18th International Workshop of European Vegetation Survey

IAVS

ROMA, March 25th - 28th, 2009 - Orto Botanico di Roma - Università "La Sapienza"

"THERMOPHILOUS VEGETATION"

What does "Favourable Conditions" for Habitat of the EC Directive mean?
What are the implications for management (EU Life+ & FESR Projects, other Natura 2000 projects)

Coenology and the Historical ecology of Plant Communities

ABSTRACTS

DIPARTIMENTO
DI BIOLOGIA VEGETALE

MUSEO ORTO BOTANICO

SAPIENZA
UNIVERSITÀ DI ROMA

ABSTRACTS

18th EVS Workshop

ROMA, March 25th-28th 2009

Edited by
Emiliano Agrillo & Laura Casella

Revised by
Members of the Programme Committee

Programme Committee:

Francesco Spada (Roma, Italy)
Sandro Pignatti (Roma, Italy)
John Rodwell (Lancaster, United Kingdom)
Joop Schaminée (Wageningen, Netherlands)

Organizing Commitee:

Laura Casella (Roma, Italy)
Emiliano Agrillo (Roma, Italy)
Andrea Savoia (Roma, Italy)
Loretta Gratani (Roma, Italy)
Fabio Attorre (Roma, Italy)

Collaborating Institutions:

Rettorato - Università degli Studi di Roma "La Sapienza"
Regione Lazio - Dipartimento Conservazione della Natura
Associazione Forum Plinianum
Parco Naturale Regionale "Bracciano Martignano"
Riserva Naturale Regionale "Monterano"

Organized by:

EVS-Italia
Orto Botanico di Roma - Dipartimento di Biologia Vegetale
Università di Roma "La Sapienza"
Largo Cristina di Svezia, 24 00165 Roma
Tel/fax +39 6 49917133
www.evsitalia.eu
Secretary: Laura Casella, staff@evsitalia.eu

© EVS Italia
ISBN -978-88-90409-14-1

Preface

In 1991, during the IAVS Symposium in Eger (Hungary), dedicated to the use of computerized methods in phytosociology, at the end of a very constructive night session, Georg Grabherr (Wien) proposed the name "European Vegetation Survey" for the new initiative on the classification of plant communities. Consequently, the first meeting of this Working Group of IAVS began in the Botanical Gardens of Rome, on March 13, 1992. In a note from those days, I wrote "even two members coming from England are present .." this was a fortunate event, because, at that time it was not usual to have British participants for meetings in phytosociology. I am recalling these details to point out that now EVS is coming of age. Meanwhile, phytosociology (first recognized in the International Congress of Brussels, 1912), is approaching one century of activity.

Indeed, the true origin for the EVS initiative goes back to a much earlier time. In 1980 we had our usual April-Symposium in Rinteln, but Reinhold Tüxen, who had been the leader of the Society for Phytosociology for the past three decades, was unable to participate for the first time. A very serious illness, it was said. I had the chance for a short visit: at the end I asked him, what in his opinion was the most important task for the new generations, and his response was: *"Prodromus machen!"* After a few weeks Reinhold Tüxen died and four months later also Josias Braun-Blanquet, the founder of phytosociology passed away at the age of 96.

In the following years, it was not possible to make much progress towards a Prodromus. The priority was to re-organize the society, with the historical leaders, among them I would like to remember in particular the contribution of H. Ellenberg and V. Westhoff. At the same time, E. van der Maarel started his "cultural revolution", launching the journal (first Vegetatio and then IVS) in the international scientific press, and transforming the rather centro-European Society for Phytosociology into IAVS, a real international body, open worldwide. Indeed, the memory of this last wish of the old master remained in my mind, and during the IAVS symposium in Warszawa (1990) a first project was proposed and discussed for the publication of a general outlook on the European vegetation. In the following years EVS developed, thanks to the collaboration of many groups in different European countries. Since the first meeting in Rome (1992) much progress has been made, although the publication of the Prodromus is presently still as far off as it was 20 years ago.

The workshops were regularly held every year, in Rome, in other Italian centres, in Greece and in the Czech Republic, with increasing participation. Meanwhile and independently from the activities of EVS, some Prodromus-like works appeared, e.g. for the Netherlands, the U.K., Austria, and the second edition of Oberdorfer's, Pflanzengesellschaften: each of these in several volumes. This was a significant progress, but it also showed that an all-European treatment would need at least 20 or 30 volumes (taking into account also the species-rich and highly diversified S-European peninsulas). Who will write such a work, who will publish it, and who will read it? For this reason, the initial idea is no longer considered as a priority. But the small "book-

let" on the Diversity of the European Vegetation published in 2002 was an important achievement. Presently, the idea of the Prodromus should be reconsidered, probably more in the sense of a general data base with the possibility of interactive data treatment. The most important result of this series of workshops is that a core group now exists, made of dedicated scientists based in different European countries, but united by common points of view and strong bounds of collaboration and friendship. Many scientific programs started and an important standardization in methods and basic concepts took place. The EVS group is now a system, working in a condition of self-organisation. On several occasions proposals were made for European Community research funds, alas, they were not successful. But EVS is presently based on a very rich human capital, and this is the most important result, since scientific progress is achieved by the creativity of the human mind, much more than by funds or books.

When I began to apply phytosociology in the early 50ies, I was more and more astonished to recognize in my study areas (Venice, Central Alps, the Northern Apennines) the same vegetation patterns which were well described for other regions (S-France, the Netherlands, NW-Germany). Phytosociology had become a solid basis for the knowledge of vegetation. This was the period for many new discoveries, at least in Italy, where research on plant communities was at the beginning. Indeed, the relevés, tables and synoptic tables are only more or less refined ways to describe the topic of our research, but description is not science. The symposia organized by R. Tüxen in Stolzenau and later in Rinteln contained not only descriptions, but also something more. During one of these symposia a Commission for the Prodromus was created, which in the 70ies produced a large bibliography. And during the 1969 symposium, a small group of participants (Beeftink, Cristofolini, Lausi, Moravec, Orloci, van der Maarel and myself) started the discussion on the use of automatic procedures for classification and ordination: the Working Group for Data Processing.

After a decade these methods were widely used in Europe and elsewhere, and now they belong to everyday life for everybody who wants to study vegetation in depth. But it must be clear that the use of advanced methods of elaboration is not sufficient. Science consists in proposing statements which can be exposed to the possibility to be proven wrong (falsified), and then substituted with a new theory. This is not the condition of phytosociology at present. If one would have the idea to describe a *Salicornio-Quercetum roboris* or something similar, how to prove it wrong? Even the fact that phytosociology is approaching 100 years of activity maintaining the original basic ideas and methods can be considered an anomaly, in comparison with the rapid progress in other fields of Biology and Ecology.

The basis of the Survey is the classification, built on species frequency and distribution within the community. Sometimes I think that this evidence offers only a portion of the necessary information. Consider the example of Linnaeus: he built his Systema Plantarum on the number of stamina and styles, apparently objective and unambiguous characters, but after some decades his method was substituted with others, based on a more diversified information. Also for the plant community, the list of species is objective and unambiguous, but probably not sufficient.

A wider definition was proposed, basing on the theory of complex systems: *Vegetation as a living system resulting from the self-organization processes of plant individuals and plant populations under the selective (driving) influence of environmental factors.* In this case, the floristic composition is only one aspect, and probably not the main one. A new paradigm which can be tested and developed or if necessary substituted with a better one.

Sandro Pignatti

Environmental remediation. A conservational nightmare ?

Since the enactment of the European Directive "Habitat" in Italy, 1997, the achievement, the whole destiny of nature conservation in the country seemed apparently secured.

In nearly all regions the law came rapidly and vigorously into force. An impressive network of protected areas, when visualized on maps, fired up conservationist and scientists after a half century of frustration and aroused a lot of concern among businessmen and building contractors. So far.

Major critical, successful tools have undoubtedly been the choice of plant communities (Habitats) as descriptors of the conservational importance of selected areas (SCI) and a classificatory framework for these plant communities able to reduce subjectivity in surveys and relatively easy to apply (Annex 1 Dir.CE/92/43 with its CORINE background). Data bases relied upon a rich heritage of historical Floras, coenological monographs, red lists, local lists and national inventories ad *hoc* BioItaly). The established acceptance of a relaxed phytosociological language among conservationist was not detrimental either. Geobotany, Vegetation Science had really succeeded.

Nevertheless some inbuilt ambiguities were not considered or detected in time, at least in the Italian arena.

When in local Administrations, a sudden compulsory need of action plans for each protected area triggered a landslide of procedures for outsourcing contests, (geo-) botanists were not so many there. Professional plant ecologists, vegetation scientists from academic institutions, perhaps considered their scientific task accomplished by the production of the still controversial, coenologically unsatisfactory, patriotically skewed but badly needed, unifying and highly welcome Habitat classification.

New groups took over the applied sector.

Teams of urban planners were there. With the help of experts in forest- and agricultural layouts they were already successfully operating in the field, sometimes with a long experience in cooperation projects for developing countries. Particularly in the province, where it took years before all local administrators eventually understood the conservational compulsiveness in the European law, some of these groups of experts, with a technical and scientific background far from vegetation science and far from any issue on natural plant communities, were more active and immediately understood the potentiality of a new environmental business based on the Habitat Directive.

In the worst scenario, description and analysis of flora and vegetation in the produced action plans used (uses) to disappear in a numerical jungle of paragraphs. Scientific problems on conservation values were (and are) tackled with the help of the mere quotation of Habitats and Codes already listed for individual areas in reports and files of existing administrative inventories. No analysis of the plant cover was (and is) ever produced, except for the mere transfer of the scanty descriptions already attached to the administrative documents. In these cases, the mandatory outlines for

management of the plant communities corresponding to the Natura 2000 Habitats were (are) dispatched using Codes and Community epithets, due to their easy applicability, as plugs for tautological computations.

In the prescriptions for the management of forest Habitats, natural succession and dynamics are obviously set aside, if not delegitimated, in favour of artificially induced and controlled silvigenetic cycles, relying upon that fatal misunderstanding, according to which, the concept of "forest conservation" in forestry language mainly means conservation of forest productivity and is not necessarily equivalent to conservation of the forest ecosystem *per sè,* which is the message of the Directive. A new wave of selective cutting in order to comply the requirements of the floristic structure listed in the Code description for each Habitat, is to be expected.

Not better for grasslands. Once again, natural dynamics are not taken into account. An agronomic point of view prevails, with the analogue, in concepts misunderstanding, which understands "grassland degradation" as the result of a decrease in productivity due to the processes of natural succession, a positive value for conservation biology.

But other active groups were (are) authentically focused on conservation. In more "charismatic" districts (larger cities), either professional zoologists or environmental association representatives were prominent in the teams of experts. As a matter of fact, these teams are operating, with high ambitions in conservational issues. But since in the outsourcing announcements botanical expertise merged, or rather dissolved into the unspecified request of ecologists, conservation and population biologists, something which seemed appropriate to administrators, the specific field of nature conservation has became domain of zoologists. These experts have traditionally been more active, more technical and more successful than botanists in conservation. Right or wrong, in many groups the zoological point of view took over the whole specific filed of nature conservation. The consequence is that the plant cover and the Habitats have in many cases been treated as mere scenario for animal populations. The analysis and, subsequently, the management of the plant cover have therefore been focused on the triggering of population increase for target animal species. Some major consequences in management prescriptions are the request of spot-clearing of the beech forest, emblematic for its floristic poorness or recommended general, enhanced selective clearing and coppicing in forests in order to favour early successional plant species, able to provide a larger spectrum of niches for a more rich fauna.

One major common consequences of the absence of geobotanists in the teams or of the limitation of their activity to the sole delivering of local species lists, giving no contribution to the scientific analysis and discussion, is that "environmental remediation" has become the only way out in projects with a poor vegetation analysis. Since the treatment of the flora and plant communities of a study area is a specialistic and therefore difficult task necessary for the outlines of management practices focused on conservation, remediation has become a surrogate for these scientific procedures. It does not necessarily need any particular knowledge in vegetation dynamics, it rather needs lack of it, often suggesting actions with the slightly bombastic

touch like "reconstruction", "restoration", "rehabilitation" of plant communities. It basically means afforestation or thickening of presumptively scarce plant populations. Here the arbitrariness of the operator is often unpredictably huge. More *Taxus* in the beech forest, more *Quercus suber* along the coasts, more junipers at high elevations. In other cases the crown-forester's axiom "more clearings - more roe deer" has been improved by its inevitable corollarium: "more biodiversity". And thus promoted to the best common praxis in forest management.

The hydrosere of this axiom: "more water bodies - more water fowl" has lead to excavations of artificial "lagoons" along the Tyrrhenian coasts in order to attract migrating birds and to start successful bird watching stations. Thus, more birds- more (what else?) biodiversity. It could not be more ecological than so. Incidentally, long strips of the Middle- Tyrrhenian coast is naturally flat since the shore has been eroded during the Holocene on the clayish bottom of former, very large late -Pleistocene lagoons. Sand dune systems, hosting the classic celebrated toposequences of Mediterranean psammophilic communities never existed in these areas under post-glacial environmental conditions. Nevertheless energetic projects promising environmental restoration, costal rehabilitation, aim to the (re-)construction of arbitrarily postulated sand dunes and their plant communities.

Enormous amounts of EU funds are devoted to these enterprises by administrations who are misleaded by these histrionic envelopes of ecological slogans.

Unsuccessful projects can always be alleged to the effects of anthropogenic climatic changes which trigger marine transgression and enhance coastal erosion. Similar threatens to real biodiversity values come from projects for the reclaim of badlands. Insufficient geobotanical documentation about their importance as areas for the conservation of relic semidesert communities, has lead to the reshaping of these unlucky areas when agronomists have taken over. Transplantation of appropriate sods by established nurseries might always restore the charismatic "6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates *(Festuco-Brometalia)* (*important orchid sites)"!

This is a call for geobotanical help.

Shall we dump a half century of scientific achievements and experiences in vegetation dynamics in order to accomplish technically misunderstood expectations of the European law? We can hardly accept that.

What about the many Habitat types corresponding to transeunt communities? Who shall decide which are the coenological conditions to monitor, the primary stands to choose and protect when the historical traditional human disturbance will no longer act?

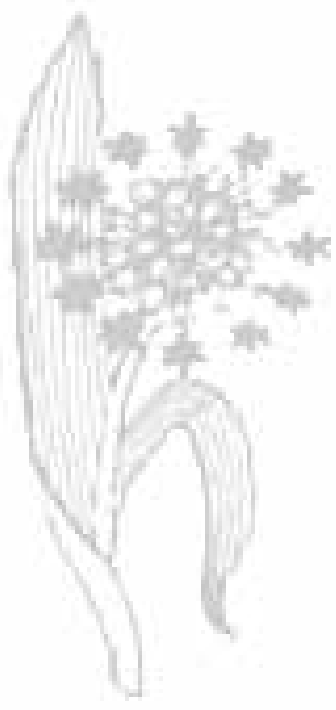
But more precisely, where is biogeography, phytogeography? The lack of *Taxus* in the middle-Tyrrhenian region is a biogeographic peculiarity which has to be preserved as much as the lack of *Abies* in the surrounding mountains. This is supported by consistent palynological records and comparative phytogeographical data. The floristic structure of the local corresponding Habitats cannot be "ameliorated" by artificial thickening of populations of these trees.

And moreover: if thickening is necessary, is commercial plant material genetically appropriate? Never. In this case, remediation is the destruction of biogeographical values and a threaten to the conservation of genetic diversity in plants. Restoration, rehabilitation, reconstruction are activities which, if not controlled by geobotanical expertise, may lead to the destruction of meso- and macroscale biodiversity patterns. The EU law cannot be blamed.

Too many histrionic projects are now in progress. Hundreds of insufficient action plans and reports, detrimental to nature conservation in the spirit of the European Directive, are kicking around.

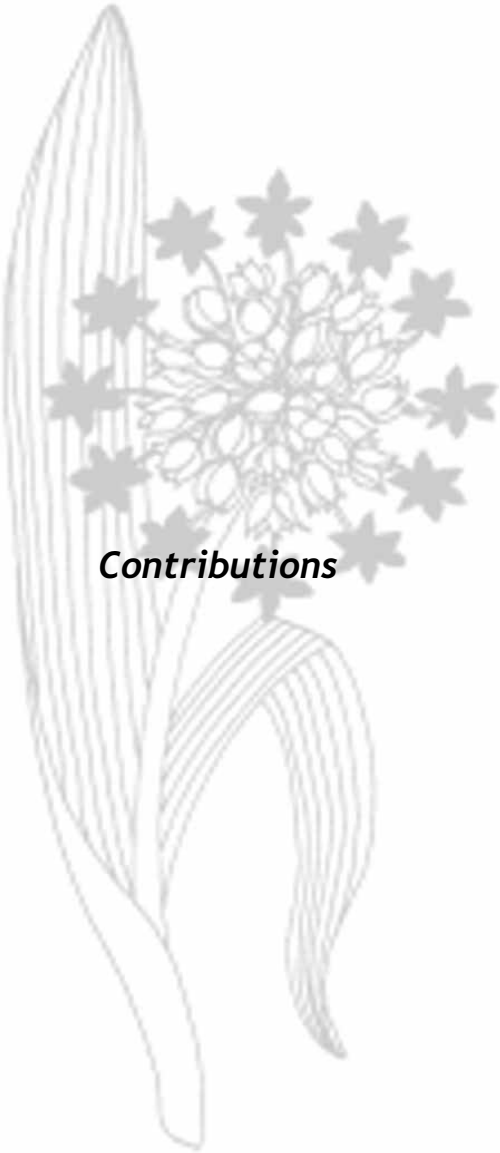
And here is another point. Since the analysis of the plant cover requires geobotanical expertise based on the knowledge of processes in natural vegetation dynamics, have geobotanists been excluded as potential constrains in the name of the agility and acceptance of the projects?

Francesco Spada



List of Contributions:

List of Contributors



Contributions

Dry grasslands of the *Bromo pannonici-Festucion pallentis* and *Diantho lumnitzeri-Seslerion* in Slovakia - a formalized classification

Monika Janišová[1] & Daniela Dúbravková[1,3]

[1] Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, 845 23 Bratislava, Slovakia, e-mail: monika.janisova@savba.sk;
[2] Faculty of Natural Sciences, Matej Bel University, Tajovského 40, 974 01 Banská Bystrica, Slovakia;
[3] Homeland Museum in Považská Bystrica, Ul. Odborov 244/8, 017 01 Považská Bystrica.

The syntaxonomical revision of dry grassland communities of the alliances *Bromo pannonici-Festucion pallentis* and *Diantho lumnitzeri-Seslerion* was performed including recent and historical data available in the Slovak phytosociological database (http://ibot.sav.sk/cdf/index.html). The stratified data set of 16640 relevés belonging to all syntaxa stored in this database were used to generate sociological species groups by the COCKTAIL method. Alltogether, 17 sociological species groups were used to formulate the formal definitions of 6 associations of the *Bromo pannonici-Festucion pallentis* and 3 associations of the *Diantho lumnitzeri-Seslerion* alliances. The obtained results were compared with the results of an over-national large-scale classification of Central European dry grasslands.
The communities of the *Bromo pannonici-Festucion* pallentis alliance are dominated mostly by xerophilous stress-tolerant species *Carex humilis* or *Festuca pallens*. The vegetation cover is unclosed or patchy. In Slovakia, the floristic composition and the overall structure of these communities are affected mainly by the geographical position, microclimatic features and type of bedrock. They are distributed predominantly in the warm colline belt of pericarpathian mountains in the western and southern Slovakia, sparsely they occur on warm slopes of inner-Carpathian basins. Following associations were distinguished within this alliance: *Poo badensis-Festucetum pallentis, Festuco pallentis-Caricetum humilis, "Orthantho luteae-Caricetum humilis", Campanulo divergentiformis-Festucetum pallentis,* {XE *"Poo badensis-Caricetum humilis"* and *Seslerietum heuflerianae*. {XE *"Festuco pallentis-Caricetum humilis"*}
The alliance *Diantho lumnitzeri-Seslerion* involves communities dominated by Sesleria albicans at lower altitudes (colline to submontane belt). They occupy usually cooler and moister locations in the warm pericarpathian calcareous mountains. Typical is the presence of numerous dealpine species. Thermophilous *Festuco-Brometea* {XE *"Festuco-Brometea"*} species differentiate these communities from *Sesleria*-communities of higher altitudes belonging to the alliance *Astero alpini-Seslerion calcariae* {XE *"Astero alpini-Seslerion calcariae"*}. Recently, many of these relic localities are endangered by succession or afforestation. Three associations were distinguished within this alliance: *Saxifrago aizoi-Seslerietum calcariae* {XE *"Saxifrago aizoi-Seslerietum calcariae"*}, *Minuartio setaceae-Seslerietum calcariae* {XE *"Minuartio setaceae-Seslerietum calcariae"*} and *Festuco pallentis-Seslerietum calcariae* {XE *"Festuco pallentis-Seslerietum calcariae"*}.
Finantial support: VEGA 2/0181/09

Conservation Status of Habitats in Germany: results of the National report (Art. 17) on Natura 2000 and options for future nature conservation

Axel Ssymank

Bundesamt für Naturschutz (Federal Agency for Nature Conservation) I.2.2, Konstantinstrasse110, 53179 Bonn, Germany. e-mail: Ssymanka@bfn.de.

In 2007 the German National Report according to Art. 17 of the Habitats Directive was submitted to the EU Commission, having only roughly one third of the habitats in favourable status in the Continental and in the Atlantic zones. During 2008 the composite report at EU level was prepared and is due for mid 2009. As this is the first reporting period including data on the conservation status of habitats and species of the Habitats Directive with standardized methods, the results will be presented and discussed, especially for habitats. At the same time a number of methodical problems became apparent. Both at EU-level and in Germany the discussion on modifying the procedures for future reports is ongoing. The analysis of the results and its implications for future nature conservation and management in Germany, research needs and future data needs will be a focus of the presentation.

Floristic changes in thermophilous woodland and "pozzine" in the surrounding of Rome - years 2004-2008

Giuliano Fanelli, Mafalda Cerrito, Daniele Cicuzza & Anna Testi

Sapienza University of Rome Dept. Plant Biology - Orto Botanico, email:giuliano.fanelli@gmail.com.

Recent years are seeing dramatic changes in climate conditions and consequently large changes in vegetation are expected. We studied by means of a raster grid of 300 squares 100 mq each changes in the flora of an important biotope, Foglino woodland in the southern surroundings of Rome. This woodland is characterized by *Quercus cerris-Quercus frainetto* woodlands and the extensive presence of "pozzine" vegetation on sandy siliceous soils *(Isoeto-Nanojuncetea),* an endangered proritary habitat, with many rare species such as *Isoetes hystrix, Isoetes velata, Solenopsis laurentia, Cicendia filiformis, Radiola linoides* ecc. The flora was surveyed in 2004 and 2008, in coincidence with a reduction in rainfall and a slight but significant rise in temperature. Important changes in the flora were observed; in general the frequency of species of Isoeto-Nanojuncetea diminuished, whereas that of species of woodland margin, a few of them rare in Italy, such as Succisa pratensis, increased.

The Red Data Book of Bulgarian habitats - some preliminary conclusions

Rossen Tzonev[1]; Chavdar Gussev[2]; Veska Rusakova[3] & Marius Dimitrov[4]

[1] Department of ecology and environmental protection, Sofia University"St. Kliment Ohridski", Faculty of biology, 8 Dragan Tzankov blvd. Sofia 1164; rosssentzonev@abv.bg;
[2] Department of applied botany, Bulgarian Academy of Science, Institute of Botany, 23 Acad. Georgi Bonchev 23' Sofia 1113; chgussev@bio.bas.bg;
[3] Bulgarian Society of Phytocoenology, Bulgarian Academy of Science, Institute of Botany, 23 Acad. Georgi Bonchev 23' Sofia 1113; v.rusakova@abv.bg;
[4] Department of Dendrology, University of Forestry, Kliment Ochridski 10, BG-1756 Sofia.
E-mail: mariusdimitrov@abv.bg.

The new Bulgarian Red Data Book - Volume 3, Habitats, includes 165 habitats, which were determined on the basis of the EUNIS habitat classification. They were divided into the main groups of EUNIS, which are: A. Marine habitats - 10 types; B. Coastal habitats - 8 types; C. Inland surface waters - 21 types; D. Mires, bogs and fens - 6 types; E. Grasslands and lands dominated by forbs, mosses or lichens - 32 types; F. Heathland, scrub and tundra - 32 types, G. Woodland, forest and other wooded land - 40 types; H. Inland unvegetated or sparsely vegetated habitats - 16 types. These Bulgarian Red list includes habitats, which have nature conservation value on the national or the European level (belonging to Natura 2000 habitat codes). Their category of threat has been assessed by the authors on the basis of different criteria: the size of the range of distribution, the historical decrease of their range, the fragmentation, the changes in the species composition or the ecological structures, the economical importance etc. The habitats were evaluated as: 1. Critically Endangered - 27 types, 2. Endangered - 71 types, 3. Vulnerable - 46 types and 4. Near Threatened - 21 types. The group of the critically endangered habitats requires the most special care. It includes mostly the habitats, which are seriously threatened from extinction, because of the strong human impact - the dune habitats, the flooded meadows, some specific fens and bogs, alluvial forests. Other group of habitats, evaluated as Critically Endangered, includes some relict, endemic communities, or Bulgaria falls in the southernmost or the northernmost periphery of their range of distribution in Europe. Such are the communities of *Juniperus sabina, J. excelsa, Quercus coccifera, Q. protoroburoides, Aesculus hippocastanum, Potentilla fruticosa, Spiraea salicifolia, Caragana frutex* etc. The category of the Near Threatened habitats include mainly the habitats, which are comparatively widespread in Bulgaria, but they have a nature-conservation importance on the European level - some pasturelands, shrub communities dominated by *Vaccinium* spp., *Juniperus sibirica, J. oxycedrus,* coniferous forests of *Picea abies, Pinus sylvestris* etc.

