietetum* (Ht. 1938) Tregubov 1941, corr. Trinajstić 2007 community (Horvat, 1937, 1953; Horvat et al. 1974). In the Velebit area, it can be seen an interesting and characteristic inversion of vegetation belts caused by micro-climate conditions prevailing in the dolinas and karst fields. Due to the temperature inversion, the bottom parts are much colder than the tops. This is why in the bottom we find forest vegetation, which is otherwise characteristic for much higher elevations.

The National Park "Northern Velebit" is the area of virgin, almost untouched wilderness. The variety of habitats and their frequent change, as well as the harsh climate gave rise to the development of specific flora. The whole Velebit has more than 2000 of vascular plants, out of which around 70 are endemic. The permanent change of forest, bare mountain tops, dolinas grassland and mountain lawns with panoramic sea views gives an incredible variety to the researched area. Most of the existing grassland areas were created by clearing the forests in the past in order to create grasslands for cattle breading and agricultural land.

In spite of many floristic researches (Schlosser & Vukotinović 1869; Rossi 1924, 1930; Hayek 1924-1933; Horvat 1932; Degen 1936-1938; Kušan 1963, 1967, 1972; Forenbacher 1990) the National park "Northern Velebit" is still an insufficiently researched area. Therefore, the aim of the study was to fill in this gap, as a part of the project "Karst Ecosystems Conservation" (KEC-project).

Material and methods

The autochthonous vascular flora (ferns and seed plants) was inventoried in the South-Western area of the National park "Northern Velebit" (Fig. 1) and in the coastal slopes along the park border. Field work were conducted during the vegetation season of 2006. The research was carried out in 34 localities within 235m-1283m of altitude, on approx. 0.25 ha each.

The plants were identified using standard determination keys: Fiori (1923-1929, 1933), Horvatić (1954), Bonnier (1962), Tutin et al. (1964-1980), Horvatić & Trinajstić (1967-1981), Trinajstić (1975-1986), Jávorka and Csapody (1979), Pignatti (1982), and Domac (1994).

The nomenclature was adjusted according to Tutin et al. (1964-1980), Pignatti (1982), Nikolić et al. (1994, 1997, 2000), and Nikolić (2010). Species and subspecies within higher taxonomic categories were listed in the alphabetical order.

The analysis of life forms was made according to Pignatti (1982). In the check list, they are marked with the abbreviations of life forms: Chamaephyta – ch, Geophyta – g, Hemikryptophyta – h, Phanerophyta – p, and Therophyta – t.

The system of floristic elements is done according to Horvatić (1963) and Pignatti (1982). The following abbreviations are used to designate the species and subspecies to a specific floristic element:

1. MEDITERRANEAN FLORISTIC ELEMENT
   - 1.1. Circum-Mediterranean plants – circummedit
   - 1.2. Illyrian Mediterranean plants
     - 1.2.1. Illyrian South European plants – ise
     - 1.2.2. Illyrian-Adriatic plants
       - 1.2.2.1. Illyrian-Adriatic endemic plants - iae
       - 1.2.2.2. Illyrian-Apenine plants - ilap
   - 1.3. Mediterranean-Atlantic plants – ma
   - 1.4. European Mediterranean plants – eumed
   - 1.5. Mediterranean-Pontic plants – mp
   - 1.6. Stenomediterranean plants – sm
2. SOUTH EUROPEAN FLORISTIC ELEMENT
   - 2.1. South European-Mediterranean plants – seum
   - 2.2. South European-Pontic plants – seup
   - 2.3. South European-Atlantic plants – seua
3. CENTRAL EUROPEAN FLORISTIC ELEMENT – eu
4. EUROASIAN FLORISTIC ELEMENT – euroas
5. WIDESPREAD PLANTS – wsp

Threatened plants were analysed according to the Flora Croatica Red Book (2010) and Nikolić & Topić (2005). The following abbreviations were used: *Endangered* – EN, *Last Concern* – LC, *Near Threatened* – NT, *Vulnerable* – VU. The analysis of the endemic species was made according to Nikolić (1994, 1997, 2000).

