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A contribution to the vascular flora of the Pelješac Peninsula (southern Croatia)

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The Pelješac Peninsula (355 km^2) is located in the south-eastern part of the Croatian Adriatic coast and characterised by considerable variations in types of vegetation. As a result of intensive floristic and vegetational research on the Pelješac Peninsula between 1994 and 1999, 64 hitherto unrecorded taxa were identified. A further 43 were identified from existing specimens in the Herbarium of the Lokrum Botanic Garden. The total number of new taxa for this area is thus 107, which brings the total number of vascular flora species for it to more than 1100.

Key words: flora, Pelješac, Croatia

Introduction

Pelješac is the second largest Croatian peninsula (Fig. 1.). It is 67 km long, 7.8 km wide at its widest point, and covers an area of 355 km^2. The total length of its coastline is 221.7 km. The highest mountain peaks of the peninsula (Sv. Ilija – 961 m, Rota – 713 m, Čučin – 616 m, Čarović – 631 m and others) are aligned in the same northwest to southeast direction as the Dinarid mountain ranges of the mainland. Pelješac is a part of the Karst area. The rock strata mostly consist of highly permeable Jurassic, Cretaceous and Palaeogenic limestones. Dolomites occur less often, and are mostly found in the region between Ston and Ponikve, and in the central part of the peninsula in the area around the villages Pijavičino and Kuna, also northwest of Potomje. In some places, most commonly along the coast (Orebić), isolated flysch rocks can be found (KOCH 1932). Mediterranean limestone soils developed on this underlying geology (ŠKORIĆ 1977).

Pelješac has a typical Mediterranean climate (BERTOVIĆ 1975). For local meteorological information we used data from the Kuna meteorological station (Croatian Meteorological and Hydrological Service, 1981–1994, unpublished data), located in the interior of the central area of the peninsula. The annual average air temperature is 13.4 °C and the total an-

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nual precipitation amounts to 1096 mm. The largest amounts of precipitation occur in October and December.

The lowest monthly average temperature of 5.3 °C was recorded in February and the absolute minimum of –9.0 °C in January. Air temperatures of 25 °C or more occur on more than 100 days per year. There are 108 rainy days per year. The annual average humidity is 71%. A dry northerly wind called the bora directly influences the relative humidity in the area.

The whole of the area surveyed belongs to the Mediterranean phytogeographical region but can be divided into two distinct climatic belts: Mediterranean-littoral and Mediterranean-mountainous (TRINAJSTIĆ 1995). A specific xerothermic evergreen vegetation pertaining to the *Querco ilicis-Pinetum halepensis* and *Junipero phoeniceae-Pinetum halepensis* (alliance *Oleo-Ceratonion*) associations is found in restricted areas, mainly in the south-western part of the peninsula. Vegetation of Pelješac mostly consists of thermophilic evergreen forests of holm oak (ass. *Fraxino orni-Quercetum ilicis* and *Ostryo-Quercetum ilicis*) and of degraded forms such as *garrigue* (e.g. ass. *Erico-Cistetum cretici*). Kermes oak forests (ass. *Fraxino orni-Quercetum cocciferae*) grow only in a few places (Orebić, Potomje) in restricted areas. Mediterranean forests of Dalmatian black pine (*Pinus nigra* subsp. *dalmatica*, ass. *Querco ilicis-Pinetum dalmaticae* and *Erico manipuliflorae-Pinetum dalmaticae*) grow within the Hemi-Mediterranean vegetation zone.