Lime at the limits: climatic, economic and religious intolerance in a *Tilio-Acerion* landscape.

Rodwell John S.[1] *& Hey David*[2]

[1] *Honorary Research Fellow, Lincoln Institute, Manchester University, Oxford Road, Manchester M13 9PL, UK (johnrodwell@tiscali.co.uk);*

[2] *Emeritus Professor, of Local & Family History, Sheffield University, UK.*

A *Tilio-Acerion* woodland in South Yorkshire, England, where *Tilia platyphyllos* grows in abundance towards its north-western European limit, illustrates how complex interactions between climatic, economic and social factors have created a distinctive local landscape of national significance. Favour and fashion have further complicated the scene. Such intricate relationships between nature and culture serve as a warning against naive understandings of condition and value and against glib predictions of the impacts of climate change in the kinds of landscapes that prevail over much of Europe.

Studying altitudinal distribution of tree species in the Bavarian Alps using the BERGWALD databank

Ewald Joerg

Weihenstephan University of Applied Sciences, Am Hochanger 5, D-85354 Freising, Germany, joerg.ewald@fh-weihenstephan.de

Thermal limits of tree species are of paramount interest in projecting effects of climate warming. Based on the large phytosociological databank BERGWALD tree species occurrence along a regional elevation gradient was assessed separately for tree and regeneration layer individuals. Upper limits in the databank were compared to altitudinal limits given in Oberdorfer's regional flora and to northern latitudinal limits given in worldwide distribution maps. Tree species distribution along the elevation gradient was modeled as a preference index, which was used to derive response groups. For 13 of the 30 tree species, the known distribution limits had to be raised based on relevé data, demonstrating the high potential of phytosociological databanks to deliver ecological information. Regional altitudinal and global latitudinal limits were quite closely related for the majority of tree species. However, several tree species climb to higher elevation in the Alps than their latitudinal limits suggest. While *Larix decidua, Pinus cembra* and *Abies alba* have boreal sister species occurring beyond the montane-boreal disjunction posed by North-Central European lowlands, *Acer pseudoplatanus, Fagus sylvatica* and *Taxus baccata* are important elements of temperate mountain forests that have no counterpart in the boreal zone.
Based on the altitudinal advance of regeneration compared to tree occurrences, *Taxus baccata, Sorbus aucuparia, Acer pseudoplatanus, Sorbus aria* and *Picea abies* have the highest potential to naturally fill the new high elevation habitat created by warming in the study region.
Statistical preference profiles broadly confirm the conventional grouping of high subalpine *(Pinus cembra, Larix decidua)*, subalpine *(Picea abies, Sorbus aucuparia)* and montane *(Abies alba, Acer pseudoplatanus, Fagus sylvatica)* tree species. Due to high incidence of alluvial primary succession and mires in alpine valleys elevation models poorly represent the thermal niches of early successional *Pinus* and *Salix* species.

Ammassalik vegetation revisited (1968/1969 - 2007) - Vegetation Change and Global Warming in the coastal low-arctic tundra of Southeast Greenland

Daniëls Fred J.A.[1] & De Molenaar Hans G.[2]

[1] Institute of Plant Ecology, Hindenburgplatz 55, 48143 Münster, Germany, daniels@uni- muenster.de;
[2] Gruttostraat 24, 4021 EX Maurik, The Netherlands.

The knowledge of the low-arctic vegetation of the Ammassalik district, southeast Greenland, is mainly known from phytosociological studies by the authors recorded 1968 and 1969. The resulting monographs present a detailed account of the flora, plant community types and landscape at a time when there was little human impact (population, tourism) or global warming effect. Climatic changes during the last 40 years include a mean annual temperature increase from minus 2, 5°C to minus 0, 3°C, and a distinctly longer period of summer warmth. Comparisons between the periods 1963-1967 and 2002-2006 show longer and warmer summer periods and distinct less cold and shorter winters with less snow.
We just wanted to find out if there were vegetation changes on the plant community type level during this nearly 40 years period and to produce a plausible interpretation of the results.
Thus in 2007 we revisited 13 key coastal tundra plant community types near the town of Ammassalik. We reanalysed the same plots, when not, the same stands, by at least 10 relevés using the same methods. Moreover we did some remapping of the vegetation. Both datasets have been analysed by multivariate methods. Preliminary results of this unique study show that vegetation structure, composition and distribution appears rather stable, in particular on dry, southern-exposed sandy slopes *(Festuco-Salicetum glaucae, Cladonio-Viscarietum alpinae* and *Caricetum bigelowii)* and zonal sites with *Empetrum hermaphroditum-Vaccinium microphyllum* dwarf shrub tundra. However mire vegetation *(Caricetum rariflorae)* and several types of snowbed vegetation *(Polygono-Salicetum herbaceae, Alchemilletum alpinae, Alchemilletum glomerulantis* and *Hylocomio-Salicetum herbaceae)* show more distinct changes, probably due to the drier sites conditions due to reduced snow cover period. *Salix callicarpaea* and some other southern and xero-thermophytic species are more prominent now. Human impact on the vegetation is still confined to the immediate surroundings of the town.
Internet: http://www.polarjahr.de/MAVC.268+M52087573ab0.0.html

Are plants moving upwards during the 20th century ? An inventory based on the French data bank Sophy

Grandjouan Gilles[1] & Brisse Henry[2]

[1] Emeritus Professor, 60 rue de Lunaret, F34090 Montpellier (France) E-mail: gilles.grandjouan@free.fr;
[2] Emeritus Professor, 36 rue Henri Dunant, Pas-des Lanciers, F13700 Marignane (France).

The theory of global warming gave rise to several attempts to examine its effects upon the flora and to show that some species tend to move upwards in order to escape the increasing temperatures. This attempt is a comprehensive study based on 2457 taxa, observed since about a century in 170.000 locations, according to 3.400 scientific publications. For each plant, it makes a review of the pairs of locations having the plant and, in each pair, it registers the difference in altitude between the previous and the former relevé by its importance, in metres, and its direction, downwards or upwards.
We summarize these geographical differences by three kinds of parameters. 1°) the direction of the medians : the number of differences downwards (1005 medians) and upwards (1178 medians) are nearly equal ; 2°) the size of the medians : the central half of the medians is between 20 m downwards and 30 m upwards, no more than the uncertainty in the registered altitude of a relevé ; 3°) the probability that, for a plant, the differences are bigger upwards than downwards, that is to say the probability that the plant increases in altitude, or, on the opposite, the reverse probability. These probabilities are, for their central half, between 3% downwards and 11% upwards ; in other words, the probability that altitudes do not change is more than 90%.
We compute also an historical difference in altitude by giving to each geographical difference its weight in years. The results are similar to the previous ones : 1°) there are nearly as many differences downwards (1035 medians) than upwards (1292 medians) ; 2°) the central half of the medians is between 34 m downwards and 60 m upwards, the median of all historical differences being only 4 m upwards ; 3°) the probabilities that historical differences shift from the geographical ones are, for their central half, between 2% downwards and 4% upwards. So, for most plants, duration has little or no influence on the differences in altitude. Indeed, the observed durations between two relevés are small. The median durations are between 12 and 15 years, which is too short to let the climate have an eventual influence on the area of a plant.
There is no socio-ecological group of plants which show any sensible difference in altitude, except a few taxa, which move more than 100 m, either downwards or upwards, mostly without any influence of the duration. We could imagine that the abundance of a plant would react to the environment more quickly than the area of its presence. It is not true. We suppose that the differences in altitude do not depend systematically on the climate, and that they result from the changes in the technical way for the surveys in the mountains and the change in land use, especially the abandonment of cultivation.

How natural are thermophilous oakwoods in sub-continental conditions of Central Europe? Half-century succession in the Milovicky Wood, Pannonian biogeographical province of the Czech Republic.

Hedl Radim[1], Szabo Peter[2], Kopecky Martin[2], Wernerova Veronika[3] & Komarek Josef[4]

[1] Institute of Botany of the Czech Academy of Sciences, Porici 3b, CZ-603 00 Brno, Czech Republic; e-mail: rhe_at_centrum.cz, hedl_at_ibot.cas.cz;
[2] Institute of Botany of the Czech Academy of Sciences, Porici 3b, CZ-603 00 Brno, Czech Republic;
[3] Institute of Botany and Zoology, Faculty of Sciences, Masaryk University, Kotlarska 2, CZ-611 37 Brno, Czech Republic;
[4] Agency for Nature Conservation and Landscape Protection of the Czech Republic, Husova 2115, CZ-580 01 Havlickuv Brod, Czech Republic.

Thermophilous oakwoods are traditionally believed an azonal potential natural vegetation of the warmest and relatively dry areas of sub-continental areas in Central Europe. Pannonian basin is a large continental area of mainly sedimentary deposits, but also hills and rocky outcrops, ecologically suitable for many vegetation types of Mediterranean and Eastern range. An interesting question arises about stability of such communities at the margins of Pannonia, as the SE of the Czech Republic with yearly temperature ca. 9-10°C and precipitation ca. 500 mm. While the variability of this vegetation was nicely captured by phytosociology, overall changes in landuse, forestry management and the putative effects global climate put stability and naturalness of these plant communities under the question.
Phytosociology has reflected thermophilous vegetation just in the period of the transition from the traditional to modern forest management in the 19th to mid-20th century. Classical associations and alliances have been described and maps of potential vegetation constructed following the concept that this was the natural state of the forest vegetation in the warmest and driest parts of the Czech Republic (similarly in the neighbouring counties).
In this paper, we present long-term observations of the sub-continental oakwoods of the Milovický Wood, the largest area of the Pannonian woodland in the Czech Republic. It is a continuous (ancient) deciduous forest at least since the Medieval times. In the 14th to 19th centuries, the Wood was completely managed as a coppice with standards in a short rotation 7 to 15 years (later 25 years). Many light- and warm-demanding organisms could probably only exist in the conditions of the open park-like landscape.
Our analysis compared relevés from the 1953, 1992 and 2006. Effect of the game preserve established in the 1960s was statistically separated showing the strongly overweighting influence of the forest succession itself. Species characteristic for thermophilous oakwoods mainly vanished, vegetation heterogeneity shrunk to the recently observed monotonous and often "untypical" oakwoods with hornbeam and field maple. We assume that the paradigm of naturalness of the sub-mediterranean and sub-continental thermophilous woodland in Central Europe should be reconsidered. Past management (coppicing, grazing) had for long unintentionally maintained the once more common but now disappearing vegetation.

Xerophytic plant communities of the Volga-Akhtuba flood-plain

Maltsev M. V.[1], Nikolaychuk L.F.[2] & Golub V. B.[3]

[1] Volgograd State Pedagogical University. Naturally-Geographical Faculty. Department of Botany and Methods of the Teaching to Biology. prosp. Lenina 27, Volgograd , Russia 400131.
E-mail: m_maltsev_biolog@rambler.ru;
[2] Institute of Ecology of the Volga River Basin. Russian Academy of Sciences. Komzina 10. Togliatti, Russia 445003;
[3] Institute of Ecology of the Volga River Basin. Russian Academy of Sciences. Komzina 10. Togliatti, Russia 445003.

What we call the Volga-Akhtuba flood-plain is the part of the Volga river valley located between the dam of Volgograd Hydropower Station and the Volga river delta. It is located in desert and semidesert zones. Its vegetation cover is formed under the influence of the river and generally has azonal nature. However, the Volga-Akhtuba flood-plain has some ecotopes which are affected by the river and ground waters to a small degree, or not at all. In those areas plant communities closely resemble the typical zonal vegetation. These plant communities are mostly included in the *Artemisietea lerchianae* Golub 1996 and *Artemisietea tchernievianae* Golub 1996 classes. Phytocenoses of the first class are formed on zonal loamy and sandy-loam mechanical texture soil and plant communities of the second class are developed on sandy soil. It is fixed or not fixed. In the latter case blow mound are arisen under the influence of wind. The plant communities review of the classes *Artemisietea lerchianae* and *Artemisietea tchernievianae* that occur in the Volga-Akhtuba flood-plain has been made by authors.

Plant communities of the class *Crypsietea aculeatae* Vicherek 1973 on the territory of Eurasia

Sorokin A. N.[1], Bondareva V. V.[2] & Golub V. B.[3]

[1] Phytosociological laboratory, Institute of Ecology of the Volga River Basin of Russian Academy of Sciences; 445003 Russia, Samara reg., Togliatti, Komzina str., 10; e-mail: an-sorokin@yandex.ru;
[2] Phytosociological laboratory, Institute of Ecology of the Volga River Basin of Russian Academy of Sciences;
[3] Phytosociological laboratory, Institute of Ecology of the Volga River Basin of Russian Academy of Sciences.

A survey of plant communities of the class *Crypsietea aculeatae* Vicherek 1973 has been made. Communities of the class are formed on low- and medium-salinized soils in habitats which are seasonally flooded either by high water or atmospheric precipitations for prolonged period of time. Ecotopes of the class *Crypsietea aculeatae* class are characterized by a high-salt ground water level. When these habitats are flooded during spring and summer season, a large amount of algae appear in the water. After these seasonal pools of water dry up, algae are deposited on the ground enriching the soil with organic matter and nitrogen. During stay of the class *Crypsietea aculeatae* ecotopes under water desalination of surface soil happens. There is a rise of salts in its top horizons again after recession of water and drying of a surface of the ground. Characteristic features of a floristic composition of the class *Crypsietea aculeatae* communities is that they are formed not halophytic plants, but of annual glycophytic plants with shallow root system. These plants have very short life cycle. It ends before the top layer of soil becomes salinized once again. It is possible to consider these communities also nitrophilous as they develop on the substratum fertilized by decaying algae.
Communities of class *Crypsietea aculeatae* Vicherek 1973 are widespread mainly in continental areas of northern Eurasia from France up to Mongolia. However in the Mediterranean they occur as well in coastal sites.

The vegetation dynamics of the northern part of the Volga-Akhtuba flood-plain.

I.S. Sharova[1], A.N. Barmin[2], K.A. Starichkova[3] & V.B. Golub[4]

[1] Astrakhan State University. Tatishcheva Str, 20a Astrakhan, Russia 414056, E-mail: kerina-best@mail.ru;
[2] Astrakhan State University. Tatishcheva Str, 20a Astrakhan, Russia 414056, E-mail: abarmin60@mail.ru;
[3] Institute of Ecology of the Volga River Basin. Russian Academy of Sciences. Komzina 10 Togliatti, Russia 445003.E-mail: kseniya-starichkova@yandex.ru;
[4] Institute of Ecology of the Volga River Basin. Russian Academy of Sciences. Komzina 10 Togliatti, Russia 445003.E-mail: vbgolub2000@mail.ru.

The Volga-Akhtuba flood-plain is the part of the Volga river valley located between the dam of Volgograd Hydropower Station and the Volga river delta. As a result of hydro building, by the beginning of the 70s of the last century, natural vegetation is preserved only in the Volga-Akhtuba flood-plain and the Volga river delta. Volga-Akhtuba flood-plain and the Volga river delta are located in desert and semidesert areas. Existence of highly productive azonal phytocenoses with meadow, meadow-boggy and forest vegetation here is conditioned by regular controlled releases of water from the Volgograd reservoir. These reservoir releases imitate natural high waters.

The observations over the vegetation dynamics in the Volga-Akhtuba flood-plain have already been conducted for about 50 years. The results of these observations in the northern part of the flood-plain are expounded in the report.

The observed changes of flora, dominant plants and productiveness of plant communities have an influence of, foremost, two factors. The first one is water volume discharged into the tail-water of the Volgograd reservoir in the spring-summer period. The second one is intensity of the agricultural use of the flood-plain's vegetable resources. The quantity of cattle population and area sizes where hay is procured had considerable variations in the period of observations. The supplementary reason of vegetation changes of the northern part of the Volga-Akhtuba flood-plain is that of invasions. The North American species of *Bidens frondosa* L., *Amorpha fruticosa* L., *Fraxinus pennsylvanica* Marshall has become ordinary. The latter quite often forces *Salix alba* L. out of the native plant communities.

Fringe communities of the class *Trifolio-Geranietea* in the Wienerwald (Austria)

Pelikan Irma[1] & Willner Wolfgang[2]

[1] Wallrissstrasse 73/4, A-1180 Vienna, Austria;
[2] Vienna Institute for Nature Conservation and Analyses (VINCA), Giessergasse 6/7, A-1090 Vienna, Austria. E-mail: wolfgang.willner@vinca.at.

The fringe communities in Eastern Austria are poorly documented so far. The aim of the present study was to investigate the whole floristic and environmental variety of fringe vegetation on nutrient-poor sites within the biosphere reserve 'Wienerwald'. The Wienerwald (Vienna Woods) is one of the largest areas covered with semi-natural deciduous forests in the colline to submontane belt in Central Europe. It is situated at the border between the subatlantic Central European and the Pannonian climatic region. Based on 132 newly sampled relevés a TWINSPAN classification was conducted. Correlation with environmental factors was investigated using canonical correspondence analysis (CCA). For the syntaxonomical interpretation, additional relevés from literature were included. Most widespread in the study area is the alliance *Trifolion medii*. Communities of the alliance *Geranion sanguinei* are less common and mainly restricted to the warm margin of the Wienerwald.

Formalized Classification of Subxerophilous Grassland Vegetation *(Cirsio-Brachypodion pinnati*, *Bromion erecti)* in the Slovak Republic

Iveta Škodová

Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, 845 23 Bratislava, Slovakia, e-mail: iveta.skodova@savba.sk.

During 2006-2008, the syntaxonomical revision and formal definitions of grassland communities in the Slovak Republic were performed. The Central Phytosociological Database of Slovakia (http://ibot.sav.sk/cdf/index.html) served as a ground for the study. The stratified data set was used to generate sociological species groups over the COCKTAIL method (Bruelheide 2000). Sociological species groups together with the dominance of the important species were applied to formulate the definitions of associations using logical operators (Bruelheide 1997).

Within the alliance *Cirsio pannonici-Brachypodion pinnati,* the occurrence of nine communities was recorded in Slovakia. Three associations were formally defined: *Scabioso ochroleucae-Brachypodietum pinnati* Klika 1933, *Polygalo majoris-Brachypodietum pinnati* Wagner 1941, and *Carici albae-Brometum monocladi* {XE *Carici albae-Brometum monocladi*} Ujházy et al. 2007. Within the alliance *Bromion erecti* the occurrence of three associations was reported from our country. The formal definition of the two communities - *Brachypodio pinnati-Molinietum arundinaceae* Klika 1939 and *Onobrychido viciifoliae-Brometum erecti* T. Müller 1966 - was carried out. The results were compared with the classification of subxerophilous vegetation of these two alliances in other countries of Central Europe.

The communities of the alliance *Bromion erecti* are synecologically transitional between dry and mesophilous grasslands. They belong to the most species-rich plant communities in the west and central Europe. They are usually dominated by *Bromus erectus, Brachypodium pinnatum* or *Carex montana.* Semi-dry grasslands of the alliance *Cirsio-Brachypodion pinnati* Hadač et Klika ex Klika 1951 are dominated by broad-leaved grasses, mostly by *Brachypodium pinnatum* or *Bromus monocladus,* and rarely by *Carex humilis.*

The formal definition of the *Brachypodio pinnati-Molinietum arundinaceae* was tested on the set of phytosociological relevés representing the succession stages of this community from one locality. As the diagnostic species were still present in the relevés even with the shrub-cover up to 50 %, the relevés fit the definition. For the evaluation of the favourable state of a grassland community from the succession point of view not only the compliance of the relevé with the formal definition is important, but also the shrub-cover relevance.

Finantial support: VEGA 2/0181/09

Sesleria latifolia termophylous grasslands in Bulgaria

Apostolova Iva, Meshinev Tenyo, Vassilev Kiril & Pedashenko Hristo

Insitute of Botany, Bulgarian Academy of Sciences, Sofia 1113, Acad. G. Bonchev bl.23, Bulgaria, e-mail: iva@bio.bas.bg.

The Balkan endemic *Sesleria latifolia* is known for Bulgaria, eastern Serbia, F.Y.R.O.M. and it is uncertain for the territory of northern Greece. The communities dominated by *S. latifolia* occupy significant areas mostly in the mountains of southwestern Bulgaria within the altitudinal range 900 - 1850 m. Their localities are related to limestone areas with shallow and dry soils (rendzinas), mostly on southern slopes. The species is included in section *Argentea* which is of most ancient origin, reffered by some authors as Tertiary. We consider the contemporary *S. latifolia* grasslands as secondary, related to destroyed relict *Pinus nigra* forests, where the species has survived for a long time. In the preserved forests, dominated by the black pine, on scattered localities *S. latifolia* still plays important role. The studied communities are significant by their rich biodiversity and high abundance of rare species of termophylous nature. Based on 122 relevés, a syntaxonomic evaluation of *S. latifolia* communities is provided. These communities are included in the Annex I of Directive 92/43 EC as habitat "6170-Alpine and subalpine calcareous grasslands" due to its high conservation value.

Dry grasslands of Southern Nechernozemje of Russia: syntaxonomy, habitats, management and protection

Yury A. Semenishchenkov

Bryansk State University, Dept. of Botany. 241036 Bryansk, Bezhitskaya, 14, r. 537.
e-mail: yuricek@yandex.ru.

Southern Nechernozemje is a large territory in the central part of the Russian plain. Dry grasslands of this region are an important base of geobotanical and floristic researches.

Syntaxonomy. Base on five-years studying of grass vegetation (2000 releves) 47 associations, 16 subassociations, 14 variants assigned to 20 alliances, 15 orders, 8 classes, and 13 basal and derivative communities were described according to the Braun-Blanquet approach. Some syntaxon were established earlier by A. Bulokhov (2001). The most syntaxonomically variable class is *Molinio-Arrhenatheretea*. According to results of the cluster analysis all alliances of this class are well differentiated. The most geobotanically interesting and rare types of dry grasslands are represented by the *Scabioso-Poion* alliance.

Habitats and management. *Scabioso-Poion* embrace xerophytic and mesoxerophytic steppe meadow communities of the ravine complexes with the ravine carbonate soils. The geobotanical analysis of the coenoflora demonstrates its steppization. It reflects the specialties of the conditions of habitats, as confirmed through Ellenbergs indicator values.

The coenoflora of the *Scabioso-Poion* consists of the mesophylic meadow species and xerophylic forest-steppe and steppe species, which are regionally rare. The phenomena of this kind of species distribution so far from the steppe zone is an important geobotanical question. They migrate very far to the broad-leaved forests zone from the southern parts of Nechernosemje trough the azonal landscapes of river walleyes and territories with calcareous substrates.

Protection. The floristic data (2600 points) are represented in the regional database 'Rare and protected plant species of Sudost-Desna watershed area' (Semenishchenkov, 2006). The most interesting communities of the *Scabioso-Poion* are protected in the natural reservation 'Markovsk Mountains'.

The halophyte and subhalophyte inland communities in South-East Bulgaria

Sopotlieva Desislava G.

Institute of Botany, Bulgarian Academy of Sciences, 23, Acad. G. Bonchev Str., Sofia, 1113, Bulgaria, desisop@bio.bas.bg.

The habitat type 1340* - Inland salt meadows is of high priority European importance according to the Habitats Directive (92/43/EEC). In Bulgaria such habitat is presented by the inland halophyte vegetation which has optimal development in the south-eastern part of the country due to the presence of favourable ecological conditions. Halophyte and subhalophyte vegetation of *Puccinellion limosae* Klika & Vlach 1937, *Trifolion resupinati* Micevski 1957 (ass. *Hordeeto-Caricetum distantis Micevski* 1957) and *Potentillion anserinae* Tüxen 1947 (ass. *Plantagini majoris -Lolietum perennis* (Beger 1932) Dengler & al. 2003 subass. *cynodontosum* Tüxen 1950) were studied. These communities were compared together using some of their ecological characteristics (electrical conductivity, soil acidity (pH), humus content, content of total nitrogen, etc.) and analyzed with DCA and CCA. The highest levels of conductivity were established for the communities of *Puccinellia convoluta* but also for the *Hordeeto-Caricetum distantis* association - sub-Mediterranean meadow vegetation. The opposite site, regarding conductivity level, is occupied by *Hordeetum hystricis* and *Plantagini majoris -Lolietum perennis,* traditionally determined as subhalophyte vegetation.

Microclimatic responses of forest associations to climatic change: a study case in the oak forests near Rome

Guidotti S., Testi A. & Pignatti S.

Sapienza University of Rome Dept. Plant Biology - Orto Botanico, e-mail: silvia-guidotti@libero.it.

At a local scale, forest trees have a marked influence on climate, so it is possible to define a microclimate. In a regional climate that has a particular temperature and precipitation regime, microclimate varies as a result of local topography and vegetation.
The aim of this study is to investigate and monitore the microclimates of the different forest types in Castelporziano Estate to identify changes at short and medium time, caused by interacting factors at local scale like anthropic disturbance, climatic change and territory management.
Air temperature and moisture, soil temperature and PAR-Photosynthetic Active Radiation were monthly monitored. Measurements were taken in 21 stations, 6 of which along dune transect and the other 15 stations in forest associations.
The dataset have been processed using some statistical treatments:
1- *Analysis of variance* to evaluate the homeostatic capacity of the different communities;
2- Analysis of microclimatic deviations values from mesoclimatic data, represented by Castelporziano meteo-climatic stations, to detect microclimatic differences;
3- *Multivariate Cluster Analysis* to classify the different microclimates.
Three main results were obtained:
1) Comparison between microclimatic parameters measured during 2007-2008 and previous ones (2003) showed a general tendency of all forest types to shift towards xerophilous conditions: air moisture decreased in a large percentage (20%);
2) Cluster Analysis allowed to classify vegetation in three different groups, reflecting the same patterns obtained by floristic composition;
3) Dunal vegetation displays homeostatic capacity in relationship with structural complexity increasing from pioneer communities of *Cakiletum maritimae* to mature stands of *Viburno-Quercetum ilicis*.
Microclimate results a valid and robust tool to detect the ecological *status* of species and communities, and to follow their temporal changes.