Figure 1. The area of the National Park "Northern Velebit" with the researched localities

Results and discussion

A total of 241 taxa were found in the South-Western area of the National park "Northern Velebit" (Tab. 1). The results of the taxonomical and ecological analysis are presented in Tab. 1 and Fig. 1, 2.

The vascular flora included 58 families, 158 genera, 216 species and 25 subspecies. According to the number of taxa, dicots are dominant with 200 taxa, followed by the monocots with 30 taxa, while the gymnosperms have eight taxa, and the ferns have three taxa. Most of the 58 families belong to angiosperms (51 dicots, four monocots), followed by two gymnosperm families and one fern family.

The most dominant families are *Fabaceae* with 33 taxa, *Asteraceae*, *Lamiaceae* and *Rosaceae* with 18 taxa, *Poaceae* and *Liliaceae* with 12 taxa, *Brassicaceae* with 10, and *Apiaceae* and *Ranunculaceae* with nine taxa each. All the other families were represented by one or a small number of taxa.

Phytogeographical analysis (Fig. 2) has shown that majority of the species of the total number belong to the Euroasian floristic (horological) element (46.1%). The reason for this is the fact that the researched localities are mostly located in the area of inland vegetation belonging to Eurosiberian vegetation region. On the other hand, a relatively high proportion of the Mediterranean floristic element (23.2%) shows the great influence of the Mediterranean climate at the localities on the coastal slopes of the Northern Velebit (Horvatić, 1963).

According to the spectrum of life forms, the most numerous life forms are hemicryptophytes (46.9%), followed by phanerophytes (18.3%), and the almost equal representation of geophytes (12.4%) and chamaephytes (12.0%), and the smallest share of therophytes (10.0%), which is still quite high (Fig. 3). Domination of hemicryptophytes corresponds to the climate of the researched area – moderate climatic zone (Pavletić, 1979).

In the research area of the National park "Northern Velebit", we determined 13 taxa (5.4%) included in the Red Book of the Vascular Flora of Croatia (Tab. 1). The endangered taxa (EN) *Dactylorhiza incarnata* were found at one locality only, while it had been quoted previously in Croatia by: Degen (1936-1938), Schlosser & Vukotinović (1869), as well as Vrbek & Fiedler (1998). Furthermore, our study contains five vulnerable taxa (VU) (Tab. 1). The vulnerable taxa *Fritillaria messanensis* subsp. *gracilis* were also found, and it had been quoted previously by: Degen (1936-1938), Forenbacher (1990), Kamenjarin (1996), Kranjčev (1997), Kušan (1969), Radić (1976), Rossi (1924, 1930), Šilić (1984), Šolić (1983) and Trinajstić (1970, 1985).

We also established the presence of the following endemic taxa: *Aurinia sinuata, Iris illyrica* and *Peltaria alliacea*.

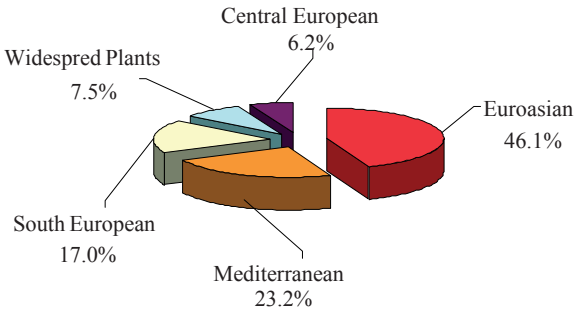

Figure 2. Spectrum of floristic elements

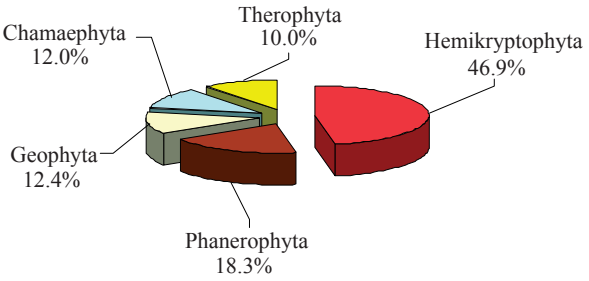

Figure 3. Spectrum of life forms

Conclusion

241 vascular plant taxa (216 species and 25 subspecies) were recorded in the South-Western area of the National park "Northern Velebit" and the coastal slopes along the park border.