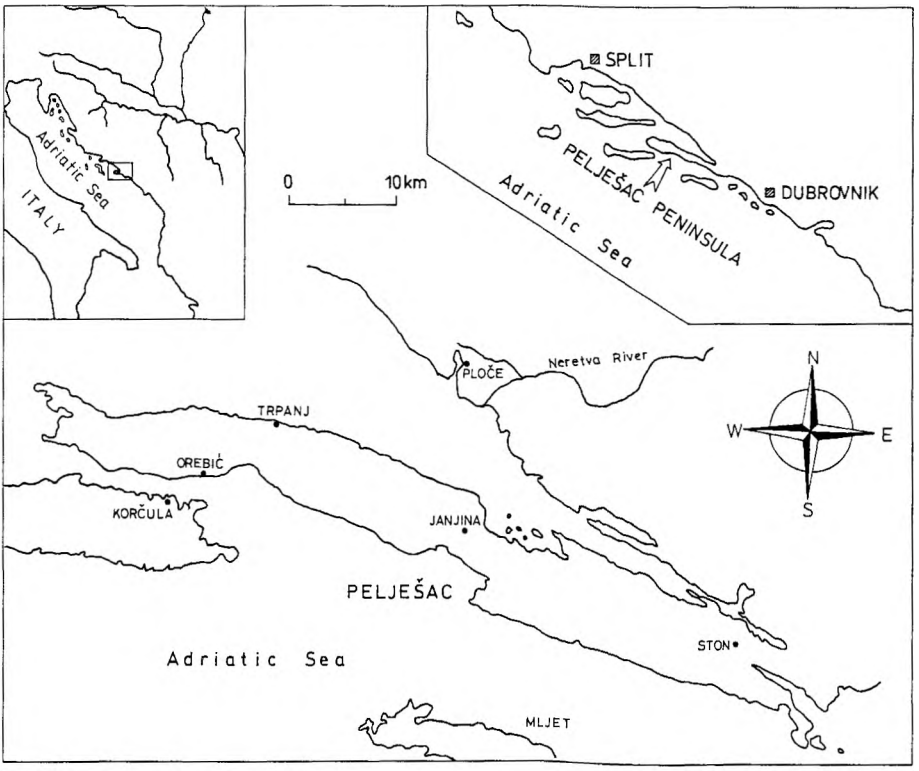

Fig. 1. The position of the area investigated.

The earliest data on the flora of Pelješac peninsula can be found in the classical works of VISIANI (1842–1852, 1872–1881). Since then, the flora of Pelješac has been studied, especially during the last 40 years, by many authors – all of them stated in previous papers (JASPRICA and KOVAČIĆ 1997a, b). Between 1994 and 1999 the authors of this paper have found a number of taxa not previously recorded in the area. They are published here for the first time.

Materials and methods

Families, genera, species and lower system units are listed in alphabetical order and organised according to higher system units.

Nomenclature has been adjusted to »Flora d' Italia« (PIGNATTI 1982). In some cases works such as »Flora Europaea« (TUTIN and HEYWOOD 1964–1980, noted »FE«) and »Liste der Gefäßpflanzen Mitteleuropas« (EHRENDORFER 1973, noted »E«) have been used.

Herbarium specimens collected on the Pelješac Peninsula by Dr. Lav Rajevski in the early 1960s were also studied. These specimens are kept in the Herbarium of the Lokrum Botanic Garden and are noted as »HbL« in this paper.

Species which have escaped from cultivation are noted with an asterisk (*).

Results

Floristic list

PTERIDOPHYTA

SPHENOPSIDA

Equisetaceae

Equisetum ramosissimum Desf. – Ston (HbL)

SPERMATOPHYTA

ANGIOSPERMAE

MAGNOLIATAE

Acanthaceae

Acanthus spinosus L. – Drače (FE)

Aceraceae

Acer negundo L. – *, Janjina

Aizoaceae

Carpobrotus acinaciformis (L.) L. Bolus – *, Orebić

C. edulis (L.) N. E. Br. – *, Orebić

Apiaceae

Ammoides pussila (Brot.) Breistr. – Trpanj, Janjina (HbL)

Bifora radians Bieb. – Zmijsko brdo

Daucus carota L. subsp. *hispanicus* (Gouan) Thell. – Lovište (HbL, FE)
Ferula communis L. – Putniković

Aristolochiaceae
Aristolochia rotunda L. – Ston (HbL)

Asclepiadaceae
Cynanchum acutum L. – Žuljana, Drače (HbL)

Asteraceae
Achillea nobilis L. – Pijavičino, Dingač (HbL)
Anthemis austriaca Jacq. – Janjina (HbL)
Artemisia coerulescens L. – Ston, Drače (HbL)
Aster squamatus (Sprengel) Hieron. – Ston
tripolium L. – Ston (HbL)
Bidens subalternans DC. – Janjina (FE)
Bombycilaena erecta (L.) Smoljan. – Sv. Ilija (FE)
Calendula officinalis L. – *, Janjina
Carthamus lanatus L. – Ston, Mali Ston (HbL)
Filago germanica L. var. *lanuginosus* (Duby) DC. – Ston, Mali Ston
Phagnalon rupestre (L.) DC. – Trstenik
Picnomon acarna (L.) Cass. – Janjina
Xanthium spinosum L. – Drače