Local occurrence of *Artemisia chamaemelifolia* Will. on the Balkans

Pedashenko H., Vassilev, K. & Apostolova I.

Institute of Botany, Bulgarian Academy of Sciences, 23 Acad. Georgi Bonchev str. 1113, Sofia, Bulgaria, e-mail: Pedashenko@bio.bas.bg;

There are 13 *Artemisia* species in Bulgaria two of which occurred in the mountainous areas only. The other 11 species are spread in the lowland part of the country. Some authors suggest different origin of these two groups. *Artemisia chamaemelifolia* Vill. belongs to the mountainous group of calcicole, chasmophilous and orophitic species. It is proposed that the centre of origin for *Artemisia* was in the mountain regions of north-western Asia in mid-Tertiary, possibly from the mesothermic subarctic or semihumid forest steppe environments. The origin and subsequent development of *Artemisia* L. are closely related to major environmental variations in the geological past. The disjunct occurrence of the species might be related to glacial and postglacial periods and to Quaternary climate variation. A. *chamaemelifolia* is currently distributed in Eurasian mountains: Spanish Sierra Nevada, Cantabrian chain, Pyrenees, Alps, the Balkan range, Caucasus and the mountains of Iran. In Bulgaria it is known by a single location, situated in the Balkan Range. In 2008 we visited the site and collected 27 relevés containing this rare species. The sampled vegetation belongs to *Festuco-Brometea* and it hasn't been studied before. Communities from Caucasus containing A. *chamaemelifolia* are referred to the same class. On the western part of the areal the species is presented, by ssp. *bertolonii*, in *Thlaspietea rotundifolii* communities.

The Construction of the National Vegetation Survey Databank "EGYPT Vegetation Archive"

El-Sheikh A. Mohamed[1] & Zakareyia M. Mohamed[2]

[1] Dept of Botany, Faculty of Science, Alexandria University (Damanhour Branch), Damanhour, Egypt. E mail: el_sheikh_eg@yahoo.co.uk;

[2] Dept of Botany, Faculty of Science, Tanta University, Tanta, Egypt.

Egypt is part of the Sahara 'North African Desert' with arid climate. Its area is about one million km^2 divided by the River Nile. It has many phytogeographical regions such as 1. Nile region (valley, Delta, and Faiyum) 2. Oases of western desrt (wadi Natrun, Siwa, Farafra, Bahariya, Kharga, Dakhla, Kurkur, Dungul and uweinat), 3. The Mediterranean coastal strip, 4. Desert (Arabian Eastern 'east of Nile' and Wester Libyan desert 'west of Nile'), 5. Red sea coast, 6. Gebel Eilba (south east corner at Sudan frontier), 7. Sinai proper (south of El-Tih desert). Therefore, the biogeographical belts are: The Mediterranean, the Saharo-Arabian and Sudano-Deccanian; the highlands of southern Sinia represent an outpost of the Irano-Turanian biota; and the highlands of the southeastern corner of Egypt (the Elba region) represent the northeast outpost of the biota of the Ethiopian highlands.

EGYPT working group on vegetation databases is dedicated to the promotion of plot databank, in order to facilitate application of botanical data, to open up new paths of analysis and to encourage exchange among scientists and practioners. As a section of the Network for Phytodiversity we co-ordinate activities concerning the stimulation, capture, dissemination and utilisation of vegetation data in Egypt. This project is dedicated to the links between plant trait and vegetation data bases. Trait data summarise morphological and physiological features of plant species - plot data present a detailed description of the biotic environment in which the species are found. Linking trait and plot data banks allows us to extract the functional features of plant communities as well as to test and refine plant functional types.

Thermophilous deciduous forests in Southeastern Europe

Andraž Čarni[1], Petra Košir[1], Branko Karadžić[2], Vlado Matevski[3], Sulejman Redžić[4] & Željko Škvorc[5]

[1] Institute of Biology, Scientific Research Centre of the Slovenian Academy of Sciences and Arts, Novi trg 2, P.B. 306, SI-1001 Ljubljana, e-mail: carni@zrc-sazu.si, petraKo@zrc-sazu.si
[2] Institute for Biological Research "Siniša Stanković", 29. novembra 142, SRB-11060 Beograd, e-mail: branko.karadzic@ ibiss.bg.ac.yu
[3] Institute of Biology, Faculty of Natural Sciences and Mathematics, Gazi baba b/b, P.B. 162, MK-91 000 Skopje; e-mail: vladom@iunona.pmf.ukim.edu.mk
[4] Department of Biology, Faculty of Science, University of Sarajevo, BiH-71 000 Sarajevo, e-mail: sredzic@pmf.ba
[5] Faculty of Forestry, University of Zagreb, Svetošimunska 25, P.B. 422, HR-10 000 Zagreb, e-mail: zeljko.skvorc@zg.t-com.hr

The presentation deals with numerical elaboration of the database of 1764 relevés of thermophilous, deciduous forests classified by the authors to the order *Quercetalia pubescentis* in the northwestern part of Southeastern Europe. After elimination of relevés which were dominated by mesophilous deciduous and coniferous tree species, the stratification of relevés was carried out. The TWINSPAN classification revealed 8 ecologically and phytogeographically interpretable groups. Additionally the analysis of Pignatti indicator values passively projected on the PCA diagram of 8 groups and chorological analysis of individual groups were made. The analyses revealed that all groups in general match with the traditionally accepted alliances, such as *Quercion pubescenti-sessiliflorae, Aceri tatarici-Quercion, Quercion confertae, Quercion petraeae-cerris, Syringo-Carpinion, Pruno tenelle-Syrinion, Carpinion orientalis* and *Fraxino orni-Ostryion*. At the end the synsystematic classification of the elaborated group is proposed and the nomenclature is harmonised with the International Code of Phytosociological Nomenclature. The results are presented also in a synoptic table together with calculation of the diagnostic species.

Pasture landscapes with high biodiversity - a favourable nature conservation strategy in woodland types of the EU Habitats Directive?

Bergmeier Erwin[1], Petermann Jörg[2] & Schröder Eckhard[3]

[1] Albrecht von Haller Institute of Plant Sciences, University of Göttingen, Untere Karspüle 2, 37073 Göttingen, Germany. erwin.bergmeier@bio.uni-goettingen.de;
[2] German Aerospace Center (DLR), EUREKA/COST Bureau, Heinrich-Konen-Str. 1, 53227 Bonn, Germany;
[3] Federal Agency for Nature Conservation (BfN), Mallwitzstr. 1-3, 53177 Bonn, Germany.

Forest formations in Europe have a long history of multiple human impacts, including various forms of wood pasturing. This practice resulted in sylvopastoral formations of different character, depending on local conditions of climate, topography and geology, the regional species pool, livestock, details of land use practice, and its history. Some of the European wooded pasture formations have been recognized by 19th and 20th century botanists and geographers who introduced the local or regional name of the formation into geobotanical literature, such as the German *hudewald*, the Spanish *dehesa* or the Serbian *šibljak*, or created new ones, such as *pseudomacchie*. These sylvopastoral formations may occur as vanishing relicts of historical land use, or commonly and widespread in present-day rangeland systems, or as an economically and ecologically favourable alternative to former land use types. In Annex I of the EU Habitats Directive wood pastures are represented but rather inconsistently. In a brief review of European wood pasture formations we discuss pros and cons of their recognition in the Habitats Directive. We advocate the formal enrolment of habitat types of pasture woodland as well as of some other wooded formations of the cultural landscape in the EU conservation legislation. It would develop a momentum not only towards the preservation of regional biodiversity but also of the diversity of the cultural heritage. Sustainability provided, wood pasturing may form an important element for the economic integrity of rural areas aiming at an advanced ecological development.

Tissue element concentrations as indicators of underlying factors for vegetation gradients in fens and wet meadows - comparison of community and individual-species level

Rozbrojová Zuzana R.Z.[1] *& Hájek Michal H.M.*[2]

[1]*Institute of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-611 37 Brno, Czech Republic;* [2]*Department of Ecology, Institute of Botany, Academy of Sciences, Poříčí 3b, CZ-60300 Brno, Czech Republic. E-mail zuzkaroz@sci.muni.cz.*

Whereas determination of nutrient availability and limitation through nutrient stoichiometry in above-ground biomass of vegetation is widely practiced, especially in wetlands, using this method at the individual-species level is still rather controversial. We investigated patterns of tissue element concentrations in whole-vegetation samples and individual species along the vegetation gradients in spring fens and wet meadows in order to compare applicability of the two approaches to explain underlying ecological mechanisms for the gradients. The study was performed in the West Carpathian flysch zone. In 83 vegetation plots, total plant species composition was recorded. Samples of above-ground biomass of vegetation as well as four selected species were collected from each plot. Concentrations of N, P, K, Ca, Fe and N:P and N:K ratios of the samples were determined. Two major gradients in the study vegetation corresponded to the poor-rich gradient from acidic to calcareous fens and the fen-to-meadow gradient from the sedge-moss fens to the wet meadows rich in broad-leaved herbs. At the community level, Ca-concentration in above-ground biomass was strongly positively correlated with the poor-rich gradient, while Fe-concentration had an opposite trend. The results indicated a slight decrease of K-availability towards poor fens and lowest P-availability in calcareous tufa-forming fens. P- and K-availability as well as Ca-uptake increased along the fen-to-meadow gradient. At the individual-species level, Ca- and K-concentrations correlated well with the gradients, but results were sometimes contradictory to the community level measurements. N, P and Fe patterns appeared to be more species-specific than those of Ca and K. Sedge *Eriophorum angustifolium* displayed lower Ca- and K-concentrations than did broad-leaved herbs. We conclude that analysis with nutrient stoichiometry at the community level is more competent to indicate nutrient conditions at the site, despite a shortcoming of variable species composition of the samples. Nevertheless, results from the individual-species level may advance our understanding of ecological mechanisms underlying vegetation gradients and reveal changes in habitat conditions of the species along the gradients. This approach may be applicable in nature conservation where it could reveal early changes in habitat conditions of rare or expansive species leading to the shifts in a plant community composition.

A simple yet precise method to impute missing pH and conductivity values in ecological data sets using species composition

Lubomír Tichý, Michal Hájek & David Zelený

Institute of Botany and Zoology, Masaryk Univ., Kotlářská 2, 61137 Brno, Czech Republic; tichy@sci.muni.cz.

Many studies use the data sets of species co-occurrence data with directly measured pH or other factors for gradient analyses, species response modelling, quantifying recent vegetation change or prediction of species composition of different taxonomic groups. Large databases allow higher number of replications but still contain a huge amount of phytosociological data without direct measurements. Because the pattern of samples with directly measured values is far from randomness, researchers often decide to use less precise expert-based indicator values instead of measurements. Our question was whether imputation of missing data may suppress the existing bias and provide more exact approximations than do indicator values.
We developed a simple imputation method based on relevé similarity which estimates the missing data for vegetation plots and named it the MOSS method (mean of similar samples). We applied the method on two data sets - fens in the West Carpathians and similar habitats in Bulgaria to test the prediction success of water pH and conductivity, the most important environmental factors influencing the vegetation structure within wetlands. As based on the Root mean squared error prediction we compared the predictive power of the method with the widely used averages of Ellenberg indicator values as well as with other recently published methods based on species response curves or indicator values calibrated through direct measurements. Within one study region, the MOSS method predicted the sample pH more precisely than both the Ellenberg indicator values and the other methods. Imputation through the MOSS method appears as the best way how to predict pH value from existing data within one geographical region and thus increase number of replications or even calibrate new data sets from the same region. The method goes without expert-based indicator values that contain considerable biases.

Dry grasslands in the Western Carpathians and northern Pannonian Basin - a numerical classification

Dúbravková Daniela[1], Chytrý Milan[2], Illyés Eszter[3], Janišová Monika[4], Kállayné Szerényi Júlia[5] & Willner Wolfgang[6]

[1] Institute of Botany, Slovak Academy of Sciences, Bratislava, Slovakia; Homeland Museum, Považská Bystrica, Slovakia e-mail: daniela.dubravkova@savba.sk;
[2] Department of Botany and Zoology, Masaryk University, Brno, Czech Republic;
[3-5] Institute of Ecology and Botany, Hungarian Academy of Sciences, Vácrátót, Hungary;
[4] Institute of Botany, Slovak Academy of Sciences, Bratislava, Slovakia; Faculty of Natural Sciences, Matej Bel University, Banská Bystrica, Slovakia;
[6] Vienna Institute for Nature Conservation and Analyses (VINCA), Vienna, Austria.

In eastern-central European countries (Austria, the Czech Republic, Hungary, Slovakia) phytosociological studies of dry grassland vegetation have been done separately in the past, which resulted in diverse syntaxonomical evaluations. Numerous associations and subassociations have been described and used in last decades, many of them reflecting local variation of dry grasslands within small regions. This made the classification of dry grasslands extremely unclear. Only creation of national databases of phytosociological relevés has enabled to perform comparative studies over broader region. In the Czech Republic and Slovakia new national surveys of dry grassland vegetation have been done recently using national phytosociological databases (Chytrý et al. 2007, Janišová et al. 2007). However, an over-national survey covering dry grasslands in a narrow sense, i.e. the *Bromo pannonici-Festucion pallentis, Festucion valesiacae* and *Koelerio-Phleion phleoidis* alliances, has been still missing. The purpose of the present study is to bridge this gap for the area of the Western Carpathians and northern Pannonian Basin. Our aims are: (1) to perform numerical classification of dry grasslands in this region using a large international geographically stratified data set, (2) to identify geographical ranges and diagnostic, constant and dominant species of the main types of dry grasslands, (3) to interpret clusters from numerical classification as syntaxa described in phytosociological literature, (4) to summarize broad patterns of floristic variation in dry grasslands of the studied regions. We believe that this study may contribute to consolidation of national vegetation classifications and habitat typologies, which might be helpful for conservation purposes across national boundaries.
We prepared a stratified data set consisting of 2 686 relevés of the *Bromo pannonici-Festucion pallentis, Festucion valesiacae* and *Koelerio-Phleion phleoidis* alliances. The study presents results of the modified TWINSPAN classification (Role_ek et al. 2009. We used 25 clusters for floristical and ecological interpretation. The majority of clusters can be assigned to one or more previously described associations. For each cluster we present syntaxonomical classification, list of diagnostic, constant and dominant species, short description and distribution map. The diagnostic species of individual clusters were determined by calculating the *phi* coefficient as a fidelity measure. The major pattern of variation in species composition of the analysed data set corresponds to soil nutrient availability, pH and moisture.
Financial support: VEGA 2/0181/09

On the concept of ecological similarity in vegetation science

Roleček Jan[1] *& Kintrova Katerina*[2]

[1] *Institute of Botany, Masaryk University, Brno, Czech Republic, Kotlarska 2, 611 37; honza.rolecek@centrum.cz.*
[2] *Institute of Botany, Masaryk University.*

Similarity measures belong to most commonly used and useful analytical tools in ecology. Dozens of different similarity measures have been proposed and applied for various purposes in ecological research. As the use of different measures may yield quite different results, selection of an appropriate measure for a particular purpose is of crucial importance for any analysis. Various aspects of selection of appropriate similarity measures in ecological community studies are discussed. It is assumed that distinction between compositional and ecological similarity may be useful in community ecology, including vegetation science.

The Role of the Southern Species in the Flora and Vegetation of Jaba Valley Region (Somogy County, Hungary)

Szabo Istvan & Kercsmar Vilmos

Pannon University Georgicon Faculty Dept of Plant Science and Biotechnology, Hungary 8360 Keszthely P.O.B. 66. il-szabo@georgikon.hu.

Southern areal-geographical elements of the Hungarian flora should be devided into two groups. One of them includes the species of sub-Mediterranean, East-sub-Mediterranean, Pontus-sub-Mediterranean and Mediterranean area. The second group consists of elements of Balkan, Pannonian-Balkan, Alpine-Balkan and Illyrian floristic-geographical area. According to Hortobágyi and Simon (1981) the ratio of the southern elements is 2% for Balkan and 18% for sub-Mediterran type for about 2200 vascular plant species of Hungary.

The ratio of southern elements is generally highest on the southern slopes of Mecsek and Villányi Mts for Hungary. These sub-Mediterranean habitats seem to be familiar to the slopes of similar ecological features of Balaton-Highland covered by *Bromo-Festucion pallentis* dry grasslands and *Quercetea pubescentis* oak woods. The study area (Jaba Valley) is situated between them establishing a way of flora-migrations, and, at the same time, it is in intermediate position between Prae-Illyricum and Eu-Pannonicum.

We have been dealing with floristic and plant-sociological studies of this poorly discovered region since 2005 regarding dry grasslands and thermophylous forests, first of all. We have found some new species for the region and southern Trans-Danube, and, especially on the northern margine of their area (*Helleborus odorus*). The statistics given below is based upon this research.

The ratio of Eurasian elements (28,7%) exceeds of the average for Hungary (22,5%), while the ratio of sub-Mediterranean and Balkanic species (18,5%) is slightly below that. These elements proved to be connected to dry grasslands and oak scrubs on southern slopes. The ratio of southern elements (28,7%) is higher that of Eurasian group (21,5%) in dry grasslands, and, it is 36,0% in oak woods against the values of 34,0% for European and 20,0% for Eurasian elements respectively. It is remarkable that the ratio of southern elements is also higher (23,94%) for *Helleboro-Carpinetum*.

Thermophilous wetland plant species in the Czech Republic - distribution changes as a consequence of human impact

Sumberova Katerina

Institute of Botany, Department of Ecology, Academy of Sciences of the Czech Republic, Porici 2b, 603 00 Brno; sumberova@brno.cas.cz.

In the Czech Republic, more wetland plant species prefer lowland regions with average annual temperatures about 9°C and sum of precipitations 500-600 mm. Such conditions are limiting for the species with main distribution range in warmer regions of Eurasia, e.g. *Nymphoides peltata, Lindernia procumbens* or *Cyperus michelianus*. They are considered as declining in the Central Europe due to landscape and management changes. However, in fact these species have never been really frequent in this region. On the contrary, in last two decades more frequent occurrence of these rare species has been observed. The same applies for the species common only to the warm regions of the Czech Republic, e.g. *Lemna gibba*, *Ceratophyllum demersum* and *Cyperus fuscus*. Using both own field data and the data from literature and the Czech National Phytosociological Database, character and causes of these changes were analysed. The changes can be detected on different scale in space and time: (1) distribution change - penetration of thermophilous species into colder regions; (2) higher frequency of species with fluctuating occurrence; (3) tendency to predominate in stands, development of own communities; (4) expansive growth, high biomass production. Factors supporting such changes are: (a) habitat - special wetland types, e.g. village ponds or fish storage ponds; (b) soil and water chemistry - changes connected with eutrophication, fertilisation and liming in higher altitudes, road salting; (c) climate - series of extraordinary mild winters and dry and hot summers; (d) dispersal possibilities - easy propagule dispersal (anthropochory, ornitochory), deliberate planting; (e) succession and disturbance - management and mechanical disturbances eliminating competition of other species. As the majority of these factors and their interactions are man-influenced or -caused, the distribution changes of many wetland species may be regarded as a consequence of human impact.

The diversity of steppe communities (class *Festuco-Brometea*) of South Ural (Russia)

Yamalov S. & Bayanov A.

Bashkir State University, Frunze, 32 Ufa, Russia. e-mail: geobotanika@rambler.ru.

In Southern Urals steppe ecosystems are related with Pre-Urals and Trans-Urals forest-steppe and steppe zones. Steppes of Southern Urals were ploughed up everywhere in the XX-th century. The largest part of plough-land (72-74 %) is situated at the northern, northeast and southern forest-steppe. The mean part of plough-land (50-68 %) is at the steppe zone of Pre-Urals and Trans-Urals. In consequence of low relative pasturages density, the remained steppe plots either were exposed intensive pasture and were transformed in unproductive communities, or have remained fragmentary at tops and slopes of hill. Today works on remained elements inventory of region steppe vegetation for the working out of measures on their protection are actual.

The investigation level of Southern Urals steppe vegetation remains weak and does not give an idea of a region steppe variety. There are 1000 geobotanical relev's, made from 1986 to 2008, were used for this investigation. The syntaxonomy analysis is executed on Braun-Blanquet method with use of software package TURBOVEG.

Research has shown, that vegetation steppe type of class *Festuco-Brometea* in Southern Urals are differentiated on two main subtypes - meadow steppes (order *Festucetalia valesiacae*) and true steppes (order *Helictotricho-Stipetalia*). Meadow steppes are a leading component of a forest-steppe zone. The second subtype represents the real steppes of zavolzhsko-kazakhstan type, which are typical only for southern areas of a steppe zone. The syntaxonomy analysis has revealed overlap of these orders combinations, and so species of the true steppes, such as *Helictotrichon desertorum, Potentilla humifusa, Carex supina, Euphorbia subcordata* etc., are background for all communities. Therefore rich meadow steppes species of order *Festucetalia valesiacae* (*Amoria monatana, Plantago urvillei, Adonis vernalis, Inula hirta*) are the differentiating species.

The general variety of studied territory steppes is presented by 9 types of communities, 4 from which represent zone vegetation from meadow and real steppes, others - petrophyte, calciphyte and bush variants of these steppes. Communities with prevalence *Stipa zalesskii, Stipa lessingiana, Stipa pennata* and *Stipa pulcherrima* are zone variants of steppes. Steppes of a mountain-forest zone, which differ by saum species group presence, are especial extrazonal type of steppe vegetation in Southern Urals.

Invasion alien plants in thermophilous communities of steppe zone of South Urals

Abramova L.M.

Botanical Garden-Institute Ufa Scientific Centre RAS, e-mail: abramova.lm@mail.ru.

Late decades there is an active adventization process in South Urals. Annually about 2 new allien species are found in the region. According to our data 25 adventive species are likely to be considered invasive, among them those of a genus *Ambrosia*, *Cyclachaena (Iva) xanthiifolia*, *Hordeum jubatum*, *Echinocystis lobata*, *Bidens frondosa* etc. Invasion the allien plants in thermophilous communities of steppe zone of South Urals lead to formation the derivate communities with dominanted invasive plants, as an example are presented in table.

Table. Derivate communities *Cyclachaena xanthiifolia* [*Artemisietea/Chenopodietea*]

Namber of relevais	1	2	25	26	11	12	17	18	40	76	Constancy
Cover degree, %	80	75	90	90	85	90	90	75	95	90	
Namber of species	14	17	22	15	11	18	19	21	20	14	
Cyclachaena xanthiifolia	4	4	1	2	4	3	4	4	5	5	V3-4
Д.в. Artemisietea vulgaris											
Artemisia absinthium	+	+	+	+		r	r	+	+	+	V
Carduus acanthoides	+	+	+	+	+	+	+	+	+	+	V
Arctium tomentosum		+	+	+	r				+		III
Elytrigia repens		+			+	+	+			+	III
Leonurus quinquelobatus	+		+				+	+		r	III
Onopordum acanthium	+	+	+		+	r				r	III
Achillea millefolium					r	+			+		II
Arctium lappa			+	+		r					II
Cynoglossum officinale		+				+				+	II
Д.в. Chenopodietea											
Cannabis ruderalis			+		1	2	1	2	+	+	IV
Chenopodium album		+	1	1	+	+	+	+		+	IV
Convolvulus arvensis			+	+	+	+	+	+	+	+	IV
Tripleurospermum perforatum	+				+	+	+	+	+		III
Amaranthus retroflexus	+		3	3					+		II
Ambrosia trifida			+		+				+		II
Atriplex tatarica	1	1							+	+	II
Sisymbrium loeselii	+	+					+	+			II
Д.в. Plantaginetea majoris											
Polygonum aviculare	1	2					+	+	1		III
Malva pusilla	+	+	+								II

Single are presented: *Artemisia abrotanum* 18, 40(+), *Artemisia sieversiana* 25, 26(+), *Atriplex sagittata* 25, 26(+), *Atriplex patula* 17, 40(+), *Berteroa incana* 25, 26(+), *Capsella bursa-pastoris* 1, 2(+), *Conium maculatum* 25, 26(+), *Consolida regalis* 17, 18(+), *Lactuca serriola* 12, 76(+), *Lappula squarrosa* 2, 40(+), *Leonurus glaucescens* 25, 26(+), *Panicum miliaceum* 25, 26(+), *Salvia tesquicola* 12(r), 18(+), *Thlaspi arvense* 17, 18(+), *Urtica dioica* 25, 26(+), *Xanthium albinum* 25, 26(+), *Artemisia vulgaris* 40(+), *Bromopsis inermis* 40(+), *Bromus secalinus* 18(+), *Camelina microcarpa* 18(+), *Lepidotheca suaveolens* 1(+), *Chenopodium opulifolium* 25(+), *Chenopodium strictum* 18(+), *Cichorium intybus* 18(+), *Conioselinum tataricum* 17(r), *Descurainia sophia* 2(+), *Echinops sphaerocephalus* 12(+), *Eryngium planum* 18(+), *Falcaria vulgaris* 18(+), *Fallopia convolvulus* 18(+), *Galium aparine* 12(+), *Galium verum* 12(+), *Kochia scoparia* 40(+), *Lavatera thuringiaca* 76(r), *Plantago major* 1(+), *Poa pratensis* 12(+), *Potentilla argentea* 40(+), *Solanum nigrum* 40(r), *Taraxacum officinale* 2(+), *Trifolium pratense* 17(r), *Vicia cracca* 76(+).