The most dominant families are *Fabaceae* with 33 taxa, *Asteraceae*, *Lamiaceae* and *Rosaceae* with 18 taxa, while the other families were represented by a fewer number of taxa. According to phytogeographical analysis, most plants belong to the Euroasian floristic element (46.1%), followed by the Mediterranean floristic

Table 1. List of taxa

Taxa	Life forms	Floristic elements	Threat categories
PTERIDOPHYTA			
Filicopsida			
Aspleniaceae:			
Asplenium ceterach L.	h	seum	
Asplenium ruta-muraria L.	h	euroas	
Asplenium trichomanes L.	h	wsp	
SPERMATOPHYTA			
GYMNOSPERMAE			
Coniferopsida			
Cupressaceae:			
Juniperus communis L.	p	euroas	
Juniperus communis L. subsp. *alpina* (Smith) Čelakovsky	p	euroas	
Juniperus oxycedrus L.	p	circummedit	
Juniperus phoenicea L.	p	circummedit	
Juniperus sabina L.	p	euroas	
Pinaceae:			
Abies alba Mill.	p	eu	
Pinus mugo Turra	p	euroas	
Pinus nigra J.F.Arnold	p	seum	
ANGIOSPERMAE			
Dicotyledones			
Aceraceae:			
Acer campestre L.	p	euroas	
Acer monspessulanum L.	p	seum	
Acer obtusatum Waldst. & Kit. ex Willd.	p	seup	
Acer platanoides L.	p	euroas	
Acer pseudoplatanus L.	p	euroas	
Anacardiaceae:			
Cotinus coggygria Scop.	p	seup	
Pistacia terebinthus L.	p	circummedit	
Apiaceae:			
Anthriscus sylvestris (L.) Hoffm.	h	euroas	
Daucus carota L.	t	euroas	
Eryngium amethystinum L.	h	ise	
Foeniculum vulgare Mill.	h	circummedit	
Hacquetia epipactis (Scop.) DC.	h	euroas	
Trinia glauca (L.) Dumort.	h	euroas	
Peucedanum austriacum (Jacq.) Koch	h	euroas	
Seseli montanum L. subsp. *tommasinii* (Rchb.f.) Arcang.	h	ise	
Smyrnium perfoliatum L.	h	circummedit	
Araliaceae:			
Hedera helix L.	p	ma	
Aristolochiaceae:			
Asarum europaeum L.	h	euroas	
Asclepiadaceae:			
Vincetoxicum hirundinaria Medik.	h	euroas	
Asteraceae:			
Achillea millefolium L.	h	euroas	
Antennaria dioica (L.) Gaertn.	ch	euroas	
Aposeris foetida (L.) Less.	h	eu	
Artemisia absinthium L.	ch	eumed	
Carduus acanthoides L.	h	euroas	
Cyanus triumfetti (All.) Á. Löwe	h	euroas	
Cyanus triumfetti (All.) subsp. *strictus* (Waldst. & Kit.) Dostál	h	euroas	
Cirsium eriophorum (L.) Scop.	h	eu	
Helichrysum italicum (Roth) G.Don	ch	eumed	
Hieracium murorum L.	h	euroas	
Hieracium villosum Jacq.	h	seup	
Inula verbascifolia (Willd.) Hausskn.	ch	ise	
Leontodon hispidus L.	h	eu	
Leucanthemum atratum aggr.	h	ilap	
Leucanthemum visianii (Gjurašin) Vogt et Greuter	h	euroas	