Boraginaceae
Anchusa arvensis (L.) Bieb. – Sreser
Buglossoides purpurocaerulea (L.) I. M. Johnston – Pijavičino
Myosotis arvensis (L.) Hill. – Ston (HbL)

Brassicaceae
Alliaria petiolata (Bieb.) Cavara et Grande – Duba Trpanjska
Arabis turrita L. – Ston
Berteroa incana (L.) DC. – Donja Banda
Diplotaxis viminea (L.) DC. – Drače (HbL)
Erysimum cheiri (L.) Crantz. – *, Janjina
Matthiola sinuata (L.) R. Br. – Ston, Prapratno (HbL)

Cactaceae
Opuntia ficus-indica (L.) Miller – *, Janjina

Caryophyllaceae
Herniaria hirsuta L. – Žuljana (HbL)
Silene conica L. – Ston (HbL)
S. sedoides Poiret – Drače

Chenopodiaceae
Arthrocnemum glaucum (Delile) Ung.-Sternb. – Drače, Lovište, Mali Ston (HbL)
Atriplex patula L. – Ston (HbL)

Cichoriaceae

Cichorium endivia L. – *, Ponikve
Crepis rhoeadifolia Bieb. – Ston (HbL)
Lactuca sativa L. – *, Janjina
Podospermum laciniatum (L.) DC. – Ston (HbL)
Sonchus maritimus L. – Ston, Žuljana, Drače (HbL)

Cistaceae

Helianthemum salicifolium (L.) Miller – Prizrina

Convolvulaceae

Calystegia sylvatica (Kit.) Griseb. – Ston (HbL)

Dipsacaceae

Scabiosa columbaria L. – Ston (HbL)

Euphorbiaceae

Euphorbia falcata L. – Ston (HbL)
E. maculata L. – Ston
E. peplis L.- Pržina
E. taurinensis All. (incl. *E. graeca* Boiss. et Spruner) – Ston (HbL, FE)

Fabaceae

Anthyllis barba-jovis L. – Prezdi Cape, near Žuljana (HbL)
Glycyrrhiza echinata L. – Drače (HbL)
Lathyrus latifolius L. – Janjina
Lotus tenuis W. et K. – Ston (HbL)
Medicago orbicularis (L.) Bartal. – Ston (HbL)
Trifolium fragiferum L. – Ston (HbL)
V. sativa L. subsp. *cordata* (Wulfen) Asch. et Gr. – Ston (HbL)

Gentianaceae

Centaurium spicatum (L.) Fritsch – Ston, Stinjevac (HbL)

Lamiaceae

Ajuga reptans L. – Ston (HbL)
Leonurus marrubiastrum L. – Ston (HbL)
Lycopus europaeus L. – Žuljana (HbL)
Nepeta cataria L. – Ston (HbL)
Salvia sclarea L. – Janjina
S. verticillata L. – Ston (HbL)
Sideritis romana L. subsp. *purpurea* (Talbot ex Bentham) Heywood – Trpanj (HbL, FE)

Linaceae

Linum strictum L. subsp. *corymbulosum* (Rchb.) Rouy – Ston (HbL)
L. trigynum L. – Trpanj (HbL)

Loranthaceae
Arceuthobium oxycedri (DC.) Bieb. – Pijavičino

Malvaceae
Abutilon theophrasti Medicus – Drače
Althea cannabina L. – Ston (HbL)
A. hirsuta L.- Putniković

Nyctaginaceae
Mirabilis jalapa L. – *, Janjina

Oleaceae
Jasminum nudiflorum Lindley – *, Janjina (FE)

Onagraceae
Epilobium parviflorum Schreber – Ston (HbL)

Papaveraceae
Chelidonium majus L.- Duba Trpanjska

Phytolaccaceae
Phytolacca americana L. – *, Sreser

Polygonaceae
Polygonum lapathifolium L. – Ston (HbL)