Vegetation cover of thermal fields and hot spring environs of the Kamchatka Peninsula (Russian Far East)

Neshataeva Valentina

Komarov Botanical Institute Russian Academy of Science, Prof. Popov Str., 2, St.-Petersburg, 197376, Russia e-mail: vneshataeva@mail.ru.

The Kamchatka Peninsula situated north of the Russian Far East region is notable for its 30 active volcanoes, geysers and numerous hot springs. The thermal sites of Kamchatka are separated from the adjacent areas by the soil isotherm +20˚C at the depth of 1 m. Different temperatures and chemical composition of thermal water, steam, gas and substrata form specific thermal environments. The specific thermophilic plant communities arise at these environments.

The vascular flora of Kamchatka hot spring environs contains 292 species represented by 171 genera and 62 families. 14 species are considered to be obligatory thermophytes: *Ophioglossum thermale, Fimbristylis ochotensis, Bidens kamtschatica, Agrostis pauzhetica, A. geminata, A. exarata, Eleocharis thermalis, E. kamtschatica, Lycopus uniflorus, Juncus articulatus, Puccinellia kamtschatica, Spiranthes sinensis, Primula sachalinensis, Chenopodium glaucum*. On the thermal fields with the temperature 50-70^0 C at the depth of 50 cm only 10 species of vascular plants were found: *Carex appendiculata, C. pauzhetica, Trientalis europaea, Oreopteris quelpaertensis, Lycopus uniflorus, Agrostis pauzhetica, Calamagrostis purpurea, Artemisia opulenta, Cirsium kamtschaticum, Glyceria alnasteretum*.

The hot spring environs are considered to be refuges of early-Pleistocene species that have disappeared completely at the other parts of Kamchatka peninsula during the Pleistocene glaciations. Some relic species were found there, mostly orchids (*Oreorchis patens, Platanthera camtshatica, Spiranthes sinensis, Epipactis papillosa*), ferns (*Oreopteris quelpaertensis, Asplenium viride, Ophioglossum thermale, Thelypteris, Parathelypteris*), liliaceous (*Gagea nakaiana*) and buttercups (*Anemone amurensis, A. dichotoma*).

Unique thermophilic plant community types occur near the hot springs. Vegetation cover is composed by plant communities usually predominated by *Fimbrystilis ochotensis, Agrostis geminata, Eleocharis uniglumis, Juncus filiformis, Ophioglossum thermale, Oreopteris quelpaertensis, Deshampsia glauca* and some others. Alternation of vegetation microzones reflect microtopography, thermal water temperature and water and soil chemistry. Because of the high specificity of environmental conditions the plant communities of various types of hot springs differ from each other significantly in floristic composition and community structure.

Landscape approach for conservation-oriented management of Atlantic lagoons

Bonis Anne[1], Membrey Céline[2] & Bouzillé Jan-Bernard[3]

[1] CNRS UMR Ecobio Campus de Beaulieu 35042 Rennes (France) anne.bonis@univ-rennes1.fr;
[2] UMR Ecobio Campus de Beaulieu 35042 Rennes (France);
[3] Professeur UMR Ecobio Campus de Beaulieu 35042 Rennes (France).

Atlantic lagoons constitute an habitat type distinguished by the EC "Habitats" Directive (1992) as of community importance and even priority. Spread along the French Atlantic coast, such lagoons correspond to ancient salt pans, established by man work since XI century. Salt production is now dropped in most of those marsh-lands.
A large panel of vegetation types could be observed in those coastal lagoons, from freshwater to brackish, depending from ancient and present management practices. Management practices controlled the water conductivity and the flooding duration as well as the use of vegetation resources. Lagoons dominated by *Bolboschoenus maritimus* are of particular extent and importance due to the use of this plant species for traditional roof in thatched cottage.
Phytosociological analysis were conducted from relevés realized on 107 lagoons, taking into account both the centre and the edge of the pans. Eighteen communities types were identified, from aquatic to terrestrial, with 14 were found of community importance and six are priority. Several communities coexist within-site and most of the coastal lagoons indeed constitute an habitat-complex.
Using phytosociological method adapted for the landscape scale, and after multivariate data analysis, 9 habitat-complexes were described, which can be repetitively found. The habitat type 'coastal lagoon' thus corresponds to a variety of habitat-complexes and this diversity is related to both within and between-sites contrasts in term of water regime and land-use management.
Accordingly, favourable conditions for the habitat type 'coastal lagoon' have to be looked at the landscape scale to address the managing and conserving challenge for the variety of vegetation units. Indeed, a panel of management modes (cf grazing intensity, mowing) and of water conductivity and flooding duration appear as a basic requirements for maximizing the diversity of vegetation units expressed in lagoons.
Management designed with explicit landscape-reference is thus required to address both conservation and socio-economics targets and constraints.

Adaptative strategies of psammophilous species.

Gratani L., Varone L. & Crescente M.F.

Department of Plant Biology, Sapienza University of Rome, P.le A. Moro, 5 00185 Rome, Italy. E-mail of correspondig author: loretta.gratani@uniroma1.it.

The psammophilous species have evolved different plant and leaf traits to cope with stress factors. They grow on a physiologically dried substrate characterized by a low capacity to water withhold, and a low nutrient content. Moreover, the sand raised by the wind, associated to high irradiance levels and high air temperatures in summer cause the erosion of the below-ground plant portion. Nevertheless, not all psammophilous species are able to withstand the same type or intensities of environmental stress.
The main objective of our study is to analyze the phenological cycle, morphological and physiological leaf traits of the most representative species of the psammophilous vegetation developing inside the Presidential Estate of Castelporziano (41°45'N, 12°26'E, S - SW of Rome, Italy), in order to define their adaptative strategies. *Cakile maritima* Scop. subsp. *maritima*, *Elymus farctus* (Viv.) Runemark *ex* Melderis subsp. *farctus*, *Ammophila arenaria* (L.) Link subsp. *australis* (Mabille) Lainz, *Ononis variegata* L., *Pancratium maritimum* L., *Eryngium maritimum* L., *Anthemis maritima* L. were considered. Moreover, we want to determine the most discriminating traits defining their adaptive strategy. At phenological level, vegetative activity, flowering, fruiting and leaf senescence are analyzed, and the relative growth rate (RGR) is measured. At leaf level, leaf area and leaf dry mass, net photosynthesis and leaf water potential are analyzed. The structure of leaves has important implications for the performance of plants in specific habitats. The results on the whole underline the influence of air temperature on the beginning and the length of the phenophases. Among the considered species, *C. maritima* and *A. maritima* are the best adapted species to the low air temperature; moreover, their highest photosynthetic rates may be justified by the highest specific leaf area (SLA).
The results allow us to hypothesize the response of the considered species to increasing stress factors including global change.

In wild *ex situ* conservation of a rare and endangered species: the self-sustaining translocation of the thermophilous *Cyperus polystachyos* in a agricultural Protected Area

Crosti R.[1], Fabrini G.[2] & Morgutti A.[3]

[1] School of Environmental Science, Murdoch University, Western Australia robertocrosti@libero.it;
[2] Department of Plant Biology, Sapienza University of Rome, P.le A. Moro 5, 00185 Roma, Italy;
[3] Climax Cooperativa Ambientale Via A. Fava 46, 00135 Roma, Italy.

Cyperus polystachyos Rottb. is a threatened species occurring in Europe only in two sites located in mediterranean southern Italy in marshland habitat. The species is listed as critically endangered (CR) according to the IUCN red list for Italy (1997).
This study investigated the recruitment and habitat limitation of the population located south of Rome (Tor Caldara) where the species has an annual behaviour. The site is an isolated island of vegetation and natural expansion is highly limited by absence of marshlands in the surroundings.
Importantly the study also endorsed an "in wild translocation program" aimed to maintain a self-sustaining population in order to increase the conservation status of the species. The program will decrease the risk of extinction connected to demographic stochasticity, climatic extreme events or wrong management.
Seed limitation, seed germination and site limitation were investigated. Seed viability and seed germination (in germination cabinet and in greenhouse) were tested at the Rome Botanical Garden; results showed that the species has high recruitment potential especially in thermophilous conditions. Germplasm (seeds) was translocated in a vegetation remnant within the Protected Area of Decima Malafede (distinguished by farmland ecosystem) managed by RomaNatura, a Regional Agency for the management of Protected Areas, which is partner in this research. The site limitation and translocation studies were undertaken in an open glade with a seasonal pond *(Nanocyperetalia)*. Seeds were sown following an experimental design and protected by a metal cage to exclude grazing.
The new site is within the natural dispersion range of the species; belongs to the same phytoclimatic unit and shows similar hydrogeological conditions. Furthermore it is surrounded by thermophilous oak woodland and cultivated fields which exclude germplasm escape. Results showed that, due to the germination behaviour, the establishment is limited by the absence of microsites suitable for recruitment. Competition with perennial species and delayed germination are the main obstacle for recruitment especially in presence of prolonged drought episodes under climatic changes. The translocation process was successful. Values of new seed set, seed viability and germination were similar to the ones present in the original site. Tagging, monitoring and evaluation of ongoing care are also carried out.
Final outcomes will be useful both for the conservation of the species (this study also detected other sites, within Protected Areas, suitable for translocation) and for the realization of an Italian handbook for ex situ conservation of threatened species.

Regularities of distribution of the xerothermic plant communities in the Islice river valley

Gustina Lauma

Department of Geography, University of Latvia. Rainis blvd. 19. LV-1586, Latvia.
E-mail: lauma.gustina@lu.lv.

Xerothermic plant communities among the others are notable with a great diversity of species, and the area of these communities is rapidly decreasing. In many places in Latvia and in Europe xerothermic plant communities are described on river valley slopes. This study was realized in Zemgale's lowland, in valley of river Islice, the left shore tributary of river Lielupe.
Aims of the paper are to find out, if xerothermic plant communities are developed in the valley of river Islice and which environmental factors are governing distributions of these plant communities in the valley of the river. To accomplish the aims, xerothermic plant communities of the valley had been mapped, slope and aspect of valley as well as soil's chemical and physical properties had been identified.
Vegetation described on 2 x 2 m size plots (in forest stand - 5 x 5 m), all vascular plant species growing in the plot were recorded. For plant community classification cluster analysis method was used. For determining of topographic and meteorological (the amount of solar radiation) factors the computer software's ArcView 9.2 Spatial Analyst extension had been used, as well as the topographic map in scale 1:10 000. Soil carbonates were detected with 10% hydrochloric acid (HCl), the soil pH - with universal indicator (KCl), but the soil granulometry determined using sensory (touch, sight, ear etc.) methods.
Eight syntaxa had been described during the research in the valley of river Islice. One belongs to class *Quercus - Fagetea,* five to class *Festuco - Brometea,* one class *Trifolio - Geranietea* and one sintaxa to class *Molino - Arrhenatheretea.* Six of the described plant communities can be regarded as xerothermic, but two as mesophytic. Placements of relevés of xerothermic plant communities in Islice river valley had been found mostly on slopes oriented to NE and SE direction with inclination angle ≥ 15°. Essential importance of location of the described plant communities has six environmental factors: light, angle of the slope, soil pH, soil moisture, soil granulometry and the amount of nitrogen in soil. Edaphic factors, influenced by slope, have bigger importance.

Phytosociological affiliation of *Tephoseris longifolia* ssp. *moravica* and two related species in the Western Carpathians

Hegedüšová Katarína[1], Janišová Monika[2], Škodová Iveta[3] & Kochjarová Judita[4]

[1] Institut of Botany, SAS, Dúbravská cesta 14, 845 23 Bratislava, Slovak Republic, katarina.hegedusova@savba.sk;
[2] Institut of Botany, SAS, Dúbravská cesta 14, 845 23 Bratislava, Slovak Republic, monika.janisova@savba.sk, University of Matej Bel, Faculty of Natural Sciences, Tajovského 40, 974 01 Banská Bystrica, Slovak Republic;
[3] Institut of Botany, SAS, Dúbravská cesta 14, 845 23 Bratislava, Slovak Republic, iveta.skodova@savba.sk;
[4] Comenius University Botanical garden, detached unit, 03815 Blatnica, Slovak Republic, kochjarova@rec.uniba.sk.

Tephroseris longifolia subsp. *moravica* is a critically endangered endemic taxon of Carpathian flora included in the European list of important species. Recently, nine localities are known and monitored (4 in the Czech Republic and 5 in Slovakia). Its occurrence is restricted to very specific and vulnerable habitats. We studied phytosociological affiliation of *T. longifolia* subsp. *moravica* in comparison with two related species, *Tephroseris integrifolia* and *Tephroseris crispa*, which distribution overlaps in the Western Carpathians. The main question was to determine plant communities inhabited by the studied taxa and the strength of their coenological specialization. For the analyses we used phytosociological relevés stored in the Slovak and Czech phytosociological databases. Grassland syntaxa were classified according to the electronic expert system, while other communities were classified according to the original authors.

The communities with the occurrence of *T. longifolia* ssp. *moravica* can be classified within the alliances *Bromion erecti* and *Arrhenatherion elatioris*. Some populations grow in the ecotone zone between meadows and beech forests which is difficult to classify. The coenological affiliation of *T. integrifolia* is rather broad - it was recorded in communities of the alliances *Cirsio-Brachypodion pinnati, Bromion erecti, Bromo pannonici-Festucion pallentis, Diantho lumnitzeri-Seslerion, Festucion valesiacea, Nardo strictae-Agrostion tenuis, Violion caninae, Geranion sanguinei* and *Quercion pubescentis-petraeae*. *T. crispa* occurs mostly in communities of the *Calthion palustris*, but occasionally it grows in wetlands of the alliances *Alnion incanae, Cardaminion amarae, Caricion davallianae, Petasiton officinalis* and *Sphagno recurvi-Caricion canescentis*.

In summary, *T. longifolia* subsp. *moravica* has the narrowest coenological niche. The communities of *Bromion erecti* represent the habitat conditions of its potential common occurrence with *T. integrifolia*. The coenological differences of the three studied species were confirmed also by the ecological analyses of Ellenberg indicator values. There are no records of hybrids between *Tephroseris* taxa in the relevant literature overall the distribution area of the studied taxa. They are all polyploids with 2n = 48 and there are several possibilities of their occurrence in the same locality within the studied area. Thus the existence of hybrids cannot be ruled out.

Financial support: VEGA 2/0017/08, 2/0181/09.

Temporal trends of occurrence and species composition of calcareous dry grasslands in the German vegetation database

Jandt Ute & Bruelheide Helge

Institute for Biology/Geobotany and Botanical Garden, Am Kirchtor 1, D-06108 Halle.
Email: ute.jandt@botanik.uni-halle.de.

Species rich dry grassland vegetation of the class *Festuco-Brometea* in Germany occurs on shallow soils on calcareous bedrock types. Typically, the suitable sites are microclimatically warmer and drier than their surroundings. The distribution of calcareous dry grasslands is therefore restricted to suitable sites and stands do only persist over time under the traditional management regime of extensive grazing by cattle or sheep or more rarely, by hay making. During the last decades traditional land use has diminished dramatically and nowadays many former dry grassland sites have disappeared either due to land use abandonment or intensification. In the remaining areas dry grassland management is often supervised and paid for by nature conservancy agencies. Our aim is to assess the species composition of dry grasslands over time. We hypothesize, that dry grasslands have not maintained high species richness per superficial area, and additionally have suffered a shift in species composition towards ruderal and more mesophilous vegetation types. Vegetation relevés of several regions in Germany have been analysed for a time period of about 80 years. The results derived from this analysis are of practical value for nature conservation as they give insight into the ongoing processes of diversity loss in these endangered vegetation types. In addition, they provide basic knowledge on the mechanisms of species occurrence over time.

The comparison of long-term tree structure dynamics in Oranienbaum Park and LTA Park (North-West Russia)

Alexander Dobrovolsky

Saint-Petersburg State Forest Technical Academy Address: Institutsky, 5, Saint-Petersburg, Russia, E-mail: alexander-83@yandex.ru.

The study was based on the data obtained during the 24-years observation period of tree mortality in the Saint-Petersburg State Forest Technical Academy's park (FTA Park) and Oranienbaum Park.

The basis for the study was made up by a total of 15443 sample trees (2187 trees - FTA Park, 13256 trees - Oranienbaum Park) which were measured (height, dbh, vitality, status) and mapped at scale 1:500 at two different occasions in the year 1983 and 2007.

These parks are situated at the northern border of the European hemi-boreal zone defined by northern distribution limits of several deciduous species. Over 1981-2007, tree mortality rates in both parks varried between 1 to 3 % annually for healthy and moderately healthy trees, and between 3.9 and 9.3% for declining trees.

In Oranienbaum Park the lowest mortality rates were observed for *Tilia cordata* and *Quercus robur* (0.8 and 1.0%, respectively), and the highest rate - for *Betula pubescens* (2.7%).

In FTA Park the lowest mortality rates were observed for *Acer platanoides* (0.8%), and the highest - for *Ulmus glabra* (1.9%).

The analysis of the mortality rates in different age groups of different tree species showed that the greatest mortality for the majority of species was observed in young (<40 years old) and old (>100 years old) age groups. Mortality rate of maple, lime and oak increased with age.

For maple, oak, linden and spruce significant differences ($P < 0.05$) between average diameters of the alive and dead trees were detected. Thus, in the younger and middle age groups diameter of dead trees less than the average diameter for the same age groups. Within the group of old trees (> 100 years), trees died after 1981 were significantly higher than living trees.

The mortality rate of old and middle aged trees was higher mostly in open stands. We also found that for the young oak and maple trees mortality rate as higher as higher the canopy closeness. For lime the relationship between mortality rate and canopy closeness appeared to be opposite.

Field observations also indicated that most of the mortality events were not wind-related, which suggest that light-conditions and competition were apparently important mortality factors.

The basiphilous semi-dry grasslands *(Festuco-Brometea)* in N and NE Europe: from a vegetation database to a consistent large-scale classification

Dengler Jürgen[1], Rūsiņa Solvita[2], Boch Steffen[3] & Löbel Swantje[4]

[1] Plant Systematics and Vegetation Ecology, Biocentre Klein Flottbek, University of Hamburg, Ohnhorststr. 18, 22609 Hamburg, Germany; email: dengler@botanik.uni-hamburg.de;
[2] Faculty of Geography and Earth Sciences, University of Latvia, Raina boul, 19, 1586 Riga, Latvia email: rusina@lu.lv;
[3] Institute of Plant Sciences, University of Bern, Altenbergrain 21, 3013 Bern, Switzerland; email: steffen.boch@ips.uni-bern.ch;
[4] Department of Plant Ecology, Evolutionary Biology Centre, Uppsala University, Villavägen 14, 75236 Uppsala, Sweden; email: swantje.lobel@ebc.uu.se.

The aim of our study was to develop a comprehensive and consistent classification of the basiphilous semi-dry grasslands *(Festuco-Brometea)* in the Nordic (Scandinavian) and circum-Baltic regions. This area includes ten countries or parts of them, namely Norway, Sweden, Finland, Russia, Estonia, Latvia, Lithuania, Poland, Germany, and Denmark. Further, we aim to unravel gradients in species composition and species richness across the studied regions and reveal the role of relevant ecological factors structuring the complexity of the *Festuco-Brometea*.

For the purpose of this study, we made use of the phytosociological database of the "Working Group on Dry Grasslands in the Nordic and Baltic Region", which is a joint project of colleagues from all ten listed countries. Ultimately, our aim is to include in the database all available relevés (both published and unpublished) of the dry grasslands and related vegetation types from the study area. As prerequisites for inclusion of the plots into the database we consider the size of the releves not to lie outside 1 m^2 and 100 m^2 and presence of basic metainformation on the locality of a relevé. Presently, the database contains some 8,000 of the ca. 20,000 suitable relevés we are aware of. For the present study, we attempted to enter at least all relevés showing obvious similarities to the *Festuco-Brometea*.

The first decisive step in any classification is to delimit the syntaxon in focus unambiguously throughout the studied data set. It is evident that this delimitation can neither be based on the original assignment of the relevés nor on an a priori classification of all vegetation types of that area (as such a system is not available). Thus, we used generally accepted diagnostic taxa of relevant classes and assigned each relevé to the one class whose diagnostic species prevailed. The obtained sub-set of the *Festuco-Brometea* relevés was than subjected to various classification analyses. We present the pros and cons of each approach used and present a new, robust phytosociological classification of the studied communities.

European Dry Grassland Group - a new network for dry grassland research and conservation

Janišová Monika[1], Rūsiņa Solvita[2] & Dengler Jürgen[3]

[1] Institute of Botany, Slovak Academy of Sciences, Ďumbierska 1, 974 11 Banská Bystrica, Slovak Republic, email:monika monika.janisova@savba.sk;
[2] Faculty of Geography and Earth Sciences, University of Latvia, Raina boul, 19, 1586 Riga, Latvia e-mail: rusina@lu.lv;
[3] Plant Systematics and Vegetation Ecology, Biocentre Klein Flottbek, University of Hamburg, Ohnhorststr. 18, 22609 Hamburg, Germany; email: dengler@botanik.uni-hamburg.de.

The European Dry Grassland Group (EDGG) has been established in August 2008 by fusion of the German "Arbeitsgruppe Trockenrasen" and the "Working Group on Dry Grasslands in the Nordic and Baltic Region". It is an informal network of dry grassland researchers and conservationists throughout Europe, presently involving 250 members from 35 countries. Research interests of its members include all aspects of dry grasslands: flora, fauna, diversity, ecology, population biology, management, conservation, restoration, environmental legislation and education.
The basic aim of the EDGG is to stimulate the exchange of ideas and data as well as cooperation across national borders. For this purpose, EDGG has developed four major tools:
1) the homepage (http://www.edgg.org);
2) the newsletter with a quarterly periodicity (http://www.edgg.org/publications.htm);
3) the mailing list for urgent issues;
4) annual conferences at varying topics and locations (http://www.edgg.org/events.htm).

During the short time of its existence, the EDGG provided its members with relevant information on the past and forthcoming scientific events and new publications, introduced dry grassland research in Latvia and several remarkable dry grassland sites. Moreover, a forum for questions, calls and other communication forms is available through the homepage or Bulletin of the EDGG.
The 6th European Dry Grassland Meeting will be held from 31 August to 2 September in Halle (Germany) with the main topic "Dry grasslands - species interaction and distribution". Registration is open and we are looking forward to your participation.
Finally, we cordially invite all interested colleagues to join EDGG (without any obligations) and to contribute to its activities.

Halophytic vegetation of grass steppes and desert steppes between Volga and Ural (Russia)

Lysenko Tatiana

Institute of Ecology of the Volga river basin RAS, Komzin str. 10, Togliatti, 445003 Russia, e-mail: ltm2000@mail.ru.

The area of the research lies in two subzones of the steppe zone - grass steppes and desert steppes - between the Volga and the Ural River within the Russian Federation. It includes the southern parts of Samara region, the western part of Orenburg region, the central, eastern and southern parts of Saratov and Volgograd regions and the northern part of Astrakhan region.
Applying the method of J. Braun-Blanquet in 1994-2007 were done 1392 geobotanical relevés in the investigated area. All the relevés of the salinized habitats were accumulated in the database created with the help of the TURBOVEG software package. The groups of the plant communities which are similar in their floristic composition have been allocated. Identification and the name of the new syntaxonomical units were performed in conformity with ICPN. The syntaxonomic system of halophytic communities was applied using the list of higher syntaxonomic units of SynBioSys Europe. During the studies 57 syntaxa were determined.
The communities dominated by halophytic therophytes *(Thero-Salicornietea, Thero-Salicornietalia, Salicornion herbaceae)* are spread in the valleys of the rivers as well as on the lake shores on wet solonchaks and are characteristic of grass and desert steppes. The communities dominated by halophytic therophytes and hemicryptophytes *(Festuco-Puccinellietea, Puccinellietalia, Camphorosmo-Suaedion corniculatae)* can be found only in the grass steppe on the depressions with saline soils of the hights Obtschschij Syrt. The communities dominated by halophytic hemicryptophytes of the alliance *Festuco valesiacae-Limonion gmelinii (Festuco-Puccinellietea, Festuco valesiacae-Limonietalia gmelinii)* can be found on the slopes and in the depressions as well as on the watersheds with solonets-soils in the most of the grass steppes and also desert steppes. The communities dominated by halophytic chamaephytes *(Festuco-Puccinellietea, Artemisietalia pauciflorae, Camphorosmo monspeliacae-Artemision pauciflorae)* are distributed on the lower slopes of the watersheds and slopes of salt lake basins with solonchak-solonets-soils in the grass and desert steppes. Perennial succulent obligatory halophytes (halophytic chamaephytes and nanophanerophytes) are dominating plant communities *(Festuco-Puccinellietea, Artemisio santonicae-Puccinellietalia fominii, Artemisio santonicae-Puccinellion fominii)* within salt lake depressions only in the desert steppes.

Diagnostic, constant and dominant species of the higher vegetation units of Slovakia

Ivan Jarolímek[1], Jozef Šibík[1], Katarína Hegedüšová[1], Monika Janisová[1], Ján Kliment[2], Peter Kučera[2], Jana Májeková[1], Daniela Michálková[1], Jana Sadloňová[1], Ivana Šibíková[1], Iveta Škodová[1], Lubomír Tichý[3], Karol Ujházy[4], Mariana Ujházyová[4], Jana Uhlířová[5], Milan Valachovič[1] & Marica Zaliberová[1]

[1] Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, SK-845 23 Bratislava, Slovak Republic, e-mail: jozef.sibik@savba.sk;
[2] Botanical Garden of Comenius University, SK-038 15 Blatnica, Slovak Republic;
[3] Department of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-611 37 Brno, Czech Republic;
[4] Faculty of Forestry, Technical University in Zvolen, T. G. Masaryka 24, SK-960 53 Zvolen, Slovak Republic;
[5] Slovak National Museum - Nature Sciences Museum, Vajanského nábrežie 2, P.O. Box 13, SK-810 06 Bratislava 16, Slovak Republic.