Leucanthemum vulgare (Vaill.) Lam.	h	euroas	
Taraxacum sect. *Ruderalia* Kirchner et. al.	h	euroas	
Taraxacum sect. *Erythrosperma* Dahlst.	h	seum	
Boraginaceae:			
Echium vulgare L.	h	circummedit	
Lithospermum officinale L.	h	euroas	
Myosotis arvensis (L.) Hill	t	euroas	
Symphytum tuberosum L.	g	seup	
Brassicaceae:			
Aethionema saxatile (L.) R. Br. subsp. *saxatile*	h	seum	
Alliaria petiolata (M.Bieb.) Cavara & Grande	h	euroas	
Arabis nova Vill.	t	seum	
Arabis turrita L.	h	euroas	
Aurinia sinuata (L.) Griseb.	ch	iae	
Biscutella laevigata L. subsp. *laevigata*	h	seum	
Cardamine enneaphyllos (L.) Crantz	g	euroas	
Diplotaxis tenuifolia (L.) DC.	h	seua	
Peltaria alliacea Jacq.	h	euroas	NT
Thlaspi praecox Wulfen subsp. *praecox*	h	seum	
Campanulaceae:			
Phyteuma orbiculare L.	h	seup	
Caprifoliaceae:			
Viburnum lantana L.	p	seup	
Caryophyllaceae:			
Arenaria serpyllifolia L.	t	wsp	
Minuartia verna (L.) Hiern	ch	euroas	
Moehringia muscosa L.	h	eu	
Silene alba (Mill.) E.H.L.Krause	h	seum	
Silene vulgaris (Moench) Garcke	h	seum	
Celastraceae:			
Euonymus verrucosus Scop.	p	seup	
Cistaceae:			
Fumana procumbens (Dunal) Gren. et Godr.	ch	mp	
Helianthemum nummularium aggr.	ch	euroas	
Convolvulaceae:			
Convolvulus arvensis L.	g	euroas	
Cuscuta europaea L.	t	euroas	
Cornaceae:			
Cornus mas L.	p	euroas	
Corylaceae:			
Ostrya carpinifolia Scop.	p	euroas	
Crassulaceae:			
Sedum sexangulare L.	ch	eu	
Dipsacaceae:			
Knautia arvensis (L.) Coult.	h	euroas	
Scabiosa columbaria L.	h	euroas	
Euphorbiaceae:			
Euphorbia characias L. subsp. *wulfenii* (Hoppe ex W.D.J.Koch)	ch	iae	
Euphorbia fragifera L.	ch	iae	
Mercurialis ovata Sternb. & Hoppe	g	euroas	
Fabaceae:			
Anthyllis vulneraria L. subsp. *alpestris* (Kit. ex Schult)	h	eumed	
Astragalus cicer L.	h	euroas	
Chamaecytisus hirsutus (L.) Link	ch	euroas	
Colutea arborescens L.	p	eumed	
Coronilla emerus L. subsp. *emeroides* (Boiss. & Spruner)	p	mp	
Coronilla scorpioides (L.) W.D.J.Koch	t	eumed	
Coronilla vaginalis Lam.	ch	euroas	
Dorycnium pentaphyllum Scop. subsp. *germanicum* (Gremli) Gams	h	euroas	
Genista januensis Viv.	ch	seum	
Genista sylvestris Scop.	ch	iae	
Genista tinctoria L.	ch	euroas	
Hippocrepis comosa L.	ch	seum	
Laburnum alpinum (Mill.) Bercht. & J.Presl	p	seum	
Lathyrus aphaca L.	t	seum	
Lathyrus latifolius L.	h	euroas	
Lathyrus pannonicus (Jacq.) Garcke	g	euroas	
Lathyrus pratensis L.	h	euroas	

