



**Eastern Alpine and Dinaric Society for Vegetation Ecology**  
**Vzhodnoalpsko-dinarsko društvo za proučevanje vegetacije**  
**Istočnoalpsko-dinarsko društvo za istraživanje vegetacije**  
**Ostalpin-dinarische Gesellschaft für Vegetationskunde**  
**Società estalpino-dinarica di Fitosociologia**  
**Shoqata për Hulumtimin e Vegjetacionit të Alpeve Lindore dhe Dinarikeve**

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## **33<sup>rd</sup> International Symposium**

**Eastern Alpine and Dinaric Society for Vegetation Ecology**

# **Programme – Abstracts**

Edited by Ch. EICHBERGER, I. WAWRA, W. R. FRANZ & P. HEISELMAYER

**Pörtschach (Carinthia, Austria)**

**July 2<sup>nd</sup> – July 5<sup>th</sup> 2009**

Organized by Naturwissenschaftlicher Verein für Kärnten in cooperation with the Department of Organismic Biology, Work Group Ecology and Diversity of Plants, University of Salzburg

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# Scientific Programme



## Thursday, July 2<sup>nd</sup> 2009, Hotel Ambassador

- 08.00                      **Registration Commences** (Hotel Ambassador)
- 09.00 – 09.15            **Opening Ceremony**
- Session 1**                      Chairperson: ŠKVORC, Ž. (EICHBERGER, Ch.)
- 09.15 – 09.45            HARTL, H. & STERN, R.:  
*Die Karte der aktuellen Vegetation von Kärnten*
- 09.45 – 10.05            ČARNI, A. et al.:  
*Flora and vegetation of the Macedonian steppe*
- 10.05 – 10.25            KAVGACI, A. et al.:  
*Cedar Forest Communities in Southern Anatolia*
- 10.25 – 11.00            Coffee Break
- Session 2**                      Chairperson: ČARNI, A.
- 11.00 – 11.20            ERSCHBAMER, B., MALLAUN, M. & UNTERLUGGAUER, P.:  
*The summit flora of the Dolomites as an indicator of climate change*
- 11.20 – 11.40            WILLNER, W., DI PIETRO, R. & BERGMEIER, E.:  
*Phytogeographical evidence for refuge areas and post-glacial spread of European beech forest species*
- 11.40 – 12.00            VUKELIĆ, J., BARIČEVIĆ, D. & ŠAPIĆ, I.:  
*Acidophilic forests of sessile oak in northern Croatia*
- 12.00 – 13.30            Lunch
- Session 3**                      Chairperson: ERSCHBAMER, B.
- 13.30 – 13.50            CATORCI, A. et al.:  
*Phytosociological study of Sibillini Mountain National Park (central Italy) beech woods*
- 13.50 – 14.10            VITANZI, A. et al.:  
*Modelling spatial distribution of upper mesotemperate forest syntaxa in Central Apennines using some ecological features*
- 14.10 – 14.45            Coffee Break

**Session 4**                      Chairperson: EICHBERGER, Ch.

14.45 – 15.45                  Poster Presentations

16.00                              **General Assembly**

17.00                              **Introduction to the excursions** (W. R. FRANZ)