This study represents the statistical revision of phytosociological data stored in the Slovak national vegetation database - SNVD. The affinities of vascular plants, bryophytes and lichens occurring in Slovakia to the major syntaxa (alliances and classes) are calculated using a statistically defined coefficient of fidelity. In addition, constant and dominant taxa of particular syntaxa are identified. A revised list of syntaxa (vegetation units) of Slovakia is also presented.
The evaluation of vegetation units by sharpness and uniqueness criteria allows us to identify well delimited alliances and classes or to point out those, for which delimitation is problematic and which are more difficult to define by statistical principles. The syntaxonomical revision and delimitation of some units with low values of sharpness and uniqueness should be considered in future.
The presented results are important not only for scientists (botanists, zoologists, and ecologists), but also for nature conservation institutions. They represents a valuable and essential source of floristic data on the occurrence of vascular and non-vascular plants in plant communities with specific environmental characteristics.

Effects of habitat fragmentation on population biology and seed bank of four plant species in calcareous grasslands

Luisa Steiner[1] & Rainer Buchwald[2]

[1] IFÖ, Kandelstr. 26, D - 79106 Freiburg, Germany; luisa.steiner@web.de;
[2] AG Vegetationskunde und Naturschutz, IBU, Carl von Ossietzky Universität, D - 26111 Oldenburg, Germany; rainer.buchwald@uni-oldenburg.de.

From 2003 to 2007 we studied seed bank and some plant traits of four selected plant species *(Anthyllis vulneraria, Salvia pratensis, Scabiosa columbaria,* and *Dianthus carthusianorum)* in 11 study sites with calcareous grassland *(Onobrychido - Brometum)* in SW-Germany, characterized by big differences in population sizes and distances from each another (degree of isolation).
As an example, we found for *Anthyllis vulneraria* strong variations in population size during the study period. After the extremely hot and dry summer 2003 populations with more than 200 individuals reached on average 95% of the starting size until 2006, while small populations attained only 87%. The density of seedlings continously increased with higher population sizes (Pearson correlation: $r=0,714$; $p<0,05$). Furthermore the mean *ex-situ* germination rate showed higher values in big populations than in small ones ($r=0,757$; $p<0,01$). The same correlations were valid for the three other species. However, we could not find clear correlations of population size with other factors of population biology, as number of flowering individuals, number of flowers per individual, as well as number and weight of seeds (exception: number of seeds in *S. columbaria*).
These results show that fragmentation has evident effects on the fitness of the four species studied, as small populations have a reduced reproductive success. As a consequence, in extreme situations as 2003 the lower reproduction may have negative effects on the survival of small populations. This is of some relevance due to the fact that the seed bank of the study sites is poor of characteristic (= target) species and therefore does not play an inportant role in the regeneration of damaged populations after extreme ecological events.
In many central-european landscapes species-rich ecosistems are small and subjected to fragmentation and isolation. For these habitats, often characterized by small or extinct populations of endangered characteristic species, a higher connectivity must be achieved by creating new 'stepping stones' or by restoring species-poor habitats with help of adequate measures (e.g. hay transfer, sowing of target species).

Numerical and syntaxonomical analysis of the class *Molinio-Arrhenatheretea* in Chile: preliminary results

Alvarez Miguel[1], Möseler Bodo Maria[2], San Martín Cristina[3] & Paulini Inge[4]

[1] *INRES, Department of Geobotany and Nature Conservation, University of Bonn, Germany. e-mail: malvarez@uni-bonn.de;*
[2] *INRES, Department of Geobotany and Nature Conservation, University of Bonn, Germany;*
[3] *Botanical Institute, Austral University of Valdivia, Chile;*
[4] *INRES, Department of Geobotany and Nature Conservation, University of Bonn, Germany.*

After the colonization of Southern Chile about 200 years ago, large forest areas were cleared to obtain timber and fire wood or burned to gain arable land. Under conditions of crop rotation and grazing by sheep and cattle grassland vegetation dominated by Eurasian plant species became spontaneously established. Because most of these species characterise the associations of Molinio-Arrhenatheretea in Central Europe, the newly established communities were assigned to the same class, but to an own order, the *Agrostion chilensis*.

For a syntaxonomical analysis of this class in Chile, we assembled a database of up to date published relevés. Our main aims are 1) to assess the current syntaxonomical classification of *Agrostion chilensis,* 2) to compare this order with the European syntaxa according to their floristic composition and ecology, and 3) to determine the relationships between the traits of the grassland vegetation (species richness and composition, life and chorological spectra, functional traits) in addition to the local and environmental factors (climate, soil conditions, land use).

The MS-ACCESS based data collection allows to storage both single relevés as well as constancy tables (depending on their form of publication). The 227 stored tables (in total more than 500 single relevés) were analysed by an hierarchical clustering (Bray-Curtis dissimilarity index, Ward`s algorithm) using the software R (including the vegan package). Finally we carried out a manual sorting of the species according to their constancy in the clusters using the software JUICE.

Obtaining 9 clusters, 6 of them correspond to previously described associations: *Leontodo-Piptochaetietum (= Cynosuro-Piptochaetietum), Acaeno-Agrostietum, Agrostio-Lotetum, Centello-Anthoxanthetum (= Anthoxanthetum utriculatae), Bromo-Lolietum* and *Loto-Agrostietum*. Two other clusters are very heterogeneous, including many associations. Another cluster contains samples of annual grasslands that did not belong to the *Molinio-Arrhenatheretea*.

Two aspects of this previous analysis are intriguing for us: 1) The most typical and studied associations, namely the *Hyperico-Agrostietum* and the *Juncetum proceri,* are not distinguished by the numerical classification, and 2) some samples of the *Agrosto-Lotetum* and the *Acaeno-Agrostietum* are also included in the two heterogeneous clusters.

Some aspects about the further storage and analysis of the data will be discussed.

Nutrient relationships and management history in European thermophilous grasslands

Merunková Kristina, Otýpková Zdenka & Chytrý Milan

Department of Botany and Zoology, Masaryk University Brno, Kotlářská 2, 611 37 Brno, Czech Republic, e-mail: merunkova@sci.muni.cz.

Semi-dry thermophilous grasslands of the Bílé Karpaty Mountains on the Czech-Slovak border are known as one of the species-richest plant communities in Europe, accommodating in places as many as 55-75 vascular plant species per 1 m^2. While there are stands with compositionally similar communities scattered in neighbouring areas to this region, these are strikingly poorer in species. It is believed that the unique species richness of the Bílé Karpaty Mts meadows owes much to the region's specific cultural history after its deforestation that involved mowing for hay only once, and late, in a year, occasional grazing and no fertilising in extensive areas. This traditional management practice proved compatible with long-term survival and coexistence of a high number of species here compared to other regions. Local species pools are, in the form of diaspores, readily available due to the habitat's good connectivity.
We ask this question: Is the considerably higher richness of the Bílé Karpaty Mts grasslands simply a legacy of their former management having resulted in large local species pools, maintained under conditions of restricted competition? Or, alternatively, can we also trace any environmental factors with a possible influence on species richness that differentiate between the Bílé Karpaty Mts and their adjoining regions, whether inherent or resulting from different management histories?
Our data indicate that biomass is significantly poorer in nitrogen in the Bílé Karpaty Mts than in neighbouring areas, and that productivity of these grasslands is strongly nitrogen-limited, which may enhance possibilities for local species coexistence. Thus, management history has probably shaped current species richness of these grasslands also through its effect on nutrient availability.

Comparative analysis of lawn flora of differently managed village yards in South-West Hungary

Pál Róbert[1], Pinke Gyula[2] & Botta-Dukát Zoltán[3]

[1] University of Pécs, Faculty of Natural Sciences, Department of Plant Systematics and Geobotany, H-7624 Pécs, Ifjúság u. 6, Hungary, e-mail: palr@gamma.ttk.pte.hu;
[2] University of West Hungary, Faculty of Agricultural and Food Sciences, Department of Botany, H-9200 Mosonmagyaróvár, Vár 2, Hungary;
[3] Institute of Ecology and Botany, Hungarian Academy of Sciences, H-2163 Vácrátót, Alkotmány u. 2-4, Hungary.

Composition of lawn flora was investigated of differently managed village yards in South-Western Hungary in July 2007. The village of Aranyosgadány (in the vicinity of Pécs) was chosen as a representative investigation area. In total 240 x 1m2 plots were sampled from 60 yards; in addition a complete list was made of all vascular plant taxa present in the yard. The yards were selected from a pool of 165 householders allowing access to heir yards. The yards represented the typical land-use types within the village. Four main usage types could be separated during the survey which were as follows: intensively mown yards, intensively trampled yards, poultry yards and pavements. The larges part of the yards are populated by spontaneous vegetation, however there were many sowed lawns as well. Properties were aged between 10 and 150 years and ranged from 80-5000 m^2 in size. The main goal of this study is to detect the differences manifesting in the composition and diversity of the vegetation of differently managed village yards.
The entire yard flora consisted of 152 species, of which 106 were found in the quadrats.
RDA analyses showed that weed composition of village yards was significantly ($p<0.01$) determined by the following factors: exposition of the yard, slope degree of the yard, age of the yard, total size of the yard, mowing activity, trampling activity, grazing activity, the presence of dogs.
Disturbance activities (mowing, trampling, grazing and presence of dogs) are the most important variables; they can explain at least 10% of the variety while geographical factors are responsible for 1.93% and yard characters (age of the yard, total size of the yard) only for 0.94%.

Simulation of the Dynamics of European Boreal Vegetation under the Influence of Global Warming

Neshataev Vasiliy

Dept of Botany & Dendrology, Saint-Petersburg State Forest-Technical Academy, Institutsky per., 5. LTA. Saint-Petersburg, 194021, Russia; email: vn1872@yandex.ru.

The system of mathematical models simulating plant populations, vegetation communities and landscape vegetation dynamics in changing environment includes three models:

1. **MSC** is the model simulating competition between plant populations in plant communities under changing environment. The model is based on modified Lotka-Volterra system of differential equations, where coefficients of competition, mortality and generation are interpreted as Ramensky -Grime species strategies and the capacity of the environment is estimated using Ramensky ecological scales.
2. **LAPONA-2** is the model simulating growth of tree stands, flows of organic matter, nitrogen and water, soil temperature and light penetration through the tree canopy. LAPONA-2 uses the submodel ROMUL (elaborated by Chertov & Komarov) that simulates rough organic matter decomposition. Main input parameters of the model are: the annual sum of temperatures above 10°C, annual winter and summer precipitation, granulometric composition of soil.
3. **LVD** is the model using the Markov-chain un-stationary process that simulates the landscape vegetation dynamics under the influence of climate and disturbances.

The models were verified for the boreal zone using vegetation and soil data obtained at 55 permanent sample plots and 2000 relevés.

Simulation for the scenario of warming in the northern boreal sub-zone of Europe (changing towards climatic parameters of the southern boreal sub-zone) predicted the following:

1. At the first stages of warming the plant cover will be characterized by the high mortality of old-growth spruce stands on the vast areas on well-drained soils, afterwards they will be replaced mainly by young spruce forests;
2. The productivity of forests, the rate of decomposition of rough organic matter will increase;
3. The role of small shadow tolerant boreal herbs *(Maianthemum bifolium, Trientalis europaea, Oxalis acetosella, Solidago virgaurea)* in the plant communities will increase and the role of lichens and dwarf-shrubs (especially of *Ledum palustre, Vaccinium uliginosum, Empetrum nigrum* on drained mineral soils) will decrease;
4. The *Cladonio-Vaccinietalia* forests will be replaced by the *Piceetalia excelsae* communities at the most parts of landscapes excluding sandy sites induced by forest fires.

The study was supported by the Ministry of Education and Science of Russia and Interreg-Tacis project (2006-2008).

Oak forests on loess in Hungary and Croatia

Purger Dragica[1], Csiky János[2], Lengyel Attila[3], Kevey Balázs[4], Lendvai Gábor[5] & Horváth András[6]

[1] DÉDUVIZIG Hungary;
[2] University of Pécs, Faculty of Science, Institute of Biology, Department of Plant Taxonomy and Geobotany, H-7624 Pécs, Ifjúság u. 6., Hungary, e-mail: moon@ttk.pte.hu;
[3] University of Pécs, Hungary;
[4] University of Pécs, Hungary;
[5] freelancer, Hungary;
[6] MTA ÖBKI, Hungary.

Although large areas are covered by loess in the Carpathian Basin, typical forests of this "base rock" occur only in the transition zone of the lowland and foot of mountain region. Dry, dry-mesic and mesic oak forest types on loess are in the process of disappearing and still survive only in fragments in the whole Pannonicum. Earlier studies distinguished several types of dry and mesic forest associations on loess, like *Aceri tatarici-Quercetum roboris, Aceri campestris-Quercetum roboris, Pulmonario mollis-Quercetum roboris, Corydalido cavae-Carpinetum* in Hungary, *Orno-Quercetum pubescentis, Cotino-Quercetum petraeae, Tilio-Quercetum roboris, Carpino-Quercetum roboris* and Aceri *tatarici-Quercetum roboris* in Croatia.
In this study cca. 500 phytosociological relevés along a climatic gradient from the North Hungarian Mts. to East-Croatia were analysed by multivariate statistical methods. The goal of this study was to answer the following questions:
How many types of oak forest on loess can be distinguished by multivariate statistical analyses in Hungary and Croatia?
How can they be characterized by diagnostic, dominant and constant species?
Are there any gradient-like pattern from north to south in the case of loess forests in Hungary and Croatia?

Averaging and analysis of concentration of ecological indicator values - an example from the South Hungarian mesic meadows

Attila Lengyel[1], Zoltán Botta-Dukát[2] & János Csiky[3]

[1] Department of Geobotany and Phytotaxonomy, University of Pécs; Ifjúság u. 6., H-7624 Pécs, Hungary; lengyel.at@gmail.com;
[2] Institute of Ecology and Botany, Hungarian Academy of Sciences; Alkotmány utca 2-4., H-2163 Vácrátót, Hungary;
[3] Department of Geobotany and Phytotaxonomy, University of Pécs; Ifjúság u. 6., H-7624 Pécs, Hungary.

Indicator values are widespread and traditional tools of vegetation ecology in Europe. Weighted averaging of species indicator values is the most frequently used method for the estimation of environmental background of communities. However, in case of indicator values of ordinal nature (like Ellenberg values), this operation is mathematically incorrect. According to suggestions of Précsényi (1995), analysis of concentration (Feoli and Orlóci 1979) offers a mathematically appropriate but rather complicated solution for this problem. This study aims to examine the relationship between values obtained from weighted averaging and from analysis of concentration using a database of phytosociological relevés from mesic meadows from South Hungary. Linear correlation of values resulted from the two different methods was tested. Their explanatory powers on multivariate patterns were also compared.
Analysis of concentration is insufficient with too many (for example 9 or 12) grades of an indicator variable, so aggregation of species groups is necessary. However, estimations obtained from this method were highly sensitive to differences in group aggregations, revealing an unavoidable risk of subjective bias. In contrary, averaging proved to be more robostus and it even performed well with the original indicator scales without merging species groups. In case of long gradients revealed by the indicator values and biologically meaningful definitions of species groups, difference between outcomes of averaging and analysis of concentration was negligible. If the requirements mentioned above were fulfilled, estimations of indicator values from both methods were strongly correlated and they were able to detect the same patterns from results of classifications and ordinations.
Considering the drawbacks of analysis of concentration and the high potential of averaging to reproduce its results when certain requirements are fulfilled, we conclude that averaging is practically appropriate for estimation of indicator values for phytosociological relevés - despite the unsuitable base of this operation.

Thermal flora and vegetation of Hévíz lake and ditches near Keszthely (Hungary) regarding colonizing neophytes

Szabó István

Pannon University Georgicon Faculty Dept of Plant Science and Biotechnology. Hungary 8360 Keszthely P.O.B. 66. il-szabo@georgikon.hu.

The Lake of Hévíz is geologically about 20-22 thousand years old. Its crater shaped basin of 47,000 sq. meter stretch of water is imbedded into immense peat layer has been established parallel with organic sedimentation of Balaton's graben. It is nurtured by wells of 86 million litres of water per day situated on 38.5 m below ground. Its wildlife is unique due to the seasonally 26-35 °C thermal water with slight radioactivity and special chemical composition characterized by reduced sulphuric compounds as well as solute oxygen; e.g. for unique cyanobacteria endemic *Micromonospora heviziensis,* and, *Pseudanabaena papillaterminata, Anomoeoneis serians* only for Hungary, and, in addition a set of micro- and macroscopic Avertebrates by several authors. The outlet of the lake flows away to the river Zala tempering the water of conducting dikes across a huge peat land.

We have since 1988 been dealing with:

- taxonomical diversity of *Nymphaea* genus, time scale and spatial distribution of representative taxa,
- floristic changes characterized by losing of native archeophytes [*Schoenoplectus litoralis* (Schrad.) Palla, *Juncus maritimus, Nymphaea alba* L. var. *minor* D.C. (*minoriflora* (Borb.), Graebn., *Nymphaea lotus* L. (*N. thermalis* DC.)], introductions (monograph of *Nymphaea* genus s.l. and introduction between 1890 and 1908 by S. Lovassy with the emblematic *Nymphaea rubra* Roxb. subsp. *longiflora* Lov.) and invasion of introduced alien neophytes mainly from 1980's, as follows: *Ceratopteris thalictroides* (L.) Brongniart *(Acrostichum th.), N. mexicana* Zuccarini, *N. coerulea* Savigny, N. × daubenyana W.T. Baxter ex Daubeny, *Nymphaea hybrida* hort., *Cabomba caroliniana* A. Gray, *Egeria densa* (Planch.) Casp., *Hydrilla verticillata* (L. F.) Royle, *Elodea canadensis* Rich., *Elodea nuttallii* (Planch.) St. John, *Vallisneria spiralis* L., *V. gigantea Graebner, Ludwigia repens* Swartz [*Ludwigia repens* J. R. Forst, *Ludwigia peploides* (Knuth) P. H. Raven], *Gymnocoronis spilanthoides* DC., *Shinnersia rivularis* (A. Gray) R. M. King (H. E. Robinson, *Rotala macrandra* L., [*Rotala rotundifolia* (Buch.-Ham. ex Roxb.) Koehne var. *macrandra* Koehne (syn. *Ammannia rotundifolia* Buch.-Ham. ex Roxb.)], *Utricularia gibba* L. [*Utricularia gibba* Le Conte subsp. *gibba, U. biflora* Lam. subsp. *gibba*], *Azolla caroliniana* Willd., *Sagittaria* spp. [*subulata* (L.) Buchenau, *Sagittaria latifolia* Willd.].

The vegetation is characterized by unique reed-grass and degradated derivatives of peat land communities.

Forests of the Southern Urals - a modern analogy of the early Holocene forests of Central Europe

Chytrý Milan[1], Danihelka Jiří[1,2], Horsák Michal[1], Kočí Martin[1], Kubešová Svatava[1,3], Lososová Zdeňka[1,4], Otýpková Zdenka[1], Tichý Lubomír[1], Martynenko Vassiliy[5] & Baisheva Elvira[5]

[1] Department of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-61137 Brno, Czech Republic, e-mail: chytry@sci.muni.cz;
[2] Institute of Botany, Academy of Sciences of the Czech Republic, Brno, Czech Republic;
[3] Moravian Museum, Brno, Czech Republic;
[4] Department of Biology, Faculty of Education, Masaryk University, Brno, Czech Republic;
[5] Institute of Biology, Russian Academy of Sciences, Ufa, Russia.

Fossil pollen spectra suggest that the main vegetation type in Central Europe at the Pleistocene/Holocene boundary was the birch-pine forests. Due to early Holocene spread of hazel, oak, elm, lime, ash, maple and other trees these forests gradually changed into vegetation which palaeoecologists call mixed oak forests. It is unclear, however, how these hypothetical forests looked like, because current knowledge of competion hierarchies among forest trees indicates that oak may hardly regenerate in the understory of a closed lime-elm-maple forest. Some insight in the palaeovegetational processes can be obtained through studies of modern analogies of the early Holocene landscapes of Central Europe. Obviously the closest analogy is the landscape of the Southern Urals and its foothills, where the above mentioned trees except ash occur frequently while strong competitors which invaded Central Europe only in the middle and late Holocene such as beech or hornbeam are absent.

Our study of forest vegetation in the Southern Urals (Republic of Bashkortostan, Russia) showed that lime-elm-maple forests occur in warmer areas than birch-pine forests, which is analogous to the spread of broad-leaved trees due to temperature increase in the early Holocene. The spread of these broad-leaved trees dramatically changes the herb-layer diversity. Whereas open birch-pine forests contain 40-60 species of vascular plants per 100 m^2, lime-elm-maple forests contain only 15-25 species. This decrease in species diversity is strongly correlated with canopy cover. However, the broad-leaved trees also increase soil (especially topsoil) pH due to calcium input from their leaf litter. Increase in soil pH is not correlated with plant species richness in these forests, but it is strongly positively correlated with species richness and abundance of land snails.

In the Southern Urals, oak *(Quercus robur)* occurs in pure rather than mixed stands with other broad-leaved trees. There are no considerable differences between abiotic conditions at sites of oak and lime-elm-maple forests, thus it seems that the main control on the distribution of these two forest types is site history, such as effects of past fires. If the hypothetical analogy between current landscape of the Southern Urals and early Holocene landscape of Central Europe is true, then the "mixed oak forest" should be understood as a landscape mosaic of two different vegetation types rather than mixed stands of oak with other broad-leaved trees.

Functional response traits to climatic gradients in alpine dry grassland ecosystems

Wellstein Camilla[1] & Kuss Patrick[2]

[1] Biogeography, University of Bayreuth, Universitätsstr. 30, D-95440 Bayreuth, Germany.
E-mail: camilla.wellstein@uni-bayreuth.de;
[2] Institute of plant sciences, University of Bern, Altenbergrain 21, CH-3013 Bern, Switzerland.

Investigating functional response traits of plant communities along climatic gradients will provide new hypotheses on the possible future changes in taxonomic and functional composition of communities.
Here, we identified functional response traits of the main important alpine dry grassland communities to major ecological gradients (low vs. high elevations, mesic vs. dry soil conditions). Elevation was used as proxy for changes in temperature (warming), soil moisture was used as proxy for changes in precipitation (drought).
Taking a stratified random sample from the dry grassland inventory of the Swiss Alps relevés of the eight most important community types of low and high elevations with contrasting conditions of soil acidity and soil moisture were selected. These are at low elevations: mesic *Arrhenatherion,* meso-xeric *Mesobromion,* xeric *Xerobromion* and *Stipo-Poion;* at high elevations on acid soils: mesic *Nardion strictae* and xeric *Festucion variae;* at high elevations on base rich soils: mesic *Caricion ferrugineae* and xeric *Seslerion variae*.
To study the functional response of clonal growth and leaf traits of these grasslands we combined the CLOPLA 3 and LEDA database with additional own investigations on the species.
Obtained results show differentiation in the general categories of clonal growth (obligatory clonal, partially clonal, non clonal) related to major ecological gradients (low vs. high elevations, mesic vs. dry conditions). There are differences in the presence of clonal growth organs (CGO) across the elevational gradient (warming). The CGO of Rhizoms (Epi- & Hypogeogenous) at low elevations responded to soil moisture gradient (drought). Specific leaf area (SLA) did not respond to the elevational gradient (warming). At low elevations the SLA responded to the soil-moisture gradient (drought).
The differences in temperature and soil moisture along the ecological gradients are similar to the predicted climate change in the Swiss Alps. This implies that the empirical functional response traits may indicate the sensitivity of traits of alpine dry grassland communities to climate change.

Coenological status of the *Iris* meadows (*Iridetum sibiricae* Philippi 1960) in Hungary

Salamon-Albert É.[1] *& Lőrincz P.*[2]

[1] *University of Pécs, Biological Institute, Department of Systematic and Ecological Botany H-7624 Pécs, Ifjúság útja 6. albert@gamma.ttk.pte.hu;*

[2] *Radnóti Miklós Economic Secondary School H-7633 Pécs, Esztergár Lajos u. 6.*

Iridetum sibiricae is a new association of *Filipendulo-Petasion* in Hungary, introduced in the last couple of years adjusting to the European syntaxonomic system. Our aim is to describe species composition, vegetation structure by species composition and some attributes in order to characterize stands and the differencies to the contact vegetation types. *Iris* meadows are situated on alluvial surfaces and have no any type of management, contact stands are regularly mown.

66 coenological relevés were collected from three phytogeographical regions of the country between 2006-2008. Samples completed with species attributes were built in TURBOVEG as a database management program. Diagnostic, differential, dominant and constant species were examined and compared within and between stands in JUICE program creating several types of synoptic tables. According to C-S-R strategic model distribution of social behaviour types (SBT) were calculated for vegetation structure. Cluster analysis for species composition, principal component analysis for some vegetation attributes (e.g. SBT values, life forms) has been carried out using SYNTAX program.