Lathyrus sativus L.	t	wsp	
Lathyrus vernus (L.) Bernhardt	g	euroas	
Lotus corniculatus L. subsp. *corniculatus*	h	wsp	
Lotus corniculatus L. subsp. *hirsutus* Rothm.	h	wsp	
Medicago lupulina L.	t	euroas	
Medicago sativa L.	h	euroas	
Trifolium alpestre L.	h	euroas	
Trifolium incarnatum L.	t	eumed	
Trifolium montanum L.	h	seup	
Trifolium pratense L.	h	euroas	
Trifolium repens L.	h	wsp	
Trifolium rubens L.	h	eu	
Vicia cracca L.	h	euroas	
Vicia sativa L.	t	wsp	
Vicia sepium L.	h	euroas	
Vicia villosa Roth	t	eumed	
Fagaceae:			
Fagus sylvatica L.	p	euroas	
Quercus pubescens Willd.	p	eu	
Gentianaceae:			
Gentiana verna L. subsp. *tergestina* (Beck) Hayek	h	euroas	
Gentianella anisodonta (Borbás) Á. & D. Löve	t	ilap	
Geraniaceae:			
Erodium cicutarium (L.) L'Hér.	t	wsp	
Geranium columbinum L.	t	euroas	
Geranium macrorrhizum L.	g	seum	
Geranium purpureum Vill.	t	seum	
Geranium robertianum L.	t	wsp	
Geranium sanguineum L.	h	euroas	
Globulariaceae:			
Globularia cordifolia L. subsp. *cordifolia*	ch	ilap	
Globularia cordifolia L. subsp. *bellidifolia* (Ten.) Wettst.	ch	ilap	
Globularia punctata Lapeyr.	h	euroas	
Guttiferae:			
Hypericum perforatum L.	h	sm	
Lamiaceae:			
Acinos arvensis (Lam.) Dandy	t	euroas	
Ajuga genevensis L.	h	euroas	
Lamiastrum galeobdolon (L.) Ehrend. & Polatschek	h	euroas	
Lamium maculatum L.	h	euroas	
Lamium orvala L.	h	seum	
Lamium purpureum L.	t	euroas	
Melittis melissophyllum L.	h	eu	
Melittis melissophyllum L. subsp. *melissophyllum*	h	eu	
Mentha longifolia (L.) Huds.	h	euroas	
Origanum vulgare L.	h	euroas	
Salvia officinalis L.	ch	eumed	
Salvia pratensis L.	ch	eumed	
Satureja montana L.	ch	seum	
Teucrium chamaedrys L.	ch	seup	
Teucrium flavum L. *subsp. flavum*	ch	sm	
Teucrium polium L. subsp. *capitatum* (L.) Arcang.	ch	mp	
Thymus longicaulis C.Presl	ch	ilap	
Thymus pulegioides L.	t	euroas	
Linaceae:			
Linum alpinum Jacq. subsp. *julicum* (Hayek) Hegi	h	seum	
Linum narbonense L.	h	circummedit	
Moraceae:			
Ficus carica L.	p	circummedit	
Oleaceae:			
Fraxinus excelsior L.	p	euroas	
Fraxinus ornus L.	p	mp	
Orobanchaceae:			
Orobanche gracilis Sm.	t	seum	
Papaveraceae:			
Pseudofumaria alba (Mill.) Lidén subsp. *alba*	h	ilap	
Plantaginaceae:			
Plantago argentea Chaix	h	seum	
Plantago lanceolata L.	h	wsp	
Plantago media L.	h	euroas	
Polygalaceae:			
Polygala comosa Schkuhr	h	euroas	
Polygala vulgaris L.	h	euroas	
Primulaceae:			
Primula veris L. subsp. *columnae* (Ten.) Lüdi	h	eumed	NT
Ranunculaceae:			
Anemone nemorosa L.	g	euroas	
Anemone ranunculoides L.	g	euroas	
Aquilegia nigricans Baumg.	h	euroas	
Clematis vitalba L.	p	euroas	
Isopyrum thalictroides L.	g	euroas	
Ranunculus platanifolius L.	h	eu	
Ranunculus acris L.	h	wsp	
Ranunculus bulbosus L.	h	euroas	
Ranunculus ficaria L.	g	eu	
Rhamnaceae:			
Frangula rupestris (Scop.) Schur	p	ise	
Paliurus spina-christi Mill.	p	ise	
Rosaceae:			
Agrimonia eupatoria L.	h	euroas	
Amelanchier ovalis Medik.	p	eumed	
Crataegus laevigata (Poir.) DC.	p	euroas	
Crataegus monogyna Jacq. subsp. *monogyna*	p	euroas	
Filipendula vulgaris Moench	h	euroas	
Fragaria vesca L.	h	euroas	
Geum urbanum L.	h	euroas	
Potentilla australis Krašan	h	iae	
Potentilla recta L.	h	mp	
Prunus avium L.	p	mp	
Prunus cerasus L.	p	mp	
Prunus mahaleb L.	p	seup	
Prunus spinosa L.	p	euroas	
Rosa canina L.	p	wsp	
Rosa pimpinellifolia L.	p	euroas	
Rubus plicatus Weihe & Nees	h	euroas	
Sanguisorba minor Scop.	h	euroas	
Sorbus aria (L.) Crantz	p	euroas	
Rubiaceae:			
Galium lucidum All.	h	seum	
Galium odoratum (L.) Scop.	g	euroas	
Galium sylvaticum L.	h	euroas	
Galium verum L.	h	euroas	
Rutaceae:			
Ruta graveolens L.	ch	eumed	
Dictamnus albus L.	ch	euroas	
Santalaceae:			
Thesium divaricatum Jan ex Mert. & W.D.J.Koch	h	circummedit	
Saxifragaceae:			
Saxifraga rotundifolia L. subsp. *rotundifolia*	h	euroas	LC
Scrophulariaceae:			
Cymbalaria muralis P.Gaertn., B.Mey. & Scherb. subsp. *muralis*	h	wsp	LC
Veronica austriaca L. subsp. *austriaca*	h	euroas	
Veronica austriaca L. subsp. *jacquinii* (Baumg.) Eb.Fisch.	h	euroas	
Veronica chamaedrys L.	h	euroas	
Solanaceae:			
Datura stramonium L.	t	wsp	
Thymelaeaceae:			
Daphne alpina L.	ch	euroas	
Tiliaceae:			
Tilia platyphyllos Scop.	p	euroas	