**Additional Programme**

19.00                              Ship excursion on the Wörther Lake to Maria Wörth  
Guide: Dr. Wilhelm DEUER



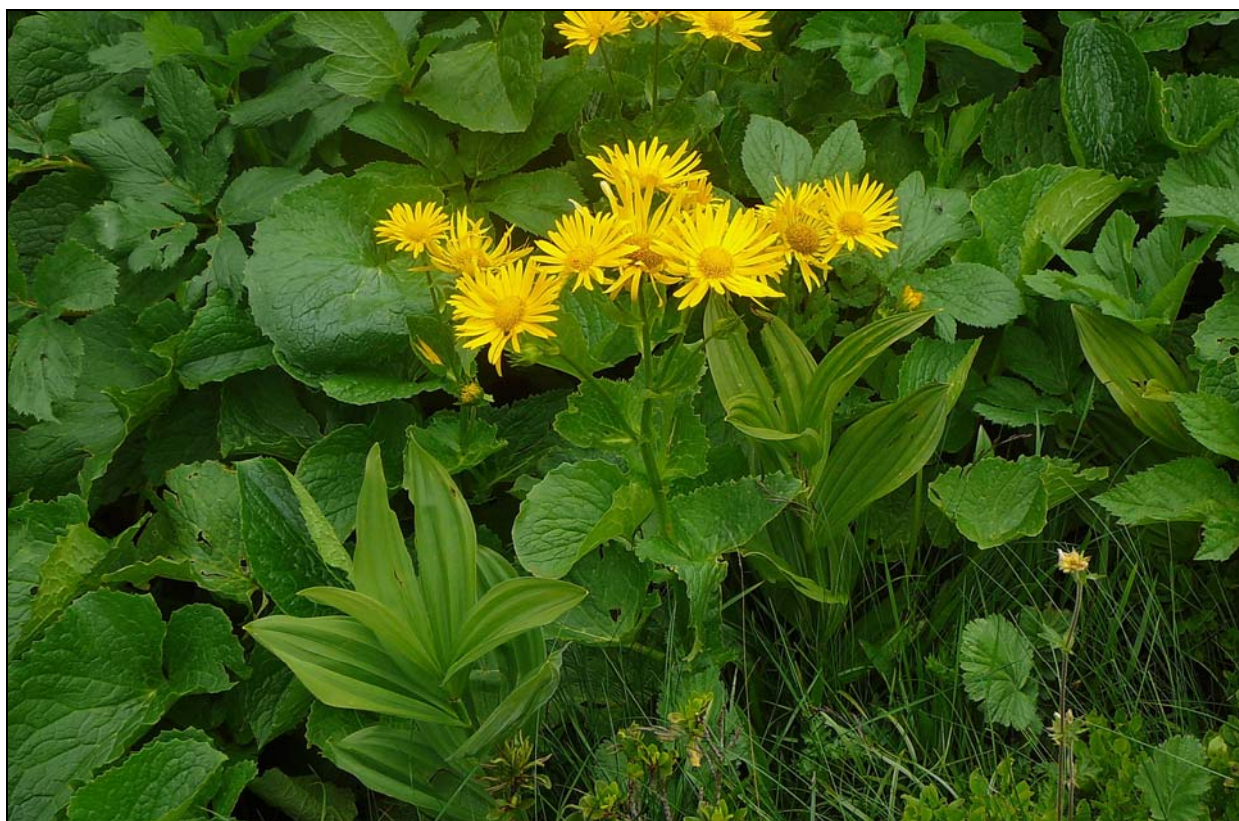
## Friday, July 3<sup>rd</sup> 2009

### One-day Symposium Excursion to **Koralpe**

Guides: Prof. W. R. FRANZ, Ing. Hugo GUTSCHI

The bus departs from Hotel Ambassador at 8.00

Please note, that in the montane to subalpine zone the weather could be wet and cold. Good shoes (mountaineering boots), warm clothing including a rain coat are necessary, staffs are useful.



*Doronicum cataractarum*

Photo: G. Tritthart

## Saturday, July 4<sup>th</sup> 2009

### One-day Symposium Excursion to **Nockberge**

Guide: Prof. W. R. FRANZ

The bus departs from Hotel Ambassador at 8.00

Please note, that in the montane to subalpine zone the weather could be wet and cold. Good shoes (mountaineering boots), warm clothing including a rain coat are necessary, staffs are useful.



Nockberge Eisenthalhöhe

Photo: W. R. Franz

## Sunday, July 5<sup>th</sup> 2009

### Post Symposium Excursion to **Schütt**

Guide: Prof. W. R. FRANZ

Departure with private cars from Hotel Ambassador at 8.00

Please note, that in the montane to subalpine zone the weather could be wet and cold. Good shoes (mountaineering boots), warm clothing including a rain coat are necessary, staffs are useful.



Bergsturzgebiet\_Schütt

Photo: W. R. Franz



# Abstracts



## Flora and vegetation of the Macedonian steppe

Andraž Čarni<sup>1,3</sup>, Mitko Kostadinovski<sup>2</sup>, Petra Košir<sup>1</sup>, Aleksander Marinšek<sup>1</sup>, Vlado Matevski<sup>2</sup>, Andrej Paušič<sup>1</sup>, Urban Šilc<sup>1</sup> & Igor Zelnik<sup>1\*</sup>

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In the central part of Macedonia, in the triangle between Veles, Štip and Negotino, there is a vast area that is different from the rest of the country. The entire area slightly resembles an undulating sea, as its surface is interrupted by numerous ditches, which makes the region almost impassable. Bedrock is composed of Paleogenic, and more rarely Neogenic sediments, among them are sandstones, marl sandstones, clays, sandy clays, carbonates, marls and others. All Paleogenic sediments are of marine origin and therefore extremely salt-rich. In the region erosion is extremely severe; water and frost cause sediment layers to decay into small particles, which are later carried away by water.

The floristic investigations deal with endemic, halophytic, steppe and other rare plant species. There are eight endemic plant species: *Hedysarum macedonicum*, *Astragalus cernjavski*, *Tulipa mariannae*, *Onobrychis megalophylla*, *Ferulago macedonica*, *Heptaptera macedonica*, *Salvia jurisicii* and *Potentilla tridentula*. There appear also some significant steppe (*Astragalus parnassi*, *Morina persica* and *Convolvulus holosericeus*) and halophytic (*Artemisia maritima*, *Artemisia annua*, *Krascheninnikovia ceratoides* and *Camphorosma monspeliaca*) species, as well as numerous other, rare plant species.

The study of vegetation results in a systematic overlook over the vegetation types of the region: weed (*Stellarietea mediae*) and ruderal (*Artemisietea*) communities; communities of salted sites (*Puccinellio-Salicornietea*), dry grasslands and steppe communities (*Festuco-Brometea*), meadows (*Molinio-Arrhenatheretea*), wet communities (*Phragmiti-Magnocaricetea*), riverine forests (*Salicetea purpureae*, *Querco-Fagetea*) and thermophilous scrublands and forests (*Quercetea pubescentis*). There were some descriptions of new syntaxa and nomenclatural corrections proposed, as *Eryngio campestris-Paliurion spinae-christi*, *Jasmini fruticantis-Paliuretum spinae-christi*, *Pistacio terebinthi-Juniperetum oxycedri*, *Carpino orientalis-Quercetum frainetto*, *Salvio verbenacae-Avenetum barbatae*, *Onopodo-Marrubietum peregrini* and *Peganetum harmalae* (cf. MATEVSKI et al. 2008).