According to hierarchical classification by presence data, samples of Iris meadows are more similar to own contact vegetation stands than to each other. Clusters from the several phytogeographical regions are separated at high level of dissimilarity. Summarized species number is different in the locations and consistently smaller in *Iridetum sibiricae* than contact vegetation types. Siberian iris a constant, dominant and diagnostic species in this association with high fidelity. More species of *Molinio-Juncetea* (e.g. *Deschampsia caespitosa, Cirsium canum*), Molinio-Arrhenatheretea (e.g. *Sanguisorba officinalis, Molinia hungarica*), *Molinietalia* (e.g. *Festuca arundinacea*) and indifferent group (e.g. *Carex flacca*) have the highest constancy and abundance. In Iris meadows competitors and specialists are the main behaviour types, generalist is the thirdly important group. In contact vegetation stands competitors, generalists and natural disturbance tolerant species are significant originated from disturbance regime. Species on life forms have the balance between hemicryptophytes and geophytes in *Iridetum sibiricae,* hemicryptophytes and chamaephytes in contact vegetation stands. Increasing the abundance of Iris sibirica, proportion of specialists, generalists, disturbance tolerants and weeds keeps growing against competitors.

From thermophily to cryophily: similarities of lichen floras from Italy to Greenland

Bueltmann Helga

Institute of Plant Ecology, Univ. Münster, Hindenburgplatz 55, D-49143 Münster, bultman@uni-muenster.de.

Diversity and similarity values of the lichen floras of Italy, Austria, Germany, Denmark, Finland, Sweden, Norway and Greenland are compared based on one carefully compiled species list to avoid the many synonyms.
Lichen diversity is highest in Italy (2235 sp.), with a slight decline to Scandinavia (Norway: 2002 sp.) and a drop to Greenland (1034 sp.). Most lichen species grow on rocks.
The focus will be on the relationship of the Italian lichen flora with the Austrian (=German), Norwegian (=Swedish) and Greenlandic. Those countries have similar sets of substrates and topography and are suitable to interpret similarity values along a south-north gradient.
Sörensen similarity values decline little from Italy to Scandinavia, then same as for diversity, drop to Greenland. As expected, the diversity and similarity drop is very strong for corticolous lichens (similarity Italy-Austria (I-A): 0.75, Italy-Norway (I-N): 0.64 and Italy-Greenland (I-G): 0.24), less so for saxicolous (I-A: 0.70, I-N: 0.57, I-G: 0.46) and especially terricolous lichens (I-A: 0.78, I-N: 0.72, I-G: 0.62), which show astonishing high similarity values over the whole studied range, for the acidophilous terricolous lichens even stronger (see below). Of respective 463 and 333 terricolous lichens in Italy and Greenland 206 occur in both countries.
Surprising is the difference between acidic and calcareous substrate. The diversity of acidophilous saxicolous and terricolous species is higher in Scandinavia than in Italy. For terricolous species Greenland even beats Italy. Of the 128 acidophilous terricolous lichens in Greenland and 122 in Italy 77 can be found in both countries.
As a sum up of the south-north gradients, terricolous lichens are rather wide-spread even to the Arctic. The epiphytes often prefer oceanic habitats and can reach rather far up north to Scandinavia, but not into the Arctic. The difference between south and north for saxicolous lichens is stronger but more steadily declining. The relative part of lichens with a preference for southern areas is highest on calcareous and for northern areas on acidic rocks.
The observed pattern may be due to climate preferences, vegetation history or dispersal, but as many of the saxicolous species disperse by rather small spores, the former is probable.

Using phytosociological data analysis to assess vulnerability of European wetland habitats to the global change

Aidoud Ahmed[1] *& Clément Bernard*[2]

[1] *University of Rennes 1 (France). Address: UMR Ecobio, Bat 14A (126/1), Campus de Beaulieu, Université Rennes1, F-35042 Rennes cedex (aidoud@univ-rennes1.fr);*

[2] *University of Rennes 1 (France).*

Global change (GC mainly climate and landuse) has already significant observed effects on a variety of ecosystems. However, very few studies addressed habitat communities as a whole. Expected changes could be seen as "habitat shifts" to new locations analogue to their current environment (first paradigm), or simply "habitat modification" (2d paradigm) which occurs as some species become locally extinct or decline in abundance and others increase (IPCC, 2001). While there are clear evidences of species range movement (e.g. Thuiller et al., 2005), habitat shifts, due to GC, are not established yet. To assess potential habitat changes, we used the "Space for Time Substitution" approach by analyzing existing data on European wetlands (960 syntaxa corresponding to a total of 33719 sampling plots) representing the main wetland habitats including palustrian (P) and terrestrial hydromorphic (T) systems. Meta-analyses, using classification and ordination methods resulted in representative habitat distribution patterns with reference to the European Habitat classification (EUNIS). Species composition was used to predict environmental variables (Ellenberg Indicator Value averages). The main drivers that explain vulnerability are hydrology and nutrient availability.

Scale-dependence of species richness in European dry grasslands

Otýpková Zdenka, Merunková Kristina & Chytrý Milan

Masaryk University, Department of Botany and Zoology, Kotlarska 2, 611 37 Brno, zdenkao@sci.muni.cz.

It is known that precipitation, soil pH, productivity or soil depth control species richness in European dry grasslands. However, relationship between species richness and other factors are usually studied on a single scale. Species richness of Moravian dry grasslands (alliances of *Festucion valesiacae* and *Cirsio-Brachypodion*) varies across space and scales. This variation is not only weakly determined by macroclimatic factors such as annual precipitation or temperature because of their narrow range in Moravia. The grasslands of the White Carpathian Mountains are remarkable for their very high local species richness and peculiar species composition. However, previous studies reported that these grasslands are not exceptionally rich on a very small scale, if compared with some other European grasslands.

We studied dry and species-rich grasslands in southern and south-eastern Moravia, Czech Republic, on two scales of 1 m^2 and 100 m^2. We measured species richness, soil depth, soil pH and above-ground biomass. Species richness for plot size of 1 m^2 ranged between 20 and 58 species. Species richness differed considerably for plots of 100 m^2 where the range was 34 to 133 species. The sites in the White Carpathians usually contained over 100 species per plot. Slope (z) of the species-area curves ranged from 0.12 to 0.50 and it was correlated with vegetation cover; the more open vegetation, the steeper slope of the species-area curve. The richest site in the White Carpathian Mountains had an intermediate slope of z=0.22. Ecological factors, such as soil pH, productivity or soil depth significantly correlated with species richness on both measured scales.

Vegetation of the Middle Gediz Basin

Emin Ugurlu[1] *& Ozcan Secmen*[2]

[1] *Department of Biology, Celal Bayar University, Manisa, Turkey; e-mail: emin.ugurlu@bayar.edu.tr*
[2] *Department of Biology, Ege University, Izmir, Turkey; e-mail: secmen@sci.ege.edu.tr.*

This study deals with the vegetation of the Middle Gediz Basin located within the city of Manisa in Western Anatolia. The Braun-Blanquet approach was used in the classification. Also, Correspondonce Analysis (CA), a type of multivariate technique used to ordinate releve - units and species. In this study, six new plant associations were identified. *Paliuro spina-cristi-Quercetum cocciferae* Cetin ex Ugurlu ass. nov , *Paliurus spina-cristi* - community, *Pistacio terebinthi-Phillyretum latifoliae* Ugurlu ass. nov, *Lino hirsuti-Pinetum brutiae* Ugurlu ass. nov, *Cisto laurifolii-Pinetum nigrae* Ugurlu ass. nov, *Quercetum ithaburensi-troianae* Akman, Quizel et Barbero 1978, *Anthemo tinctoriae-Quercetum infectorioriae* Ugurlu ass. nov, *Phlomido samiae-Quercetum cerridis* Ugurlu ass. nov

This study area within a transition zone between Northeast Anatolian steppes and Southwest Anatolian steps.

The Quercetea ilicis class contains well developed xserophyte and deciduous forest formations along the coasts of the Mediterrenean region, together with the *Quercetea pubescentis* class which contains deciduous forest formations found within the upper Mediterrenean vegetation level and *Astragalo-Brometea* class which characterizes The Middle Anatolian steppes.

Correlation analysis between ecological pattern and distribution of vegetation communities in mountain grassland landscape of Umbria-Marches Apennines (Central Italy)

Catorci Andrea[1], Cesaretti Sabrina[1], Gatti Renata[1], Pieruccini Pierluigi[2] & Tardella Federico Maria[1]

[1] Department of Environmental Science - University of Camerino, via Pontoni 5 - 62032 Canerino (MC). andrea.catorci@unicam.it;

[2] Department of Earth Science - University of Siena, via Laterina 8 - 53100 Siena.

The study site is located along the Apennine ridge that characterize the interior of central Italy. From a geological point of view the Umbria-Marches Apennines is predominantly characterized by limestones. In terms of pedology, the aforementioned geomorphological areas are differentiated by the presence of soil catenas characterized by the presence of less evolved and shallow soils found gradually moving from more conservative morphologies (flat surfaces) toward steeper morphologies or from northern to southern aspect. With regard to the bioclimatic area, the study is included within the following bioclimatic belts: Higher Mesotemperate, Lower Supratemperate and Higher Supratemperate. The study of the relationship between environmental factors and the floristic framework show that each syntaxon presents a characteristics set of environmental parameters which can be summarized in the soil water capacity and in its pH. There are evidences that such attributes are connected to the geomorphological features of the *syntaxa* distribution area, especially referred to: relief energy, duration of snowing and raining period (remembering that for this study the sample was selected with homogeneous aspects). One of the outcomes of this research is that rains, soil depth and texture, at the landscape scale, are the main ecological parameters that explain the plant community pattern; at a lower level, temperature connected to altitudinal gradient assume an high degree of significance. Ph acts, instead, at a lower ecological level, segregating *syntaxa* with a high degree of homogeneity, regarding on available water content (AWC) and temperature parameters. To better understand the *syntaxa* distribution in the study area, we analized the environmental factors (soil characteristics and stational data) typical for each *syntaxon* in relation to the floristic composition. For the soil, three factors were considered: depth, texture and pH, while the stational features analized were precipitations, temperatures, altitude, slope and morphology. The collected data were submitted to Canonical Correspondence Analysis (CCoA) usimg SYN-TAX 2000 software. The survey shown that the parameters analized explain the vegetation landscape diversity but the correlation between environmental factors and vegetation landscape is better understandable considering also the diachronic aspects of landscape use.

The vegetation of Mori (Trento) and its warmest district: the landscape unit of Mori-Talpina

Vittorio Ingegnoli & Elena Giglio

University of Milan, Faculty of Natural Sciences

The vegetation survey of the Mori municipality (about 35 sq.Km, 53% covered by forest) was conducted following the "Landscape biological integrated survey of vegetation" (LaBISV), as published by Ingegnoli (2002), Ingegnoli and Giglio (2005), Ingegnoli and Pignatti (2007).
The bio-geographic province concerned is the Central European one distributed from the low Adige Valley (200 m a.s.l.) up to the Pre-Alpine mountains of Biaena (1.700 m). The main forest formations resulted in 60% of mixed oak woods *(Orno-Ostryon)*.
The territory of Mori has to be divided into 4 landscape units (L.U.), the first of which is the Mori-Talpina, the lowest one (from 200 to 550 m) and the more urbanised one: anyway 1/3 is covered by forest. Within this L.U. near 21% of the species show an euri-Mediterranean chorology character, being one of the most thermophilous vegetation of the Trentino province. Even for this reason the province instituted a SIC area (Site of European Community Importance), because the warm species areas are in regression in Trentino. In some Southern rocky habitats shrubs of *Quercus ilex* are present. Remnant types of traditional agriculture can be found near the SIC area, mixed with chestnut woods *(Castanea sativa)*, even if some wooded patches were been planted with exotic species (e.g. *Cedrus deodara, Pinus strobus*).

Differentiation of thermophilous oak forest *Potentillo albae-Quercetum* Libb. 1933 nom. invers. in Europe

A. Brzeg[1], M. Kasprowicz[1], W. Rakowski[1], M. Wojterska[1] & D. Iakushenko[2]

[1] Department of Plant Ecology and Protection of Environment, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznan, Poland, email:mwzerios@amu.edu.pl;

[2] M.G. Kholodny Institute of Botany NAS Ukraine, Tereschenkivs'ka 2, Kyjiv 01601, Ukraine.

The recession of *Potentillo albae-Quercetum* has been stated and confirmed independently by several authors from many localities within its range. This relic community represents a habitat of European importance defined as "Euro-Siberian steppic woods with *Quercus* spp." and has been listed in the Council Directive 92/43/EEC under the code number *91I0.

Albeit there are many published data, there is still insufficient knowledge about the differentiation within this widespread association.

The main aim of this study was to show the geographical and habitat differentiation of thermophilous oak forest *Potentillo albae-Quercetum* within its known range in Europe. The analysis was conducted on the set of 1460 relevés from Germany, Czech Republic, Slovakia, Poland, Ukraine and Russia. Wide range of the association brings about its distinct geographical differentiation, whereas the group of numerous species diagnostic for the community remains constant.

The results of classic phytosociological ordination according to Braun-Blanquet approach were compared to those obtained from numerical multivariate analysis. As result three groups of subassociations ordered after humidity gradient (humid, mesic and xeric) and several geographical races have been distinguished.

Better knowledge about this association contributes to its effective protection as a priority habitat.

Vegetation plot data and databases in Europe: an overview

Joop H.J. Schaminée[1], Stephan M. Hennekens[1], Milan Chytrý[2] & John S. Rodwell[3]

[1] Centre for Ecosystem Studies, Alterra, Wageningen University and Research Centre, P.O. Box 47, NL-6700 AA Wageningen, The Netherlands;
[2] Department of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-61137 Brno, Czech Republic;
[3] Ecological Consultant, Lancaster, United Kingdom.

Almost a century ago Josias Braun-Blanquet developed his phytosociological approach for vegetation field study, which was explained and demonstrated in his famous handbook Pflanzensoziologie. Grundzüge der Vegetationskunde of 1928. At that time, nobody could foresee what the impact of this methodology would be for vegetation science as well as for its application in nature conservation. Hundreds of thousands of so-called relevés (vegetation plot records) have been made, collected in field books, and many of them published afterwards in research reports, theses, standard and grey literature. Some twenty years ago, the software package TURBOVEG was developed by Stephan Hennekens for the input, storage and handling of vegetation data. Since then, many national and regional vegetation databases have been compiled, providing the basis for national and international classification overviews and other scientific studies. Within the framework of the European Vegetation Survey, the initiative was taken to get an insight in the amount of vegetation data that have been collected in Europe since the early 20th century and the amount of data that have been computerized. Based on the questionnaire sent out to the managers of individual databases and leading vegetation scientists of European countries, it is estimated that currently there are > 4.2 million relevés in Europe, including 1.8 million relevés already available in electronic dabatases. Of the computerized relevés 45 % are available in TURBOVEG format. The vegetation data will enable a better insight in the functioning and distribution of plant communities, and as such constitute a proper basis for evaluating the consequences of local and global changes, caused by (among other things) changes in land use and climate. Short notice is given to ecological information systems, for which computerized vegetation data may form a fundament.

How can the noise elimination increase the reliability of classification?

Botta-Dukát, Z.

Institute of Ecology and Botany, HAS; H-2163 Vácrátót Alkotmány 2-4, Hungary; bdz@botanika.hu.

Hierarchical agglomerative classification methods are often used in vegetation science. Their robustness is low when used on noisy data set that is a common situation in analysis of vegetation data. This negative property results from the fact that these methods do not consider the complete dissimilarity relationship among clusters, but only individual dissimilarity values for couples of clusters or objects in each step. Botta-Dukát et al. 2005 (*Preslia* 77: 89-111) suggested that noise elimination by metric ordination can solve this problem. In this work I tested effectiveness this method on artificial and real datasets. Different hierarchical classifications (complete linkage, UPGMA, beta flexible) were used both with and without noise elimination. For comparison Ward's method with noise elimination, and in the case of artificial data a new method, non-hierarchical classification around medoids were also included.

In the analysis of artificial dataset the correlation between true and obtained classification was measured by Cramer's V, as measure of goodness of classification. Noise elimination increase goodness in each algorithm, but the change was highest in the case of UPGMA and lowest in the case of beta flexible method. After noise elimination the differences between methods become negligible.

In real data set the true classification was not known, therefore number of faithful species was used as a goodness measure. The results are less unambiguous than in the artificial data. Noise elimination combined with Ward's algorithm gives better results in high hierarchy levels (i.e. low number of clusters) than most of the other methods (an exception is complete linkage without noise elimination, but it probably a property of this dataset rather than a general rule). In the low hierarchy levels the trend may be the opposite. Since often only the high hierarchy levels are interpreted, noise elimination by metric ordination improves the reliability of classifications.

Ecological classification of forest communities in Central Apennines (Abruzzo) through soil parameters and ecoindicators

De Nicola C., Fanelli G. & Testi A.

Department of Plant Biology, Sapienza University of Rome, P.le A. Moro, 5 00185 Rome, Italy.
E-mail: kridn@libero.it

The study area is located in the Upper Sangro Valley in central Apennines (Abruzzo region). In 97 samples pedological profiles and phytosociological relèves were carried out in the beech forests and mixed forests.
In this study we have gone through the historical steps, beginning from the traditional classification of the vegetation based on the phytosociological approach and thereafter continuing by an ecological application of factors measured in the field, like edaphic parameters (pH, organic matter, nitrogen, etc.), as well as on Ellenberg indicators and hemeroby to estimate anthropic disturbance.
Cluster Analysis divided the reléves in seven groups phytosociologically classified as different communities. Afterwards, basing on soil parameters and ecoindicators an ecological classification was been obtained, confirming the classification based on floristic data set. Four main environmental factors are responsible for discriminating the forest communities: Carbon/Nitrogen ratio, $CaCO_3$ measured in the soils, light indicator and hemeroby index.

Effects of fragmentation in the forest clearings of the central Apennines

D'Angeli D., Fanelli G. & Testi A.

Department of Plant Biology, Sapienza University of Rome, P.le A. Moro, 5 00185 Rome, Italy.
E-mail: anna.testi@uniroma1.it

Our research concerns clearings in the montane belt in Central Apennines (Abruzzo); these clearings have been since long remarked by foresters and local people because they show no trace of recolonization. Moreover, the floristic composition of these clearings is poorly characterized, with species referred to different associations of *Festuco-Brometea*.
To detect biodiversity of species and communities, Shannon index was applied to the matrix species\relèves. Grasslands, meadows and forest clearing show different diversity values:
communities deeply linked to environmental factors like the permanence of the snow display the lowest Shannon values (0.5 - 0.9); *Juniperus communis* and *Daphne oleoides* shrublands have intermediate values (0.9 - 1.2); *Brachypodium genuense, Nardus stricta* and *Bromus erectus* communities: 1.3-1.4; *Festuca dimorpha* communities show the highest values (1.5 - 1.6). Along this gradient the forest clearing represent discontinuites spots: communities show diversity lower than the same communities outsider the forest.
In summary, we are in presence of a colonisation process that seems to have stopped in its initial stage; a possible explanation lies in an insularity effect: these grassland experience low seed input from nearby sites because of the barrier to dispersal of herbaceous species represented by the forest surrounding the clearings.

The *Lygeo-Stipetea* class in Sicily

S. Brullo[1], G. Giusso del Galdo[1], R. Guarino[2], P. Minissale[1], G. Siracusa[1], L. Scuderi[1] & G. Spampinato[3]

[1] Università di Catania, Dipartimento di Botanica, via Longo, 19, I-95125 Catania
[2] Università di Palermo, Dipartimento di Scinze Botaniche, via Archirafi, 38, I-90123 Palermo
[3] Università Mediterranea di Reggio Calabria, Dipartimento S.T.A.F.A, Loc. Feo di Vito, I-89100 Reggio Calabria

Basing on literature data and unpublished relevés from Sicily, a revision of perennial dry grasslands belonging to the *Lygeo-Stipetea* class is presented. This vegetation is characterized by the dominance of big caespitose hemicriptophytes and it is widely distributed in Sicily from the sea level up to 1500m a.s.l. within the thermo- and meso-mediterranean belts. The several plant communities included in this class are linked to very xeric environmental conditions and usually they play a secondary role as consequence of the woodland degradation processes mainly due to fire, overgrazing, deforestation, and human over-exploitation.
The *Lygeo-Stipetea* class is represented in Sicily by two orders, both floristically and ecologically well differentiated: *Lygeo-Stipetalia,* including the sole alliance *Moricandio-Lygeion* exclusevely found on clayey substrates, and *Hyparrhenietalia hirtae,* including five alliances *(Hyparrhenion hirtae, Avenulo-Ampelodesmion mauritanici, Thero-Brachypodion ramosi, Bromo-Oryzopsion meliacea,* and *Arundion collinae).* Within the class, 51 associations have been recognized. Nomenclature, floristic settlement, ecology and chorology are examined for each syntaxon.

Thermal symmetry breaking at sunrise in ecosystems of extreme habitats

Sandro Pignatti

Emeritus Professor, Sapienza University of Rome, P.le A. Moro, 5 00185 Rome, Italy.

The ecosystem is an open system with continuous exchange of energy with the environment. As to plant communities, they can be interpreted as a particular step in the energy flux depending from the solar radiation. Sunlight is the total electromagnetic radiation produced by the Sun. It reaches the Earth surface in different components: (a) ultraviolet - wavelength < 400 nm, mainly absorbed by the atmosphere, (b) visible range or light - 400-700 nm, the energy source for photosynthesis, and (c) infrared - > 700 nm, which can be perceived as heat. This energy is acting the metabolic processes of plants and animals and warming the Earth surface, atmosphere and hydrosphere and finally is irradiated in the space as low temperature heat (dissipation).

During the night, solar irradiation is completely lacking: the residual heat is dissipated and, as a consequence, plant communities and their environment are in a condition of total homeothermy at low temperature. In this condition, all components of the community (individuals, populations, species) are at the same temperature. We can imagine to divide in two half the space occupied by the community: from the thermal point of view the two half will result completely similar. Then, the geometrical plane used to divide the community, is a plane of symmetry. The system is in a condition of symmetry with regard to temperature. With the sunrise in general the temperature is progressively increasing, and some thermal gradients appear: atmosphere may remain fresh (e.g. on the coast by sea breeze), rocks and soil surface are differently warming in dependence of exposition, slope and colour. On the contrary, in most cases vegetation remains in the condition of homeothermy. Indeed, in some cases an interesting phenomenon appears: the symmetry breaking. Some species developed particular ecomorphological adaptations, so that they can modify the temperature at the leaf surface. Temperature can be significantly increased by concentration of the solar radiation (e.g. on the leaves of *Soldanella* in the alpine environment) or reduced by intensive transpiration. Such adaptations are important, because the efficiency of photosynthesis depends from temperature.

Highly complex communities, as forests and dense heath, have in general elevate homeostatic feedback and the symmetry break is not occurring; even in open communities (*Pinus*- or *Eucalyptus*-woodland, subalpine *Rhododendron* heath) the possibility of self-regulation is limited. On the contrary, this possibility seems to be the factor for survival in several communities growing under extreme environmental conditions:

- alpine pastures on limestone *(Seslerio-Caricetum sempervirentis)*,
- *Crithmo-Limonietum* in coastal habitats,
- communities of thorny cushions (*Astragalu*s subgen. *Tragacantha*) in the Mediterranean mountains,
- *Acacia aneura* woodlands in the stony deserts of W. Australia,
- communities of grasses with spinescent leaves *(Triodia basedowii)* in the sandy deserts of W. Australia.

The symmetry breaking is strictly dependent by the particular events occurring during sunrise and dawn; under good meteorological conditions it is repeating every day; with fog or rain it is impossible. In our opinion, it has to be considered as a key factor to understand plant biodiversity.

The vegetation on two significant gullies of Iblei mountains (Southern Italy)

E. Poli Marchese, M. Grillo & E. Magro

D.A.C.P.A.- Sez. di Biologia ed Ecologia vegetale, Università di Catania
Via Valdisavoia 5- 95125 Catania (Italy). E-mail:epolimar@unict.it; mgrillo@unict.it

The hyblaean gullies are of fluvial origin, they include particular habitats which allowed the development of significant plant communities. They are very different of those of the surrounding field areas.
The study area is localized in the Ragusa territory, on two hyblaean gullies: the "Cava Martorina" and the "Cava Coda di Lupo". They are 2-4 kilometres long and about 200 m deep. Geologically the territory belongs to the Oligocene and to the infra Miocene; the substrata are mostly of carbonatic nature.
The bioclimate is sub-humid Mediterranean; average annual temperature is 16 °C; average annual rainfall is of 646 mm.
The aim of this work is to present the natural vegetation of these two gullies.
The study was carried out following the Braun-Blanquet's method; many relevés had been made on different habitats; the data where processed by multivariate analysis. The data collected allowed to distinguish some plant communities; the predominant types are represented by: *Quercus ilex* and *Pistacia lentiscus* woodlands belonging to the *Pistacio-Quercetum ilicis (Quercion ilicis)* and localized on the gully floor; by some maquis communities characterized by *Pistacia lentiscus, Rhamnus alaternus* and *Myrtus communis* belonging to the *Pistacio-Rhamnetalia alaterni*. They are mostly localized on small surfaces of the gully floor. The maquis communities dominated by *Chamaerops humilis* and *Euphorbia dendroides (Oleo-Ceratonion)* colonize the gully sides and can reach the edge of the gully. On the clearings there are garigue communities characterized by *Corydothymus capitatus, Erica multiflora, Salvia fruticosa (Cisto-Micromerietea)* and xerophilous herbaceous vegetation dominated by *Ampelodesmos mauritanicus (Lygeo-Stipetea)*. This vegetation type is very widespread.
All these communities are dynamically linked, but the dynamical processes are often disturbed by man's intervention.
The study allowed to point out the presence on the study area of plant communities which have widely disappeared in the surrounding areas. They are to safeguard within the planned natural Park of Iblei Mountains.