Ulmaceae:			
Ulmus minor Miller	p	euroas	
Urticaceae:			
Urtica dioica L.	h	wsp	
Valerianaceae:			
Valeriana officinalis L.	h	eu	
Violaceae:			
Viola arvensis Murray	t	euroas	
Viola reichenbachiana Jord. ex Boreau	h	euroas	
Viola tricolor L.	t	euroas	
Vitaceae:			
Vitis vinifera L. subsp. *sylvestris* (C. C. Gmelin) Hegi	p	wsp	
Monocotyledones			
Iridaceae:			
Iris graminea L.	g	euroas	
Iris illyrica Tomm.	g	ilap	LC
Liliaceae:			
Asparagus acutifolius L.	g	circummedit	
Asparagus tenuifolius Lam.	g	seum	NT
Convallaria majalis L.	g	euroas	
Fritillaria messanensis Raf. subsp. *gracilis* (Ebel) Rix	g	eumed	VU
Lilium bulbiferum L.	g	seum	VU
Lilium carniolicum Bernh. ex W.D.J.Koch	g	seum	VU
Muscari botryoides (L.) Mill.	g	eumed	
Muscari comosum (L.) Mill.	g	seum	
Ornithogalum collinum Guss.	g	ilap	
Ornithogalum umbellatum L.	g	seum	
Polygonatum multiflorum (L.) All.	g	euroas	
Smilax aspera L.	g	circummedit	
Orchidaceae:			
Dactylorhiza incarnata (L.) Soó	g	euroas	EN
Ophris scolopax Cav. subsp. *cornuta* (Steven) Camus	g	eumed	
Orchis purpurea Huds.	g	euroas	VU
Orchis tridentata Scop.	g	eumed	VU
Poaceae:			
Arrhenatherum elatius (L.) J. Presl & C. Presl	h	eu	
Briza media L.	h	euroas	
Bromus erectus Huds.	h	seum	
Bromus erectus Huds. var. *hackelii* Borbás	h	euroas	
Bromus sterilis L.	t	eumed	
Dactylis glomerata L.	h	wsp	
Festuca valesiaca Gaudin	h	seup	
Koeleria lobata (M. Bieb) Roem & Schult.	h	seum	
Melica ciliata L. subsp. *ciliata*	h	eumed	LC
Poa angustifolia L.	h	euroas	
Poa bulbosa L. subsp. *bulbosa*	h	wsp	
Poa pratensis L.	h	euroas	

element (23.2%). The analysis of the life forms showed the highest number of hemicryptophytes (46.9%), and the relatively high presence of phanerophytes (18.3%). Out of the total number of the found taxa, there were 13 endangered and 34 endemic taxa.

Our study pointed out the high level of plant diversity and floristic importance of the area of the National Park "Northern Velebit".

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