### References:

MATEVSKI, V., ČARNI, A., KOSTADINOVSKI, M., KOŠIR, P., ŠILC, U. & ZELNIK, I. 2008: Flora and vegetation of the Macedonian steppe. — Založba ZRC, Ljubljana.

## **Phytosociological study of Sibillini Mountain National Park (Central Italy) beech woods**

Andrea Catorci<sup>1</sup>, Alessandra Vitanzi<sup>2</sup>, Sandro Ballelli<sup>1</sup>, Sabrina Cesaretti<sup>2</sup> & Walter Scapin<sup>2</sup>

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Results of a phytosociological study on the woods on the calcareous bedrock are here presented. The studied area is located in the southern part of Marche Region (central Italy), under the influence of temperate climate (higher mesotemperate and lower/higher supratemperate bioclimatic belts). The vegetation study has been performed through 175 phytosociological relevés. All data were submitted to multivariate statistical analysis. The phytosociological analysis has permitted to characterize 9 associations (Carici digitatae-Ostryetum carpinifoliae, Solidagini-Fagetum sylvaticae luzuletosum sylvaticae, Solidagini-Fagetum sylvaticae aceretosum pseudoplatani, Lathyro veneti-Fagetum sylvaticae lathyretosum veneti, Lathyro veneti-Fagetum sylvaticae hieracietosum murori, Cardamino kitaibelii-Fagetum sylvaticae, Cardamino kitaibelii-Fagetum sylvaticae corallhorizetosum trifidae, Cardamino kitaibelii-Fagetum sylvaticae anemoneretosum nemorosae and Aceretum obtusati-pseudoplatani), whereof 4 news: Lathyro veneti-Fagetum sylvaticae hieracietosum murori, Cardamino kitaibelii-Fagetum sylvaticae corallhorizetosum trifidae and Cardamino kitaibelii-Fagetum sylvaticae anemoneretosum nemorosae.



## **A geobotanical outline on the vegetation of the Lousi valley (Peloponnesos, Greece)**

Christian Eichberger

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The high-lying valley of Lousi in north-western Peloponnesos (Nomos Achaia) is situated approximately 5 km south of the city of Kalavrita. In the northeast the Chelmos Mountains reach 2338 m. On the margins of valley floor, which is situated between 950 to 1000 m four little hamlets are located (Ano Lousi and Kato Lousi in the north, Sigouni, Levki in the south). A city called Lousoi and its sanctuary of Artemis was even known in classical times. Nowadays excavations are carried out by the Austrian Archaeological Institute (leader of the excavations: Dr. Georg Ladstätter). Today one can visit the ruins of the temple of Artemis, in the last years the agora and other parts of the city were investigated (see LADSTÄTTER 2001). Plants like *Laurus nobilis* connected with the goddess Artemis (and with her brother Apollon too) can not be found in the Lousi valley (cf. EICHBERGER et al. 2007).

Within the scope of the recent excavations the present geobotanical survey including a vegetation map was worked out. The valley floor with its fertile loamy soil is traditionally used for cereal cultivation while the slopes, dominated by *Quercus coccifera* L. and therophytes are grazed by sheep and goats. In the north-western part of the valley communities with *Abies cephalonica* J.W. Loudon cover especially north-exposed slopes and can be integrated into the Abietion cephalonicae (cf. BERGMEIER 2002). In the south of the valley, on the old path to Kleitoria deciduous forests of *Quercus frainetto* Ten., an important timber tree, can be found.

### References:

- BERGMEIER, E., 2002: Plant communities and habitat differentiation in the Mediterranean coniferous woodlands of Mt. Parnon (Greece). — *Folia Geobot.* 37(3): 309-332.
- EICHBERGER, Ch., SIGL, M. & RÜHFEL, H., 2007: Trees and Shrubs on Classical Greek Vases. *Bocconeia* 18: 117-130. Palermo.
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- MEILLIEZ, F., FLAMENT, J.M., DE WEVER, P. & FLEURY, J.J., 1978: Γεολογικός Χάρτης τις Ελλάδος: Φύλλο Δάφνι / Geological Map of Greece: Dhafni Sheet. Ινστιτούτον Γεολόγικον και Μεταλλεύτικον Ερεύνων / Institute of Geological and Mining Research, Athens.

## **The summit flora of the Dolomites as an indicator of climate change**

Brigitta Erschbamer, Martin Mallaun & Peter Unterluggauer

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Alpine plant communities are expected to experience serious impacts by the ongoing climate change. One of the predicted consequences is the migration of species from lower altitudes to higher elevations provoking consecutive displacements of alpine and nival plant species. Until present we have scarce empirical evidence of how and how fast diversity decline will happen. The monitoring project GLORIA ([www.gloria.ac.at](http://www.gloria.ac.at)) was established in different mountain regions worldwide in order to study short- and long-term changes. Since 2001 a GLORIA-station exists in the Dolomites (Italy). Here, short-term changes were studied after 5 and 7 years along an altitudinal gradient crossing four summits from the treeline ecotone to the subnival zone. Large scale (summit areas) and small scale patterns (16 x 1m<sup>2</sup> plots per summit) were monitored. After 7 years, the re-visitation of the summit areas revealed a considerable species increase at the upper alpine and subnival zone and relatively modest changes at the lower alpine zone and the treeline ecotone. At the small scale the results were partly attributed to competitive interactions.