Floristic changes along the topographical gradient in montane grasslands in Monti Picentini (Campania, South-Western Italy)

F. Spada[1], M. Cutini[2] & B. Paura[3]

[1] Dip.to di Biologia Vegetale, Università degli studi di Roma "La Sapienza", P.le A.Moro 5, 00185 Roma; e-mail: francesco.spada@uniroma1.it;
[2] Dip.to di Biologia, Università degli studi di Roma Tre, Viale G.Marconi 446, 00146 Roma; e-mail: cutini@bio.uniroma3.
[3] Dip.to SAVA, Università del Molise, Via De Sanctis 86100 Campobasso; e-mail: fobos@unimol.it.

Populations of xerotolerant species (*Achnatherum calamagrostis, Stipa crassiculmis* subsp. picentina) are scattered along a wide altitudinal gradient on slopes at mid- and high elevation in Monti Picentini, a subcoastal mesozoic limestone ridge in Tyrrhenian Southern Italy. Their stands are widespread in grasslands of mostly secondary origin. At lower altitudes these grasslands replace former deciduous forest communities dominated by oaks or beech, while at higher altitudes they reach the summits, where they apparently merge into the remnants of the still partially grazed, zonal climatogenic, grasslands ranging above the local tree-line.
Nevertheless primary stands of these grasslands are to be found around the many clusters of highly dynamic sites of the montane and sub-alpine levels, scattered around screes and rocky outcrops of the prevalently dolomitic morphology of the slopes. This virtual continuity of non arboreal communities across more than 1000 metres of the local topographical gradient, where azonal, relic stands of *Pinus nigra* s.l. are transitional between the grasslands and the surrounding zonal broadleaved forest vegetation, stresses patterns of the coenological changes between *Festuco-Brometea* and *Elyno-Seslerietea* along the catena, which suggest fragmentary persistence of a paleozonation.

Effects of temperatures on the spatial arrangement in Mediterranean annual dry grasslands

Riccardo Guarino[1] & Gianpietro Giusso del Galdo[2]

[1] Dipartimento di Scienze Botaniche, Università di Palermo, via Archirafi, 28 - 90123 Palermo, Italy - email: guarinotro@hotmail.com

[2] Dipartimento di Botanica, Università di Catania, via A. Longo, 19 - 95125 Catania, Italy

Some preliminary results of diachronic researches on the spatial arrangement and species richness in Mediterranean annual dry grasslands belonging to the class *Tuberarietea guttatae* are presented.
Our results are based on 12 permanent plots, set in three places at different heights in Southern and Central Sardinia. Sites were chosen to have annual species richness and plant density not significantly different. The relationship between patchiness and temporal stability was investigated at the scale of the square plots. We used the mean abundance divided by the SD in abundance ($S = x_m/r$), as the measure of temporal stability of populations (Tilman 1999) and the Shannon-Wiener index to evaluate the patchiness in the therophytic layer (Whittaker 1972, 1979).
According to our preliminary results, among the factors influencing the spatial arrangement in the Mediterranean dry grasslands, the average temperatures and seasonality could play an important role for the following reasons:
- Higher temperatures amplify the effects of the seasonal drought in the thermomediterranean, therefore promoting the specialization of annual plants and pulling down the competition. In the Mediterranean region, annual dry grasslands typically form a mosaic with perennial plant communities and they occur mainly in patches corresponding to 'gradient wells', characterized by a severe summer drought. In these xeric situation, patches would remain a longer time devoid of perennials (Madon & Médail, 1997).
- Higher temperatures can affect the fire frequency, resulting in variations in the soil nutrients and microbial activity (Grasso et al., 1996; Heike, 2007). Periodical severe disturbances caused by fires may give more chances to the poorly competitive but highly versatile therophytes, therefore increasing their population stability, that in xerothermophilous therophytic vegetation is positively related with the community diversity and population size (Valone & Hoffman, 2003).
- In the meso-mediterranean bioclimate, the summer drought becomes less severe, although summer temperatures keep relatively high. On the other hand, the winter cold stress becomes relatively more severe (Mitrakos, 1980). Density-dependent seed predation by ants may govern population stability to such an extent as to override the potential effects of relatively lower mean temperatures on the annual plant communities, that in the Mesomediterranean context resulted to be the most stable and least patchy.
- In the supramediterranean bioclimate the summer drought stress is buffered quite well by the cooler temperatures and by the moisture condensation (Guarino, 2001). This would lengthen the growing season beyond the optimum for most annual competitors and provide conditions adequate for perennial seedling survival and development (Jackson and Roy 1986). In this context, the affirmation of annual plants largely depends upon the extensive land use, related to the stock raising and to the use of fire for enhancing the development of rangelands.

Sand dune vegetation on the Ionian coast of Calabria: SCI "Dune di Marinella"

Uzunov Dimitar[1], Gangale Carmen[2] & Caruso Giuseppe[3]

[1] Museo di Storia Naturalis della Calabria ed Orto Botanico, Universita della Calabria, Arcavacata di Rende - 87036 Italia. duzunov@libero.it ;
[2] Museo di Storia Naturalis della Calabria ed Orto Botanico, Universita della Calabria, Arcavacata di Rende - 87036 Italia. cgangale@inwind.it;
[3] Istituto Tecnico Agrario Statale "Vittorio Emanuele II", via V. Cortese 1, 88100, Catanzaro, Italy, caruso_g@libero.it.

The structure and floristic composition of plant communities in the SIC "Dune di Marinella" are described. The studied area represents one of the largest coastal dune systems in Calabria, characterized by the grey, white and embrional dune series and a complex of paleodunes that reach 800 m from the coastline. The observed communities mainly belong to *Ammiphyletea* Br.-Bl. & R. Tx. Ex Westhoff Dijk & Paschier 1946, *Helichryso-Crucianelletea maritimae* Géhu, Rivas-Martinez, R.Tx. 1973 em Siss. 1974, *Cakiletea maritimae* R.Tx. & Preising in R. Tx. 1950, *Tuberarietea guttatae* Br.-Bl. (1940) 1964 and *Quercetea ilicis* Br.-Bl. Ex A. & O. Bolòs 1950.
The vegetation of paleodunal complex is modified by human activities and actually shrubby communities are alternated to xeric grasslands rich in species of *Stipo-Trachynietea* Brullo 2001 and *Lygeo-Stipetea* Rivas Martinez 1978, favorite by frequent fires.
The importance of the site is also due to the presence of the only one Calabrian population of *Retama raetam* (Forsskal) Webb et Berth. ssp. *gussonei* (Webb) W. Greuter. This *taxon* occurs in few localities of southern Sicily where it is a significant element of phanerophytic vegetation of coastal stabilized dunes. In the studied area the species forms communities of *Oleo-Ceratonion,* but it enters frequently in contact with more pioneer communities of *Ammophilion* and *Crucianellion*, showing a high ecological plasticity.
A syntaxomomical scheme and a vegetation map of the area are presented. Preliminary data on the evolution of the landscape shows expansion of R. raetam ssp. gussonei in the last ten years and the origin of the population (indigenous or introduced?) are discussed.

Petrifying springs in the gorge of Reschia River (S Italy)

Gangale Carmen[1] *& Uzunov Dimitar*[2]

[1] *Museo di Storia Naturalis della Calabria ed Orto Botanico, Universita della Calabria, Arcavacata di Rende - 87036 Italia. cgangale@inwind.it;*
[2] *Museo di Storia Naturalis della Calabria ed Orto Botanico, Universita della Calabria, Arcavacata di Rende - 87036 Italia. duzunov@libero.it.*

Plant communities in the gorge of Reschia River in the Tyrrhenian part of Calabria (S Italy) are studied, with particular attention to the rich and diversified vegetation occurring along the canyon in the middle part of the river flow. The area is characterized by the presence of large stands of *Cratoneuron commutatum* (Hedw.) G. Roth and abundance of rare ferns as *Woodwardia radicans* (L.) Sm., *Pteris cretica* L. and *Phyllitis scolopendrium* (L.) Newman. The observed associations belong to *Adiantion* Br.-Bl. Ex Horvatic 1934 and a new peculiar community with *Adiantum capillis-veneris* L. and *Lereschia thomasii* (Ten.) Boiss. is described. The finding of the latter species, endemic of Calabria usually occurring in orophilous and wet communities of *Galio-Urticetea* Passarge ex Kopecky 1969, is of particular interest.
The presence of rich populations of Woodwardia radicans and Pteris cretica makes this site of high importance for the conservation of crittogamic flora and vegetation in Calabria and preliminary data of the population structure and demography of these species are reported.

Are European coastal dune systems so similar? A comparison between Atlantic (Aquitaine region, France) and Mediterranean (Lazio region, Italy) coastal dunes

Izzi Carmela Francesca[1] *& Acosta Alicia*[2]

[1] *Dipartimento di Biologia - Università degli Studi Roma Tre- Viale G. Marconi 446 - 00146 ROMA acosta@uniroma3.it*
[2] *Dipartimento di Biologia - Università degli Studi Roma Tre - Viale G. Marconi 446 - 00146 ROMA c.izzi@uniroma3.it*

Coastal dune ecosystems are severely constrained systems in which environmental determinants play a particularly important role in shaping and modifying plant communities. The action and intensity of abiotic factors along largely determine species composition and diversity, biomass and structure of plant communities. Because of these extreme ecological conditions, climatic differences within the range of the dune vegetation are of secondary importance in determining the flora. Furthermore, the vegetation in the Holarctic region has a similar composition the world over. In this framework, this study analyses two different European coastal dunes, one in the Atlantic (Aquitaine region, France) and the other in the Mediterranean (Lazio region, Italy). Using phytosociological relevés we aim to highlight major differences and similarities focusing on: a) floristic composition, b) plant communities and position in the phytosociological system, c) stand structure and physiognomy, and d) chorological distribution. Our starting points are some general assumptions on European coastal dune vegetation, trying then to answer specific questions with reference to the Mediterranean and Atlantic regions:

a) In European coastal dunes, halophytes and psammophytes plants dominate in the ecological spectrum and almost all of them are highly specialised; halophytic species play a dominating role only in the pioneer stages of the coastal zonation, since later on they are replaced by psammophytes. Which are the most abundant plant species in both regions? What species are in common and which are the major differences? How do species change along the coastal zonation? Which are the most representative families?

b) The sea-inland environmental gradient is related to the coexistence of different communities in a relatively short space giving rise to a typical vegetation zonation. How is this community sequence in both regions? What about their position in the phytosociological system (syntaxa)?

c) The spectrum of life forms in the European coastal dunes is dominated by hemicryptophytes, geophytes (rhizome), chamaephytes and therophytes. Which are the major differences between the two regions? How is their distribution along the coastal zonation?

d) Mediterranean species dominate in Italian coastal dunes while European and Atlantic species dominate in French dunes, however, which other chorological features could be evidenced?

European beach and foredune habitat types (92/43/EEC). A comparison between Atlantic and Mediterranean habitats using large scale vegetation databases.

Feola Silverio[1], Carranza M.Laura[1], Janssen John[2], Schaminèe Joop[2,3] & Acosta Alicia T.R.[4]

[1] EnviX-lab. Dip. STAT, Molise University, Contrada Fonte Lappone, Pesche 86090 (IS) Italy. silverio.feola@unimol.it; carranza@unimol.it;
[2] Alterra Wageningen UR, P.O. Box 47, 6700 AA Wageningen, The Netherlands
[3] Radboud University Nijmegen, P.O. Box 9010, 6500 GL Nijmegen, The Netherlands
[4] Dip. of Biology, Roma 3 University. V.le Marconi 446-I 00146 Roma, Italy

The "Habitats" Directive 92/43/EEC of the European Union is at present one of the world's most effective legal instruments concerning biodiversity and nature conservation. This Directive aims to protect the unique natural European heritage creating a coherent network of protected habitats under the name of Natura 2000. Coastal dune systems. although covering relatively small areas, show an extremely specialized flora and fauna that include many exclusive species. In the Habitats Directive Annex, 19 Habitat Types were scheduled to describe the vast environmental heterogeneity of coastal sand dune habitats in Europe. However, for the Mediterranean drift lines beaches and fore dunes ecosystems this description is currently incomplete.
Because of the importance of a comprehensible Habitat Types definition for the conservation and monitoring of this threatened ecosystems, in this study we analyze and characterize the Atlantic and Mediterranean beach and foredunes habitat types using two comparable examples, located in The Netherlands and Italy respectively. We try to answer the following questions:
1) are the communities of the embryonic (2110) and white (2120) dunes of the Mediterranean and Atlantic coasts similar enough (floristically, structurally and ecologically) to be included in the same Habitat Type?
2) are the Atlantic and the Mediterranean plant communities actually scheduled as the Habitat Type 1210 (Annual vegetation of drift lines), truly comparable and floristically similar in both regions?
This comparative approach is based on pre-existent classification of vegetation types using Turboveg and around 400 phytosociological relevés, considering Ellenberg indicator values and life forms. Floristic information was analyzed using Detrended Correspondence Analysis, and habitat types were compared through life form frequency spectra and Ellenberg mean values.
Results confirmed similar floristic and ecological characteristics for the Habitat Type 1210, however, for embryonic and white dunes floristic, structural and ecological differences were found These results underline the necessity to add two new Habitat Types to the 92/43/EEC Directive aiming to describe and correctly protect the heavily threatened Mediterranean foredune communities still distributed in Italy, France, Spain and Greece.

Dry grasslands at Monte Gargano pedimont and the legacy of the last pleniglacials

F. Spada & M. D. Magri

Sapienza University of Rome Dept. Plant Biology & Orto Botanico e-mail: francesco.spada@uniroma1.it.

Large areas at the Southern piedmont of the Gargano promontory (Apulia Southern Italy) are at present covered by xeric grasslands dominated by *Andropogoneae (Cymbopogon hirtus, Andropogon distachyus, Bothriochloa ischaemon), Stipa* sp.pl., *Asphodelus* sp.pl., *Helianthemum* sp.pl.. On locally shallow soils *Poa bulbosa, Plantago serrata* are common, while on rocky outcrops, phryganic dwarf shrubs(*Teucrium polium, Helichrysum italicum, Micromeria* sp.pl., *Fumana* sp.pl., *Euphorbia spinosa, Satureja cuneifolia, Sideritis syriaca, Thymus capitatus* prevail. The origin of these grasslands is largely anthropogenic, due to a long history of pastoralism in the area, which for thousand of years has represented the southernmost endpoint along one of the main routes of the Italian transhumance. Large forests of *Quercus ilex* and *Q. trojana* are likely to have disappeared in the area since prehistoric times. Nevertheless there is evidence for the local coexistence of primary stands of xeric steppe.

Pollen records from late-Holocene document species assemblages of open areas persisting within the forest canopy throughout the transition from late-glacial to the onset of the agro-pastoral colonization. This, along with the outstanding occurrence of a steppe-galliform *(Tetrax tetra),* support the hypothesis of a still incomplete recover of the local forest canopy as late as at the time of the agro-pastoral colonization, suggesting along with the outstanding occurrence of a steppe-galliform *(Tetrax tetra),* that the clusters of primary stands of xeric steppe in the area might be considered extant fragments of a pleniglacial plant cover.

The origin, dynamics and syntaxonomy of thermophillous calcareous vegetation of class *Festuco-Brometea* Br.-Bl. et R.Tx in Br.-Bl. 1943 at the Dinaric Alps (W. Balkan)

Sulejman Redzic

Academy of Sciences and Art of B-H7 Bistrik St., 71 000 Sarajevo, Bosnia and Herzegovina

At the Dinaric area dominated calcareous stones of different geological age. They enter into the construction of well-known and very diverse Dinaric karst. On this geological background, developed various soils: rendzine, calcomelanosol, calcocambisol and luvisol. In terms of different climate (sub-Mediterranean, continental and mountain) have developed different types of deciduous forests. In the ecological view, they belong to order *Quercetalia pubescentis* and order *Ostryo-Carpinetalia orientalis*. Some cooler habitats occupy thermophilous beech forests of order *Fagetalia* with the alliance *Fagion moesiacae*. In the area of these forests, in open habitats, they are still developed very diverse thermophilic meadows. Sintaxonomically are included in class *Festuco-Brometea*. Moving towards the Mediterranean, this class makes syndynamic relationship with vegetation of rocky grasslands of class *Thero-Brachypodietea*. The old volcanic rocks, the vegetation is in close connection with the class *Festucetea vaginatae*. In the sub-alpine area, the vegetation continues to sub- alpine pastures of class *Elyno-Seslerietea*. Coldest habitats, thermophilic meadows in the area are dark coniferous forest class *Vaccinio-Piecetea* on the continental Dinarids.

By using the method of Braun-Blanquet made more than 1000 releves. Releves were later grouped in the analytical and the synthetic tables. Vegetation class *Festuco-Brometea* at the Dinarides to be differentiated at the orders: *Brometalia erecti*, *Scorzonero-Chrysopogonetalia* and *Koelerietalia splendentis*. The order *Brometalia erecti* differentiated in the alliances: *Cirsio acauli-Bromion erecti, Carici humilis-Bromion erecti* and *Fumano-Scabiosion leucophyllae*. The alliance *Cirsio acauli-Bromion* inhabits the coldest habitats. They belong to sub-alliances: *Gentiano tergestinae-Crepidenion dinaricae, Filipendulo vulgaris-Danthonenion alpinae* and *Cirsio acauli-Bromenion erecti*. Order *Scorzoneretalia villosae* includes alliances: *Scorzonerion villosae, Saturejion subspicatae* and *Saturejion montanae*.

The vegetation of the class includes more than 50 associations. In the composition of inputs around 1 500 species of plants. Many of them are endemic, and some and relict.

Vegetation thermofilic grassland and pastures every day is more endangered. In addition, they play a key role in the biological and ecological diversity at Dinaric area.

Biomization: Historical Phytogeography revisited

Francesco Spada

Sapienza University of Rome Dept. Plant Biology & Orto Botanico e-mail: francesco.spada@uniroma1.it.

Since the onset of the interest in phytosociological issues in Italy, geobotany (phytogeography in broader sense) seems to have gradually neglected one of its basic and pristine goals: the reconstruction of origin, changes in time, patterns of dispersal of different stocks of species, in one word the genesis of the present day plant communities. These classic issues of the historical phytogeography (AUCT.) have rather been shifted to the sphere of interest in the paleoenvironment, reconstructed on palynological data (Huntley and Birks, Prentice AUCT.) or in phylogeography, approached on biomolecular basis (AUCT).
In Italy most of the phytogeographical treatments are today performed as complements to coenological studies and are rather focused on endemism, on the construction of floristic districts and their consequences on the patterns of vegetation changes along geographical or environmental gradients.
But the huge diversity of the peninsular flora and communities, characterized by disjunctions, relictuality, schizoendemism, high density of refugia and dramatic paleogeographical changes, cannot find any satisfactory explanation in ecological actualism. A connection between an individual taxon and its appropriate biome of origin is therefore necessary, in order to convert the information about floristic diversity in space into the historical processes of known, past environmental changes.
On this basis, chorologically different, coexisting floral stocks within a community type, may enlighten processes of its own historical development , as far as they are interpreted as representants of different climatogenic responses of the plant cover.
Recently the process of biome reconstruction ("biomization") based on functional traits in the species of a paleoflora, has successfully been introduced in paleoenvironmental studies
The connection between species and their appropriate zonal biomes at the scale of continents, is stressed here as major tool in the interpretation of spatial changes in the plant cover of the present.

Restoration of biotopes of aquatic vegetation of Natura 2000 Habitat type: a case study from the floodplain of the river Tiber (Central Italy)

Casella L., Agrillo E. & Spada F.

Sapienza University of Rome Dept. Plant Biology & Orto Botanico e-mail: laura.casella@uniroma1.it.

The Habitats Directive defines when the conservation status of the Habitats and species is to be considered as *favourable*. It is required that range and areas of the listed habitats should be at least maintained at the status exhibited when the Directive came into force in 1994 or, if the 1994 status was not viable in the long term, should be restored to a state in which it would be viable.
In this framework the project presented here was intended to restore the riverine ecosystem in an area where abandonment of the traditional agricultural practices enables the reconversion into a (semi-) natural floodplain with a network of rivulets and marshes.
Conservation planning devoted to wetland restoration is a crucial topic. Since it implies changes in topography and hydro-geomorphology, it often induces dramatic consequences on the local ecological *equilibrium* and in the structure of the existing plant communities.
In order to provide new viable sites for hydrophytic vegetation of the Natura 2000 Habitats 3130, 3150, 3260, which had been damaged and nearly annihilated by drainage channels dug for land reclamation during earlier decades, a project has been proposed and carried out by a team of botanists and hydrogeologists with the accomplishment of the local administration.
The project was aimed to restore a portion of a drained alluvial terrace located along the river Tiber, in the surrounding of Roma (Central Italy).
The purpose was to recover the damages induced on the assessment of flora and vegetation by the disturbance generated by the modern agricultural transformation on the local hydrological system and gradients inherited from pre-industrial times. This older assessment had been originated by a long history of mowing and grazing of wet meadows which replaced the former riverine forest of pre-agrarian times.
The experimental approach was intentionally constrained by the necessity of avoiding any heavy human intervention on topography and on the extant fragments of refugial populations of hydrophytes protected by the EC Directive "Habitat".
The study of local patterns of succession showed the vigorous capacity of the refugial stands to recolonize the area provided an increase of the water input. Therefore the original, pre-drainage, hydrological pattern has been re-established placing dams and bulkheads along the ditches in order to enhance the spread of propagules from cores of relic populations and the activation of the seed-bank.
Natural re-vegetation processes revealed to be rapid and vigorous enough to ensure the triggering of a completely satisfactory and successful vegetation succession demonstrating the efficiency of the natural development in recovering pre-disturban-

ce community structure.
No plantation of woody or herbaceous seedlings seemed to be necessary. In order to avoid genetic contamination of populations of both hydrophytic and non-hydrophytic native plants, the (unfortunately) quite common practice of spreading commercial seeds has been strictly avoided.
An old-shaped agrarian landscape in agreement with the new hydrological regime has been obtained only by the active plantations along the regular pattern of the drainage streams, of aged cuttings obtained from existing individuals of *Salix alba* var. *vitellina,* in order to provide stools for pollarded trees as it formerly was very common in the area.

Thermophilous grasslands and some forms of semi-moist meadows *(Bromion erecti, Molinion)* as a result of a long-term military activity

Stachnowicz Wojciech

Adam Mickiewicz University, Faculty of Biology, Department of Plant Taxonomy, ul. Umultowska 89, 61-614 Poznań, Poland; e-mail: wsta@op.pl

As far as the vegetation diversity is concerned, military activity is one of the less known forms of human pressure on landscape. It is more or less obvious that Central Europe, and Poland in particular, was an area of extensive land transformations during 2nd World War. However, ca. 65 years is quite a long time and perhaps in most cases - long enough - for the development of the secondary succession processes, to assume that non-forest vegetation (meadows and grasslands) would rather be replaced by shrubs or even early stages of forest communities. Moreover, in densely inhabited areas of C Europe, where forestry services are (traditionally) strongly established and organised (which is, in fact, somehow similar to the military...), it is now highly improbable to find any large, non-(post-)agricultural area covered substantially by (semi-)natural, non-forest vegetation.

Nevertheless, there are a few exceptions of the above outlined rule. Some, often large areas, for many years have remained relatively isolated, from such forms of human activities as: forestry, agriculture, industry, settlement and communication (e.g. public roads). These areas have been used by the army, sometimes for approx. a time exceeding the mentioned 2nd World War.

I would like to present an example of such a military training ground - situated in the vicinity of a large city of Poznań (central-western part of Poland), recently considered as the European SCI Natura 2000 area. About 13 years ago I carried out detailed geobotanical investigations there, focused on various meadows and grasslands. Using phytosociological approach, I have obtained field data documenting two types of floristically related plant communities: well-developed and differentiated semi-moist *Molinion* meadows and locally less common grasslands of *Bromion erecti*. Both vegetation types have probably developed on areas potentially covered by thermophilous oak forests *(Potentillo-Quercetum)* or some forms of rich oak-elm forests *(Querco-Ulmetum)* - as a result of deforestation due to long-term military presence.

The investigated communities represented different phytosociological classes (*Molinio-Arrhenatheretea* and *Festuco-Brometea*, respectively), but some species were locally present in both of them, at least in some relevés. These floristical relations also refer to moderately thermophilous species which are not common in central parts of Poland, because of its geomorphologic and climatic conditions.

Vegetation Survey of High-Rank Syntaxa of Europe (EuroChecklist): A Brief Story of a Long Journey

Mucina L. & the Team of the Euro-Checklist

Dept. of Botany & Zoology, Stellenbosch University, Private Bag X1, 7602 Matieland, Stellenbosch, South Africa; Email: LM3@sun.ac.za

The checklist of high-rank syntaxa (alliances, orders, classes) of the European vegetation has been one of the core activities of the Working Group "European Vegetation Survey" of IAVS for the past 10 years. One of the major sources of the idea was the EUNIS units and the need to create crosswalk to syntaxa (Rodwell et al. 2002. Diversity of European Vegetation. Alterra, Wageningen.).The other major source was the need to "stabilised" conceptual and terminological system of the high-rank syntaxa to serve as communication tool among vegetation scientists in Europe, offer a basic substrate for various data-base projects and pan-European conservation initiatives, and to assist university-level education. The EuroChecklist became an international cooperative project bringing together so far 20 co-authors from 20 countries of Europe (& Africa and North America). The checklist underwent an evolution spanning mere listing of syntaxa in hierarchically and logically ordered syntaxa to annotated authoritative scientific text. The EuroChecklist strives to present a system of validly published high-rank syntaxa (excluding the problematic ranks of sub-class, sub-order and sub-alliance) dominated by phanerogamic and cryptogamic plants. It does not include, at this stage, the syntaxa based on fungal and algal communities. Each syntaxon is presented by valid (at the current stage of knowledge) name, a brief one-line verbal definition (diagnosis) and the list of synonyms. The classes are also complemented by a list of diagnostic taxa" to allow future automatic expert-system identification of new relevé material collected in the field. An extensive list of literature sources (featuring papers and books) containing the protologues of the high-rank syntaxa of European vegetation is also added. There are 88 and 25 classes dominated by phanerogamic and cryptogamic plants, respectively. The class of *Petrosimonio oppositifoliae-Kalidietea caspicae* is described as new. A system of syntaxa (classes) defining the European biomes is also presented.