Ranunculaceae
Clematis viticella L. – Ston
Consolida regalis S. F. Gray subsp. *regalis* – Pijavičino, Dingač (HbL)

Rosaceae
Filipendula vulgaris Moench – Zmijsko brdo
Pyracantha coccinea M. J. Roemer – *, Ston

Rutaceae
Haplophyllum patavinum (L.) Don. f. – Pijavičino

Salicaceae
Salix alba L. – Ston

Scrophulariaceae
Chaenorhinum minus (L.) Lange – Trpanj (HbL)
Kickxia spuria (L.) Dumort. – Janjina
Linaria chalepensis (L.) Miller – Ston
Verbascum densiflorum Bertol. – Zamaslina
V. thapsus L. – Dingač (HbL)
Veronica anagalis-aquatica L. – Ston

Solanaceae
Datura inoxia Miller – Mali Ston

Tropaeolaceae
Tropaeolum majus L. – *, Ston

Ulmaceae
Ulmus laevis Pallas – Ston

LILIATAE

Cyperaceae
Carex distans L. – Drače
C. extensa Good. – Mali Ston
C. illegitima Cesati – Lovište
Cyperus longus L. – Ston
Schoenoplectus littoralis (Schrader) Palla – Ston

Iridaceae
Iris pseudacorus L. – Ston

Liliaceae
Allium dalmaticum Kern. – Trpanj (HbL, E)

Orchidaceae
Orchis coriophora L.- Tabor, Pijavičino
O. romana Sebast. et Mauri – Zmijsko brdo

Poaceae
Aegilops geniculata Roth. – Janjina
Bromus condensatus Hackel – Zmijsko brdo
Echinaria capitata (L.) Desf. – Janjina
Festuca ovina L. – Zmijsko brdo
Imperata cylindrica (L.) Beauv. – Kučište
Paspalum paspaloides (Michx.) Scribner – Ston (HbL)
Sesleria robusta Schott, Nyman et Kotschy – Orebić (FE)

Discussion

As a result of intensive floristic and vegetational research on the Pelješac Peninsula between 1994 and 1999, 64 unrecorded taxa were identified. A further 43 were identified from existing specimens in the Herbarium of Lokrum Botanic Garden. The total number of new taxa for this area is thus 107. This number also includes plants which have escaped from cultivation and can be found at various ruderal locations. Plants in cultivation in parks and gardens are not included; these will be the subject of a separate paper.

Some of the noted species belong to the group of rare and vulnerable species of Croatian flora (for example *Anthyllis barba-jovis* L., *Orchis coriophora* L.) and are included in the »Red Book of Plant Species of the Republic of Croatia« (ŠUGAR 1994). The finding of

Datura inoxia Miller is very interesting – it is an *Ergasiophygophyta,* which was discovered during the past decade not only at number of locations along the Adriatic coast, but within the continental climate area as well (cf. PANDŽA and STANČIĆ 1999). Amongst the group of plants that are constituents of a few wetland communities (*Iris pseudacorus* L., *Schoenoplectus littoralis* (Schrader) Palla) we should emphasise a newcomer from the tropical parts of America, *Paspalum paspaloides* (Michx.) Scribner, registered for the first time in the delta of the river Neretva (HORVATIĆ 1949).

References in the existing literature to individual species found on Pelješac are not wholly consistent and require further checking. Regrettably, not all the species noted by previous researchers could be confirmed, although many have now been confirmed. Likewise, floristic works have often cultivated species included. In the authors' opinion these species should not be included in native plant lists, except those species which were once in cultivation but are now naturalised. Another difficulty derives from authors of earlier papers having followed different reference literature, with a consequent confusion in taxonomic nomenclature. As all of this suggests, the exact total number of species on Pelješac peninsula is debatable, but the flora of this area probably does include more than 1100 species and lower system units. Due to its relatively large area, variation in altitude and vegetation types, Pelješac might turn out to be floristically even richer than the current record suggests.

In this presentation of the newly recorded taxa of Pelješac, the isles adjacent to the central stretch of the northern coast of the peninsula (Dubovac, Galičak, Tajan, Gospin škoj etc., with an aggregate surface area of approx. 5 km^2) were not included. It is intended to publish the flora of these isles at a later date.

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