The main newcomers at the first three summits resulted to be species of the treeline and the lower altitudes. Only at the highest summit the newcomers were restricted to the alpine species pool. At the treeline ecotone, trees, dwarf shrubs, and clonally growing graminoid species enhanced their abundance and frequency. Here, alpine species displacements are assumed for the near future. Expansions of the established alpine species and further invasions of species from lower altitudes are forecasted for the higher summits.

## Die Karte der aktuellen Vegetation von Kärnten

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Die vorliegende Vegetationskarte ist durch die Zusammenarbeit zwischen zwei Vegetationskundlern und dem Geographischen Institut der Universität Klagenfurt möglich geworden. Einerseits wurden von beiden Autoren die Feldarbeiten abgedeckt, andererseits stellte das Geographische Institut (M. Seger) einen digitalen Datensatz über die Landnutzungs- und Landoberflächenklassen zur Verfügung. Dieser digitale Datensatz bezieht sich auf eine Realraumkartierung im mittleren Maßstab (1: 50.000), wobei als Besonderheit erstmalig eine Differenzierung der ausgedehnten Waldflächen vorgenommen wurde. Diese Differenzierung erfolgte anhand der visuellen Interpretation und manuellen kartographischen Erfassung aus Farbinfrarotluftbildern. Letztere stammen von einem flächendeckenden Flug aufgrund der Neuerhebung (1992-1996) des Berghöfe-Katasters, sie wurden optisch nach Hauptbaumartenzusammensetzung (Laubwald, Nadelwald, Nadelwald mit Laubholzeinsprengungen...) abgegrenzt und lieferten so die ersten vegetationskundlich ausscheidbaren Grenzen. Die so ausgeschiedenen Flächen bildeten Anhaltspunkte für eine weitere vegetationskundliche Differenzierung, in manchen Teilen Kärntens konnten sie sogar mit vegetationskundlicher Terminologie versehen werden. Manche Flächen wiederum mussten neu definiert und im Gelände abgegrenzt werden, da der vorhandene Aussagewert nicht reichte (z. B. Differenzierung der Laubwälder in Schwarzerlen-, Grauerlen-, Buchenwälder, feuchte Laubmischwälder... oder die Differenzierung der Nadelwälder in Fichten-, Rot- und Schwarzföhren-, Zirbenwälder...).

Neben dem Einarbeiten vorhandenen Kartenmaterials (siehe die Übersicht des bestehenden Kartenmaterials für Kärnten anlässlich der Österreichischen Botanikertagung 1997) bestand die nach einem ersten Einführungsjahr beginnende 3 jährige Geländearbeit vor allem im Befahren und Begehen sämtlicher Landesteile zur Verifizierung der Grundlagen aus der Realraumanalyse. Immerhin bot dieser Datensatz (der für ganz Österreich vorliegt) so eine gute Grundlage, dass er für eine vegetationskundliche Kartierung herangezogen werden konnte. Neben den Waldflächen bezog sich die digitale Grundlage auch auf die subalpin-alpine Höhenstufe (Latschen und Grünerlenvorkommen sowie Ausscheidung der Rasen, des alpinen Ödlandes einschließlich der Gletscher) und die Talräume. Die in der Basiskarte schon vorhandene Ausscheidung der Neigungen des landwirtschaftlich genutzten Grünlandes und der Ackerflächen wurde in der Vegetationskarte nicht differenziert behandelt, es wurden im Talbereich wie auch bei manchen Wäldern eher Nutzungen zusammengefasst, die sich oft in wenigen Jahren ändernde Zustandsformen darstellen. Insofern lässt sich die Karte später auch als Basis für ein eventuelles Monitoring heranziehen. In diese großflächigen Einheiten wurden nun Ergebnisse der Biotopkartierung des Naturwissenschaftlichen Vereins Kärnten und anderes vorhandenes Basiswissen (Florenkartierung, geologische Verhältnisse) eingearbeitet.

## Variation of Sweet Chestnut (*Castanea sativa* Mill.) Populations in Croatia According to the Morphology of Fruits

Marilena Idžojtić<sup>1</sup>, Marko Zebec<sup>1</sup>, Igor Poljak<sup>1</sup> & Jasnica Medak<sup>2</sup>

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In Croatia sweet chestnut grows in very diverse ecological conditions, in various forest communities, on an area of about 35,000 ha. It provides direct and indirect benefits (high-quality wood, edible fruits, honey, firewood, preventing soil erosion, maintaining the watershed etc.) and it also contributes to the distinctive character of landscapes. Sweet chestnut is among the priority species for the conservation of genetic resources in Croatia. In the last 50 years it has been seriously threatened due to chestnut blight.

The aim of this study was to assess the interpopulation and intrapopulation variability of sweet chestnut populations in Croatia according to the morphology of fruits. Nuts were sampled in 10 natural populations, from the whole area of sweet chestnut distribution range in Croatia. Each population was represented by 10 mature trees and each tree by 30 nuts. Nine morphological traits and seven indices were analysed. Univariate and multivariate statistical techniques were used to evaluate the differences among and within populations.

### References:

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- ERTAN, E., 2007: Variability in leaf and fruit morphology and in fruit composition of chestnuts (*Castanea sativa* Mill.) in the Nazilli region of Turkey. — Genet. Resour. Crop Evol. 54: 691-699.
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- SOLAR, A., PODJAVORŠEK, A. & ŠTAMPAR, F., 2005: Phenotypic and genotypic diversity of European chestnut (*Castanea sativa* Mill.) in Slovenia – opportunity for genetic improvement. — Genetic Resources and Crop Evolution 52: 391-394.

## **Cedar Forest Communities in Southern Anatolia (Turkey)**

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*Cedrus libani* A. Rich. is found in NW Asia. It builds forests that have been under the anthropogenic pressure for thousands of years. The almost inaccessible topography of Southern Anatolia (Taurus mountains) prevented the cedar forests from being destroyed in a larger degree and there are about four thousand hectares of relatively well preserved cedar forest in Taurus mountains that were the object of our research.

There exists some local studies of these forests, but there is no a comprehensive work exhibiting the cedar forests on the Taurus Mountains as a whole. So is the aim of the presentation to settle the classification pattern, as well as main environmental and phytogeographical gradients of *Cedrus libani* forests on the Taurus Mountains. Numeric analyse techniques (classification and ordination ) were used for this goal.

It was found out that the division of *Cedrus libani* forests on the alliance level (*Abieti-Cedrion* and *Lonicero-Cedrion*) defined in literature conforms with the numeric classification. *Abieti-Cedrion* is represented on the middle and eastern Taurus, whereas *Lonicero-Cedrion* appears on the western Taurus. In addition, floristic inventory of cedar forests shows locally strict differences that enable to define different communities.

Floristic composition of *Cedrus libani* forests is strongly affected by geographical differentiation from west to east and also from south to north. Topographical factors are also decisive on the distribution of *Cedrus libani* forests. These forests mainly belong to the Mediterranean phytogeographical region, but depending on the decrease of Mediterranean climate effect, more continental conditions appear and the proportion of Iran-Turanian and Euro-Siberian species increase, especially in the east and north, high altitudes and more inclined surfaces.

## **Narzissenwiesen in den Karawanken**

Klaus Krainer

Arge NATURSCHUTZ, Gasometergasse 10, 9020 Klagenfurt, Austria

Seit Jahrhunderten schon ist das Leben in den Karawanken mit der Natur eng verbunden. Das Zusammenleben mit der Natur sowie besondere geologische und ökologische Verhältnisse schafften auf beiden Seiten der Grenze Besonderheiten. Bis vor wenigen Jahrzehnten wurden alle Almgebiete in den Karawanken bewirtschaftet. Infolge der Aufgabe der Beweidung sind viele der Almflächen mittlerweile verbuscht oder sogar aufgeforstet. Mit der Änderung der Bewirtschaftung geht der Verlust der artenreichen Weideflächen einher und somit Lebensraum für eine Vielzahl von Pflanzen (z. B. Narzissen, Orchideen) und Tiere (z. B. Schmetterlinge, Heuschrecken) verloren.

Auf Initiative von Slowenien hat die Arge NATURSCHUTZ als Projektträger, ein gemeinnütziger Naturschutzverein mit Sitz in Klagenfurt, ein länderübergreifendes Projekt mit dem Ziel der Erhaltung und Wiederbewirtschaftung dieser für die Karawanken typischen Narzissenwiesen bzw. Almflächen gestartet, welches über ein von der EU im INTERREG III A Österreich-Slowenien Programm kofinanzierten Projektes zwischen Juli 2005 und September 2007 durchgeführt wurde.

Zu diesem Zweck wurden im Kärntner Projektgebiet zwischen Mittagkogel und Hochstuhl wissenschaftliche Untersuchungen über den aktuellen Zustand der Narzissenwiesen, der historischen und aktuellen Nutzung, und zum Vorkommen ausgewählter Tiergruppen (Heuschrecken und Schmetterlinge) sowie spezielle ökologische Fragestellungen (Quellzönosen) in Abstimmung mit den slowenischen Partnern auf ausgewählten Standorten durchgeführt. Als herausragendes Ergebnis sei angeführt, dass während des Untersuchungszeitraumes zwischen Mai 2006 und April 2007 insgesamt 636 verschiedene Schmetterlingsarten nachgewiesen wurden, davon scheinen 77 Arten in der Roten Liste gefährdeter Tiere Kärntens auf. Eine Miniermotten-Art stellt sogar einen Erstnachweis für Österreich dar, drei weitere Arten (Wickler, Federmotte, Faulholzmotte) auch einen Erstnachweis für Kärnten, 6 weitere Arten sind als Zweitfunde für Kärnten zu verzeichnen.

Gemeinsam mit den Grundeigentümern und Interessensvertretern wurden auch Pflegekonzepte erarbeitet und auf der Roschitzalm pilothaft umgesetzt. Das Projekt wurde von einer umfassenden Öffentlichkeitsarbeit (zweisprachiger Folder und Broschüre, Medienarbeit, Exkursionen) begleitet. Eine Narzissenverpflanzung bildete den Abschluss und Höhepunkt des Projekts.

An dem Projekt beteiligte Institutionen waren Zavod RS za varstvo narave, Regional unit Kranj (Regionale Naturschutzamt Kranj), die Gemeinde Tržič, das Landesmuseum für Kärnten, Abt. für Zoologie und die Universität Innsbruck, Institut für Zoologie und Limnologie.

## Plant species dynamics in sweet chestnut forests in Croatia

Jasnica Medak<sup>1</sup>, Sanja Perić<sup>1</sup>, Marilena Idžojtić<sup>2</sup>, Marko Zebec<sup>2</sup>, Igor Poljak<sup>2</sup>

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Over many centuries chestnut trees were planted around southern Europe in forms of orchards and coppices, both intensively managed. On these stands phytocoenological research did not have much sense.

In Croatia, although influenced, most of the chestnut stands never lost their forest structure. Nevertheless, no important floristic and ecological research was performed in these forests since many years (HORVAT 1938, ANIĆ 1940).

In last seventy years there were major changes in these stands. Chestnut blight (*Cryphonectria parasitica*) seriously damaged chestnut tree quality and caused decrease or even disappearance of chestnut from some mixed stands. Also, less anthropogenic influence (intensive use and management) enable these stands to get way to evolutionary dynamics toward climax forests. According to these changes, certain changes in floristic composition were also expected.

In the period 2002-2004 and 2006-2007, a significant number of phytocoenological relevés was made in all sweet chestnut regions of Croatia. Special attention was paid to find the same localities where phytocoenological research was performed by HORVAT and ANIĆ.

Important changes in floristic compositions were observed in acidophilous chestnut forests – *Querco-Castanetum sativae* Horvat 1938 (comparing relevés from HORVAT 1938). They show successional character regarding to better life conditions.

In more or less mesophilous chestnut forests (comparing to ANIĆ 1940) great similarity in floristic composition, after 70 years, was observed. These forests show good stability, despite all negative influences during the time.

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## **Polygalo-Quercetum pubescentis ass. nov. Millaku, Rexhepi & E. Krasniqi**

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In the Kosova's terrain, during the investigation of thermophilous oak habitats (*Quercus pubescens*), a new association was discovered, which we have named Polygalo-Quercetum pubescentis, as an endemic phytocoenosis in Kosovo. In this association *Polygala doerfleri*, an endemic species of Kosovo and Albania is confined within the ultimate border of dissemination toward East and North-East (REXHEPI 1994, 2000). Although *Quercus pubescens* mainly forms phytocoenosis on carbonated rocks (BLEČIĆ & KRASNIQI 1971, KRASNIQI 2003) in these locations (Gurane-Kosovo), nevertheless it forms a specific association. It is typical and characteristic in floristical aspect in serpentine areas (MILLAKU et al. 2008). Characteristic species of this phytocoenosis are: *Quercus pubescens*, *Polygala doerfleri*, *Centaurea napulifera* and *Iris pallida*. Characteristic species and the species of the characteristic group are mainly connected to this association. It belongs to the thermophilous forests of the alliance Pruno tenellae-Syringion of the order Quercetalia pubescentis (class Querco-Fagetea).

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**Ostryo-Fagetum M. Wraber subass. paeonietosum subass. nov.  
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Fitocenosis *Ostryo-Fagetum* is disseminated on Albanian Alps (Kosovo) and in the Burimi Mountains, on the altitude 1000-1300 m, mainly in carbonated rocks. The soil is typical rendzine on the carbonated rocks. Exposition is mainly southward, whereas the inclination is above 30 degrees. The phytocoenosis is composed of thermomesophilous species with basiphilous-neutrophilous character. In this association are interweave species from the orders *Fagetalia sylvestris* and *Quercetalia pubescentis*, with illyric elements. These are the most termophilous beech forests (DAKSKOBLER 1996, MARINČEK et al. 1980.). The community is rich of species (MILLAKU 1999). Previously, this phytocoenosis in Kosovo is found in Koritnik and Pashtrik Mountains. Similar to this is also the association *Seslerio-Fagetum*, disseminated in the Sharri Mountains. These three associations have similarities between them within the floristic aspect. On the basis of our investigations carried out lately, the *Ostryo-Fagetum* in this location is different from two above mentioned associations (PAVLETIĆ et al. 1982, REXHEPI 1994). Therefore we have ascertained a new subassociation which we have named *Ostryo-Fagetum paeonietosum*. Differential species of this subassociation are *Paeonia corallina*, *Eryngium palmatum* and *Laser trilobum*.

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## Time series mapping and prediction of the invasive plant *Fallopia japonica*

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Japanese knotweed, *Fallopia japonica* [Houtt.] Ronse Decraene var. *japonica*, the species of focus, is categorized by Daisie (2008) among the “100 of the worst” invasive plant and animal species identified worldwide. This species is native to East Asia and was introduced to Europe as a garden ornamental, to prevent soil erosion and as forage crop for grazing animals.

The alarming dissemination rates of invasive *Fallopia japonica* in many parts of the world calls for (semi-) automated detection methods for early detection based on easily accessible and widely available operational remote sensing systems.

The objective of this work was to study the dispersion of the plant *Fallopia japonica* bases on mapping of this species using orthophotos, high resolution maps, and the field work for the last 7 years. The study area includes part of the community at the east of Ljubljana, with dimensions of 6.8 km by 6 km in central Slovenia.

Several significant homogeneous areas were mapped, inventoried, and analysed in GIS-environment. A time series mapping was proceed and studied using investigation from the last years. All of the described areas were just sampled across the study area. Criteria of the invasion were defined too, and several significant variables that predict *Fallopia japonica* were proposed. A simple preliminary prediction model of the *Fallopia japonica* was established for the study area.

A detailed recognition of the *Fallopia japonica* was done based on the field work and on the remote sensing techniques using a high resolution Quickbird MS image and orthophotos. The results of the some novel approaches show that *Fallopia japonica* areas are clearly identified and distinguished from the neighbouring agricultural fields. This study will be an input for more accurate and advanced prediction modelling in the future and for the prediction of some other invasive species.

## **Forest vegetation dynamics in the Spačva Basin in the last 40 years**

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Forests of the Spačva basin represent the largest complex of near-natural pedunculate oak forests in this part of Europe. The last systematic vegetational research in the area was undertaken in the late 1960s. Since these forests are under constant anthropogenic influences. Vegetation dynamics was studied in detail. 60 relevés were made for three associations (Carpino betuli-Quercetum roboris Anić 1959 ex Rauš 1969, Genisto elatae-Quercetum roboris Ht. 1938 and Leucojo-Fraxinetum augustifoliae Glavač 1959). Alder plant communities are present only in fragments and cover less surface than at the end of the 1960s. The floristic composition of plant communities from the end of the 1960s and today were compared using numerical methods (Direct ordination analysis). Analyses were also made of the changes in Ellenberg indicator values, number of species and cover of vegetation layers. Changes in the entire study area showed a tendency towards drier plant communities. Furthermore, the numerical analyses indicated that there was more similarity between the communities today than at the end of the 1960s. This is probably result of habitat changes and method of forest management. The biggest changes in the floral composition and other characteristics were found in the subas. Genisto elatae-Quercetum roboris caricetosum remotae Ht. 1938. The majority of these changes were the result of anthropogenic impacts.

## **Postfire vegetation dynamics in a *Pinus nigra* (Austrian black pine) forest in the Karawanken – Results of a 10 year monitoring**

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In a *Pinus nigra* and *P. sylvestris* dominated forest area in the south of Austria on 12<sup>th</sup> May 1998 a fire caused by a lightning strike broke out. From this fire also 5 ha of the natural forest reserve “Potokkessel” had been affected in which the investigations were carried out.

Based on up to 140 semisystematic chosen quadratic plots (0.25 m<sup>2</sup>), changes in vascular plant cover and survival continuity of tree regeneration have been observed. The survey shows that one of the most important factors of vegetation dynamics is the lethal damage of before dominant *Erica carnea*. Now the former required space is successive occupied by other species with more potential for regeneration. At all regeneration plays the main role during the re-establishment of a herbal layer. On these sites which are characterised by extreme drought new colonisation plays a relatively insignificant role. The proliferation of the remained species is running in very different ways. While *Euphorbia cyparissias* passed through its peak of abundance within the first 4 years, *Carex humilis* appears to reach its climax probably not within the period of the next few years. The former dominant species *Erica carnea* remigrates slowly but continuously.

## **Modelling spatial distribution of upper mesotemperate forest syntaxa in Central Apennines using some ecological features**

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The forest landscape of Central Italy is almost well known from a phytosociological point of view. In fact, all the most important forest types are nowadays inserted in an organic synsystematical framework. However there are some problematic aspects and, moreover, there is a lack of knowledge about the synecology of such forest syntaxa and particularly about the direct linking, using quantitative environmental field data, of the different phytosociological types distribution with the main ecological parameters (geomorphology, soil and bioclimate, to name the most important). This kind of knowledge is, however, the basis of advancing in the understanding of the ecological processes involved at the plant community level and at the landscape scale. Moreover, it could allow a better understanding of the interrelations between the botanical resource and the present and past use of the forest heritage.

With the aim to fill up this lack of knowledge, a sin-ecological study was carried out and the first results will be shown in our communication. For each forest syntaxon of Central Apennines upper mesotemperate belt stational parameters (altitude, aspect and slope) and soil properties (depth, texture and pH) were collected. All phytosociological and ecological data were analyzed by means of multivariate analysis using the Podani's Syn-tax 2000 Software. The evaluation and the integration of the obtained results allows us to build a model of ecological distribution of the considered syntaxa and, moreover, the ecological framework of each syntaxon.

## Natural grassland flora and vegetation on the Čićarija mountainous plateau (Istria, Croatia)

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Most grassland areas in Istria, and also on Čićarija have been completely abandoned due to progressive succession of healing to shrubs and trees. In certain smaller areas pasture is uncontrolled, which leads to changes in botanical composition and reduction of plant diversity. Abandonment of cutting on meadows results in the reduction of yield and forage value of grasslands, and expansion of undesirable plant species. Grassland vegetation in the area of Čićarija mountainous plateau belongs to the class *Festuco-Brometea* Br.Bl. et R.Tx. 1943, order *Scorzonero-Chrysopogonetalia* H-ić et Ht. (1956) 1958 (KALIGARIĆ 1997). Grassland is being developed at relatively deep, brown soils and in the rule is on the surface without a stone, and is used as meadows, as well as pastures (VITASOVIĆ KOSIĆ & BRITVEC, 2006). Characteristic taxa are: *Scorzonera villosa*, *Knautia illyrica*, *Leucanthemum atratum* subsp. *platylepis*, *Plantago argentea*, *Inula hirta* (TRINAJSTIĆ 2008).

During 2008, the plant diversity, feed value and yield of natural grassland community of rocky pastures and dry grasslands from the *Scorzonero-Chrysopogonetalia* at four localities on Čićarija (560-700 m a.s.l.) with four different ways of using was investigated as well. A total of 428 plant taxa, belonging to 49 families were found.

At selected locations different associations with the following dominant plant taxa appear: *Carex humilis*, *Satureja montana*, *S. subspicata*, *Stipa pennata* subsp. *eriocaulis*. Many species are palatable for sheep and quite valuable quality-wise. These are: *Lotus corniculatus*, *Hippocrepis comosa*, *Medicago lupulina*, *Onobrychis viciifolia*, *Trifolium alpestre*, *T. campestre*, *Sanguisorba minor*, *Plantago lanceolata*, *Tragopogon pratensis* subsp. *orientalis* and others, which according to ŠOŠTAČIĆ-PISAČIĆ & KOVAČEVIĆ (1974) have excellent and very good quality in the green matter and hay. Production of green mass in the range of 5.74 -13.95 t/ha, and the annual grassland yield range from 2.51 - 5.00 tonne dry matter per hectare, depending on utilization. The results of this preliminary research could provide guidelines for determining the complete and optimal management of grassland in the studied areas, which will contribute to the improvement of the ecological sheep production, as well as to preservation of the diversity of flora and vegetation of grasslands in Istria.

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## Acidophilic forests of sessile oak in northern Croatia

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Past surveys of forest vegetation in Croatia (VUKELIĆ 1991, RAUŠ et al. 1992, VUKELIĆ & BARIČEVIĆ 1996, BARIČEVIĆ 2002, TRINAJSTIĆ 2008, VUKELIĆ et al. 2008) classify acidophilic forests of the order Quercetalia roboris petraeae, with sessile oak (*Quercus petraea* Liebl.) as the edifier, in three associations: Querco-Castanetum I. Horvat 1938, Hieracio racemosi-Quercetum petraeae Vukelić (1990) 1991 and Festuco drymeiae-Quercetum petraeae (Janković 1968) Hruška-Dell'Uomo 1974. Their distribution range is predominantly in the colline and montane belt of sub-Pannonian mountains in south-eastern Europe. They generally grow on dystic cambisols over silicate rocks and mainly inhabit mountain tops, ridges, and steep and exposed slopes.

According to the latest research and analyses, the most represented association is that of Hieracio racemosi-Quercetum petraeae. The floral composition is widely diverse. The tree layer is distinctly dominated by the sessile oak, whereas the shrub layer and the layer of ground vegetation are dominated by acidophilic species of the order Quercetalia roboris-petraeae (*Genista tinctoria*, *Hieracium racemosum*, *Melampyrum vulgatum*, *Luzula luzuloides*, *Hieracium sylvaticum*) on the one hand, and the elements of Quercetalia pubescentis: *Fraxinus ornus*, *Lathyrus niger*, *Dactylis glomarata*, *Campanula persicifolia*, *Sedum maximum*, *Tanacetum corymbosum* and others on the other. These are important differential species in relation to similar communities of the Luzulo-Quercetum s.l. type.

In addition to the results of more recent research from northern Croatia, the paper also describes basic synecological conditions, presents pedological analyses and diversity of the association, and compares it statistically with other related communities in Croatia and neighbouring areas. Since the name Hieracio racemosi-Quercetum petraeae is not valid (PEDROTTI et al. published a different association in 1974), its syntaxonomic and nomenclatural determination is also given.

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## **Phytogeographical evidence for refuge areas and post-glacial spread of European beech forest species**

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The post-glacial migration of European beech (*Fagus sylvatica*) has been addressed by many studies using either genetic or fossil data or a combination of both. In contrast to this, only little is known about the migration history of its understorey species. In a review of phytosociological literature, we identified 110 species with a high fidelity to beech forests. The distribution range of European beech forests was divided into 40 geographical regions, and the presence or absence of each species was recorded for each region. Data were compiled from phytosociological literature, distribution maps, and floras. We compared overall species numbers per region and numbers of narrow-range species (species present in < 10 regions). A multiple regression model was used to test for the explanatory value of three potential diversity controls: range in elevation, soil type diversity, and distance to the nearest potential refuge area. A hierarchical cluster analysis of the narrow-range species was performed.

The highest number of "beech forest species" is found in the S Alps, the N Apennines, and the NW Dinaric mountains. With increasing distance from this centre of diversity, species numbers are decreasing, reaching its minimum in NW and N Europe. This picture is changed when only narrow-range species are taken into consideration: In this case, the highest species diversity is observed in the S Apennines, and although the S Alps, N Apennines, and NW Dinaric mountains still reach high species numbers, secondary maxima are found in N Spain, the Carpathians, and Greece. Distance to the nearest potential refuge area is the strongest predictor of beech forest species richness, while altitudinal range and soil type diversity had little or no predictive value. The cluster analysis of the narrow-range species revealed six main geographical clusters which are in good concordance with the glacial refuge areas of beech and other temperate tree species as estimated in recent studies.

Our findings support the hypothesis that the distribution of many beech forest species is limited by post-glacial dispersal rather than by their environmental requirements. The results provide also evidence that most of the studied species have been closely affiliated with beech for at least one glacial cycle, and that the current distribution of understorey species is a good indicator for the localisation of glacial refuge areas of temperate forests. The possibility of one or several refuge areas of beech in the Carpathians is supported by the floristic evidence but needs further paleological and genetical confirmation.



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# Guide to the Excursions

Unfortunately the file is too big!

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