Assessing the conservation status of habitats of European Community Interest

Doug Evans

ETC/BD - European Topic Centre-Biological Diversity Paris, France- email: evans@mnhn.fr

The EU Habitats Directive requires all member states to report each 6 years on the implementation of the directive. The report covering the period 2000-2006 included an assessment of the conservation status of the habitats and species listed on annexes I, II, IV & V following an agreed format. Recently the European Topic Centre on Biological Diversity have prepared assessments for each biogeographical region which are now available on the internet. It is clear that the majority of habitats of Annex I are not at favourable conservation status although there is much variation both between countries and regions and between habitats.
Habitats linked to agriculture appear to be particularly unfavourable. This was the first time such an evaluation has been attempted and many problems were encountered, work is already under way to improve the next report which will cover the period 2007-2012.

Grasslands on the sands of the nemoral zone of Ukraine: syntaxonomy, ecological evaluation, distribution patterns

Dmytro M. Iakushenko

M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Tereschenkivska 2, Kyiv, 01601, Ukraine

Nemoral zone of Ukraine (north, west and central parts of the country) is an important territory for the vegetation diversity study in the Eastern Europe, because the boundaries between central- and eastern-European floras lies there. Besides, the influence of boreal and steppe (sarmatic, pontic) elements is considerable too. Thermophilous grasslands on the sand are especially interesting because of their specific flora. Open sands in the nemoral zone are widespread mostly on postglacial planes in the north (Polissia) and on terraces of the river valleys. These habitats have been studied in Ukraine previously by the taxonomists, the phytosociogical investigations were rare (Vicherek, 1972, Andrienko, 1994). The general syntaxonomical survey has not been carried out till now.

The main theme of the present study is a review of the syntaxonomy and distribution of the *Koelerion glaucae* (Volk 1931) Klika 1935 communities in Ukraine. From 2003 to 2008, about 250 relevés were made according to the Braun-Blanquet approach. Additionally 110 published relevés were included in the database.

Syntaxonomical diversity of the thermophilous grasslands on sands in the region is established. It consists of 3 associations of the alliance *Corynephorion canescentis* Klika 1931, 1 - *Vicio lathyroidis-Potentillion argenteae* Brzeg in Brzeg et M.Wojt. 1996 and 10 associations of the *Koelerion glaucae* from the class *Koelerio glaucae-Corynephoretea canescentis* Klika in Klika et Novák 1941. The question of the syntaxonomical position of communities from the class *Festucetea vaginatae* Soó 1968 ex Vicherek 1972 was not solved, because they reached the north limit of distribution in the southernmost part of investigated area and occur sporadically only.

Biological spectra of the associations are achieved and the analysis of ecological strategies is made. Edaphic (soil acidity, nitrogen and carbonates contents, general salt regime) and hydrological conditions, which influenced on communities differentiation, are evaluate by the method of synphytoindication (Didukh, Pliuta, 1994) using ecological indicator values.

Peculiarities of geographical distribution and relations with climatic factors are analyzed. A gradual substitution of amphiatlantic species by pontic ones is shown. The distribution of communities in the region is mapped. For nature protection purposes rare associations and EUNIS habitat types defined.

A quick method for mapping Natura 2000 habitat types

John A.M. Janssen & Sander (C.) A. Mücher

Alterra Wageningen UR, The Netherlands - email: John.Janssen@wur.nl

For all Natura 2000-sites in the Netherlands management plans are obligated, according to Dutch implementation of the EU Habitats Directive. For these management plans there is an urgent need to have up-to-date maps of the locations of the Annex I habitat types within the Natura 2000-sites.
We prepared such habitat maps for 27 of the 162 Natura 2000-sites in the Netherlands, following two approaches:

(1) translating existing vegetation maps into habitat maps;
(2) preparing new habitat maps, using digital aerial photographs (false colour infrared, scale 1:10,000), computerized mapping methods and additional fieldwork.

The second method is described and discussed in the poster. We used the program *Definiens Developer* (formerly: *Ecognition*) to delineate boundaries of vegetation units on the digital photographs, using specific settings of compactness, scale, shape and weighting of spectral bands. For each Natura 2000-site the settings of the program were optimized according to the spatial configuration of vegetation units. We related the (spatial) vegetation units to EU-habitat types in two different ways: (1) using accurate ground data from the National Vegetation Databank, and (2) carrying out new field surveys.
The computer program produced very useful preliminary maps, especially in dune and heathland areas. In forested areas, however, the method was not suitable, as the program distinguished mainly between shaded and non-shaded parts of trees. We used spectral characteristics (a.o. NDVI) to stratify between forests, bare soil and other vegetation units. In the areas with the latter units (grasslands, heathlands and shrubs) the applied method appeared to be a very efficient way of making new maps of the locations of EU habitat types.

Recent vegetation history of the Northern Adriatic karst and flysch areas: shifts in thermophilly

Mitja Kaligarič[1], Metka Culiberg[2] & Andrej Paušič[2]

[1] FNM, University of Maribor, Koroška 160, 2000 Maribor, Slovenia
[2] Biological Institute, SRC SASA, Novi trg 4, 1000 Ljubljana, Slovenia

Deforestation, detectable on landscape level, has been perceived ca. 2500 years BP on two contrast pilot areas within the Northern Adriatic - a "classical karst" limestone area and the Dragonja river catchment on the Eocene flysch. A summary pollen diagrams and different old cartographic materials were used to reconstruct the recent vegetation history and trends on both areas. Remotely-sensed data and habitat mapping reveals the present situation. Decline of mesophilous trees *(Fagus sylvatica, Carpinus betulus, Coryllus avellana),* and increase of pioneer trees and shrubs *(Quercus, Ostrya, Juniperus)* and predominately grasses and herbs during 2000-400 years BP suggest that large-scale clearances let to a more termophilous vegetation. A 250-year-old map of the "classical karst" area shows probably a peak of deforestation, where grasslands have a 3.2 times larger surface than on a recent land-use map in a 665.8 km^2 large pilot area. Thermophilous grassland species, colonizing the deforested areas, probably derived from rocks and natural stony swards in the Mediterranean basin (e. g. *Helichrysum italicum, Salvia officinalis, Satureja* spp., *Teucrium montanum, Satureja montana* subsp. *subspicata, Thymus* spp.). They moved toward the north (inland) due to the fact that after deforestation microclimate conditions changed and caused that vegetation shifted from mesophilous towards more thermophilous, sclerophyllous and heliophilous. In the last 100 years reforestation with termophilous *Ostrya* and *Quercus pubescens*-dominated pioneer woodland replaced the abandoned grasslands. Similar conclusions were drawn for a flysch area of Dragonja catchment, before human covered predominately with beech forest. A 180-year-old map, compared with 2007 habitat mapping, showed strong progression of termophilous woodland and decline of grasslands. A "grassland period", lasting from Roman times to early 20th century, is now replaced with a "woodland period"; this could be concerned as a shift away of termophilly again, although not to the same degree as it was present before the human interference.

Phytogeographical and syntaxonomical vicissitudes at European level related to the phytosociological analysis of the termophilous chasmophytic vegetation of southern Italy

Di Pietro R.[1], D'Amico F.[2], Terzi M.[3] & Wagensommer R.P.[4]

[1] Department ITACA, University of Rome "La Sapienza" Via Flaminia 70, I-00196, Rome. Italy. e-mail: romeo.dipietro@uniroma1.it;
[2] Department of Plant Production Science, University of Bari, Botanical Garden, Via Orabona 4, Bari, Italy;
[3] Institute of Plant Genetics, CNR, Via Amendola 165/a - I-70126 Bari - Italy;
[4] Dipartimento di Biologia Vegetale, Università di Firenze, Via G. La Pira 4, I-50121 Firenze.

After a research on the chasmophytic communities including rare and/or endangered species of Gargano National Park in Apulia region (Fitosociologia vol. 45 (1): 177-200, 2008) the order *Centaureo kartschianae-Campanuletalia pyramidalis* was proposed again in a valid form on the basis of ICPN rules, and a new alliance named *Campanulo versicoloris - Dianthion japigici* was described for the Mediterranean chasmophytic communities of Salento and Murgia territories (central and southern Apulian Region). This alliance is characterised by a strong endemic component, and in southern Italy it behaves as vicariant of other alliances such as *Asperulion garganicae* (Gargano area), *Dianthion rupicolae* (western coastal sector of southern Italy) and *Centaureion pentadactyli* (Aspromonte massif, southern Calabria). In addition to several other vegetation types such as deciduous and/or evergreen woodlands, Mediterranean garrigues, subalpine dwarf-shrublands (etc), also for the chasmophytic vegetation the Italian Peninsula play a role of "biogeographical boundary" between the "eastern" and the "western" floristic and coenological districts. This particular geographical location has often brought to a difficulty in providing suitable syntaxonomical schemes especially as far as the high-rank syntaxa are concerned. In the specific case of the Mediterranean chasmophytic vegetation of southern Italy the debate is based on two different point of view: the first one suggests to include all the endemic southern Italy alliances into a single western-central Mediterranean order *(Asplenietalia glandulosi)* whereas the second one theorizes the inclusion of these same alliances in different orders *(Asplenietalia glandulosi, Centaureo-Campanuletalia, Onosmetalia frutescentis...),* which, at any rate, are very different each other for distributional range size, diagnosis, and specific character component.

Phytosociologycal and historical landscape ecological change of open sand grasslands (*Festucetum vaginatae*) in the last 200 years

Biró Marianna, Molnár Zsolt, Horváth Ferenc & Kröel-Dulay György

Hungarian Academy of Sciences, Institute of Ecology and Botany, MTA ÖBKI, Vácrátót, Alkotmány út 2-4. H-2163. e-mail: Biró Marianna (mariann@botanika.hu); Molnár Zsolt (molnar@botanika.hu); Horváth Ferenc (horvfe@botanika.hu); Kröel-Dulay György (gyuri@botanika.hu).

Open perennial sand grasslands (*Festucetum vaginatae danubiale*) in the Kiskunság region of Hungary has two dominant grass species: *Festuca vaginata* and *Stipa borysthenica*. Botanists and foresters of 19. century observed and described this community as three "formations": *Festuca* formation (*Festuca vaginata* subtype of the open perennial sand grassland), *Stipa* formation (*Stipa borysthenica* and *S. capillata* subtype of the open perennial sand grassland) and *Bromus* formation (open annual sand grassland). Historical sources mention the two types of *Festucetum vaginatae* as two phases of succession: sand fixation by *Festuca vaginata* stands on open, moving sands surfaces were followed by *Stipa* stands are regarded as the second phase of sand fixation on semi-fixed sand surfaces.
Species composition of open sand grasslands were defined by historical landuse changes of the last 200 years:
Till the end of the 18th century, in the sparsely inhabited Kiskunság region extensive grey cattle raising went on which sustained the open sand surface. Steadily blowing strong winds strengthened the result of grazing, kept the humus poor sand of pastures constantly moving and caused catastrophic sand storms sweeping arable lands too. The change in the grazing regime in the first half of the 19th century resulted in a spectacular shrub encroachment of open sand grasslands. As the impact of afforestation and cultivation (vineyards, orchards, gardens and ploughs) started at the same time, by the end of the 20th century only 6 % of open sand grasslands survived from the original 190 000 ha. The last moving sand dunes in the Kiskunság stopped in the 1980s. As a consequence of afforestation, the decrease of wind blowing and giving up pasturing on sand dunes in the last decades, a slow enclosure of open sand grasslands can be seen today. In the last 10 years we documented a significant shift in dominance from *Festuca vaginata* to *Stipa borysthenica*. This was triggerred by severe droughts in 2000 and the 2003. Both species died back considerably due to droughts, but *Stipa* recovered very fast following the droughts, thus gaining dominance over *Festuca*.

What is exactly the *Roso sempervirentis-Quercetum pubescentis* Biondi 1986?

Edoardo Biondi[1], Simona Casavecchia[1] & Daniela Gigante[2]

[1] Dipartimento di Scienze Ambientali e delle Produzioni vegetali, Sezione di Biologia vegetale, Università Politecnica delle Marche (Ancona, Italy)
[2] Dipartimento di Biologia Applicata, Sezione Biologia vegetale e Geobotanica, Università degli Studi di Perugia (Italy)

We here present the preliminary results of a study about the meaning of the association *Roso sempervirentis-Quercetum pubescentis* Biondi 1986 which was found, after its description in the 80s for the *Quercus* gr. *pubescens* woods of Mt Conero (Ancona), in several localities of central and southern Italy. First of all, it is necessary to examine the taxonomic problem of *Quercus* gr. *pubescens* that involves a lot of difficulties in the recognition of the dominant trees that compose these kinds of thermophilous woods. In fact, it is undoubted that in the floristic composition of the association *Roso sempervirentis-Quercetum pubescentis* the main *Quercus* species is *Quercus virgiliana*, while *Q. pubescens* and *Q. dalechampii* can also participate in the tree layer. The relevés from different peninsular localities attributed to the association have been compared in order to put in evidence the floristic and ecological differences among them and find a more clear syntaxonomical definition.

Phytosociological survey of the temporary pools systems in Apulia region (South-Eastern Italy)

Beccarisi Leonardo[1], Ernandes Paola[2], Gigante Daniela[3], Venanzoni Roberto[4] & Zuccarello Vincenzo[5]

[1] Di.S.Te.B.A., University of Salento, Ecotekne, via Monteroni, I-73100 Lecce, Italy, e-mail: l_beccarisi@libero.it
[2] Di.S.Te.B.A., University of Salento, Ecotekne, via Monteroni, I-73100 Lecce, Italy, e-mail: paola.ernandes@unile.it
[3] Dept. of Applied Biology, University of Perugia, Borgo XX giugno, 74, I-06121 Perugia, Italy, e-mail: daniela.gigante@unipg.it
[4] Dept. of Applied Biology, University of Perugia, Borgo XX giugno, 74, I-06121 Perugia, Italy, e-mail: rvenanzo@unipg.it
[5] Di.S.Te.B.A., University of Salento, Ecotekne, via Monteroni, I-73100 Lecce, Italy, e-mail: zuc@unile.it

The temporary wet systems of the vernal pools in the Thermo- and Mesomediterranean areas of Apulia region in South-Eastern Italy have been investigated by applying the phytosociological methodology; 167 releveés have been carried out in the early spring 2008 by using the Braun-Blanquet's classic approach, and classified by applying techniques of multivariate analysis to the data set. The most interesting aspects of these vegetational types can be included in the *Isoëto-Nanojuncetea* class, with the phytosociological alliances *Isoëtion*, *Preslion cervinae*, *Verbenion supinae* and *Cicendion filiformis* (incl. *Cicendio-Solenopsion*). The perennial plant types that sometimes surround these systems can be referred mainly to the classes *Phragmito-Magnocaricetea* and *Molinio-Arrhenatheretea*.
Different types of ponds have been taken into account, with different morphological, hydro-ecological and geological characteristics; they can be referred to three main fresh to brackish waters habitat types: cupular pools, that are little karstic forms excavated in limestone, with a thin layer of soil; waterlogged soils, that are soils with low hydraulic conductivity, which tend to remain flooded; and dolines, that are natural topographic depressions of soil, linked to groundwaters. The different phytocoenosis include species with a wide ecological range as concerns their life span: from short-cycle ephemeral therophytes to long-lasting geophytes and, in case of more permanent waters, even perennials. The sequence in time and the spatial (catenal) contacts of the different plant types have been investigated, in order to outline an interpretative model for these complex systems, which are often formed by a mosaic of different communities.
On the basis of their remarkable floristic and coenologic originality, the analyzed systems find a proper placement in some of the most interesting European Habitats listed in the Annex I to the 92/43/EEC Directive: 3120 "Oligotrophic waters containing very few minerals generally on sandy soils of the West Mediterranean with *Isoëtes* spp." and 3170 "Mediterranean temporary ponds", the latter also with a priority relevance.

Effect of climate change on forest ecosystems in Italy

Attorre F., Francesconi F., Valenti R., De Sanctis M., Vitale M., Di Traglia M. & Bruno F.

Plant Biology Department, Sapienza University of Rome, P.le A. Moro 5, 00185, Rome, Italy.
e-mail fabio.attorre@uniroma1.it

Biological changes due to global warming are already noticeable. Therefore, the effects of climate change must be addressed as they can negatively influence the survival capacity of a species. This kind of concern has led to the development of species-climate envelope models to predict potential effects on species distribution under climate change scenarios at European scale. To this aim a project has been started focused on the application of a bioclimatic envelope approach to analyse the effects of climate change on the distribution of tree species abundance in Italy at a high resolution. 6437 forest plots distributed on a 3 sqkm grid are used to calculate the importance value, a measure that combines density and dominance, for each species. High resolution (1sqkm) current climatic maps are produced by interpolating precipitation and temperature data recorded in 1100 meteorological stations. Future projections for 2050 and 2090 are derived using the HadCM3 GCM and two scenarios: B1 (moderate) and A1FI (extreme). High resolution climatic scenarios are derived by applying a statistical downscaling. Then the predictors from a GCM simulation are fed into the statistical model to estimate the corresponding local characteristics. Several statistical envelope models are compared to model the climatic niche of each species. The effects of future scenarios are derived under two extreme cases of dispersal, zero and unlimited. Cellular automata spatial model is used to incorporate the effects of time and fragmented forest cover in order to provide in a more realistic picture of the future potential distribution of tree species. The transition rules take into account habitat availability, abundance in occupied cells, distance between occupied and un-occupied cells. Among results obtained, it is worthy to note the increase of the Mediterranean region and the decrease of the Temperate and Alpine ones. This effect will also be accompanied by an increase of aridity and an higher probability of drought, especially in southern Italy. As a consequence, the potential distribution of a typical Mediterranean species such as cork oak (*Quercus suber*) is likely favoured, while a mesophilous Eurosiberian species such as beech (*Fagus sylvatica*) should suffer a strong reduction of area and abundance. The integration of these outputs with the Protected Areas GIS map of Italy is useful to quantify their rule in conserving forest habitats and to elaborate strategies of adaptive management including the do-nothing strategy, the afforestation plans to promote species predicted suitable for new areas or to improve the forest habitat resilience to maintain health conditions.

WEB-GIS application of the Lazio Biodiversity Observatory

Attorre F.[1], Cattena C.[2], De Sanctis M.[1], Francesconi F.[1], Spada F.[1], Valenti R.[1], Casella L.[1], Agrillo E.[1] & Bruno F.[1]

[1] Plant Biology Department, Sapienza University of Rome, P.le A. Moro 5, 00185, Rome, Italy. e-mail fabio.attorre@uniroma1.it

[2] Regione Lazio Area Conservazione e Natura 2000. e-mail: ccattena@regionelazio.it

The WEB-GIS application of the Observatory of the Biodiversity of the Lazio Region (OBL) is presented. The project started in 2006 to create a system to collect, organize, manage and spread the information about biological diversity of the Lazio Region. The flow of information follows the following scheme: Natural Protected areas-Regional Parks Agency-Universities-OBL and it parallels the process of collection-validation-spreading of data. The system has been developed by using ArcGisServer for the WEB applications and SQL Server 2005 for data management. Up to now georefenced data have been collected on vascular plants, birds, reptiles, amphibians, lepidopterous and carabidous beetles, with a total of 140.000 records. In the next future the database is going to be improved with the acquisition of data on lichens, fungi, bryophytes and fresh water algae. Moreover the group is currently producing vegetation maps that will be available as a tool in the WEB-GIS application. A project on mapping vegetation of the region Lazio using units of the CORINE Biotopes Classification System, is in progress, along with a critical revision of the CORINE Biotopes units, more consistent with local vegetation patterns. The classification of satellite imagery and the interpretation of aerial photo through GIS and remote sensing applications are validated through accurate field surveys. These maps, are also used in environmental modeling: the results will be a crucial tool for environmental conservation and habitat management in the region.
Furthermore, the Natura2000 habitat maps, produced in the management plans of the SCI and SPA have been acquired. A network for the monitoring of habitats is also available.
The functionalities of the system are the following:
- Species and habitat query according to geographic location, taxonomy and protection type;
- Visualization of species distribution;
- Species Infotool: life traits, distribution, images, conservation status;
- Site infotool: information about the site survey;
- Habitat infotool: Classification codes (Natura2000, EUNIS, Corine Biotopes), habitat description, area.
The main aims of this system are: to convey and standardize the flow of information about the biodiversity, to support the elaboration of adaptive strategies for its conservation, to facilitate the spread of its knowledge.

Application of Zurich-Montpellier method for studying tropical plant communities.

Borhidi A.[1], Capote R.P.[2] & Fernández M.Z[2]

[1] Department of Systematic Botany and Geobotany, University of Pécs, H-7624 Pécs, Ifjusag u. 6. e-mail: borhidi@gamma.ttk.pte.hu

[2] Instituto de Ecología y Botánica AC Cuba, La Habana, La Chata e-mail: botanica.ies@ama.cu

For studying composition and cover of plant communities in tropical grassland and heatland vegetation square-plot relevé-method is applyable without any modification. The same is due to the oligodominant woodland communities, like pine woodland, pine-oak woodlands, mangrove-vegetation savanna-woodlands. For polidominant tropical forest vegetation the classic transect-method is to be used, but there are methods to transform these kind of relevés into relevés of Braun-Blanquet method. Some of these applications are discussed and demonsrated.

Compositional divergence among ancient and recent forests: evidences from the field

Alessandro Chiarucci[1,2], Giovanni Bacaro[1,2], Sara Landi[1], Valerio Amici[1], Francesco Geri[1] & Duccio Rocchini[1,2]

[1] Dipartimento di Scienze Ambientali "G. Sarfatti", Università di Siena, Via P.A. Mattioli 4, 53100, Siena corresponding author: chiarucci@unisi.it
[2] TerraData s.r.l. environmetrics, Università di Siena, Via P.A. Mattioli 4, 53100, Siena.

Over the past several centuries, clearance of forests for agriculture and forests recovery on abandoned fields have transformed biodiversity patterns across much of Europe. Agricultural land use, and disturbance in general, could homogenize forest plant communities in several different ways, which correspond to different hypotheses about mechanisms of community assembly. These considerations lead to two specific predictions related to species composition and environmental gradients: firstly, variability in species composition among patches (or, in other words, observed beta diversity) should be greater in ancient than recent forests and, secondly, species-environment relationships should be stronger in ancient than recent forests. Here, we aim to test for the existence of compositional differences between recent and ancient forests. In order to accomplish this aim, we used vegetation data from a large scale biodiversity survey and explicitly developed for monitoring plant diversity in Sites of Community Importance (Habitat Directive 92/43/EEC) within the Siena Province (project MoBiSIC). In details, plots were firstly divided in forest/non forest categories; afterward, those plots classified as belonging to forested areas, were further classified in ancient and recent forests, on the basis of multitemporal cartographic data showing forest expansion during last five decades in Siena Province. In this way, we evaluated the effect of forest origin using permutational multivariate analysis of variance (PERMANOVA), testing the simultaneous response of species composition compared to forest age classes. Results demonstrated that forest origin significantly contribute to explain compositional variability occurring among similar forest physiognomies. Under the light of this result, we suggest that ecological factors, such as environmental filters, lead not only to reduced alpha diversity in recent forests, as previously documented quite generally, but also to strongly modify species composition across the landscape.

JUICE and R: new developments in visualization of unconstrained ordination analysis of vegetation data

David Zelený & Lubomír Tichý

Department of Botany and Zoology, Faculty of Science, Masaryk University Brno, Kotlarska 2, CZ-61137 Brno, Czech Republic; zeleny@sci.muni.cz

JUICE and R-project can be used as complementary programs with many advantages. While the first one offers user friendly environment for editing, classification and analysis of vegetation data, the second one has almost unlimited possibilities of analysis and visualization of any type of data, yet its interface is not designed for users without an advanced experience. Therefore, we decided to use benefits of these programs for advanced visualization of results of unconstrained ordination analysis, such as Detrended Correspondence Analysis (DCA), Principal Components Analysis (PCA) and Non-metric Multidimensional Scaling (NMDS). In R-project, wide selection of analytical and visualization tools for multivariate ordination analysis is available in the package vegan, developed by Jari Oksanen and his colleagues. We used this package, extended its functionality for several new visualization methods and connected it with JUICE program. Beside traditional two dimensional ordination diagrams with projected environmental variables and vegetation groups, the combination of JUICE and R-project offers more advanced methods such as three dimensional interactive ordination diagrams with convex hulls or spiderplots. The function such as manual update, online discussion forum, online manual and export of ordination results are also provided. We believe that this method, particularly the three dimensional visualization of ordination results, may bring new possibilities for interpretation of ordination results and their quick and effective visualization. More details can be found on http://www.sci.muni.cz/botany/zeleny/ordination.php.

List of Contributors:

Poster Presentation:

1. Formalized Classification of Subxerophilous Grassland Vegetation *(Cirsio-Brachypodion pinnati*, *Bromion erecti)* in the Slovak Republic

Iveta Škodová

Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, 845 23 Bratislava, Slovakia, e-mail: iveta.skodova@savba.sk.

2. Xerophytic plant communities of the Volga-Akhtuba flood-plain

Maltsev M. V.[1]; Nikolaychuk L.F.[2] & Golub V. B.[3]

[1] Volgograd State Pedagogical University. Naturally-Geographical Faculty. Department of Botany and Methods of the Teaching to Biology. prosp. Lenina 27, Volgograd , Russia 400131. E-mail: m_maltsev_biolog@rambler.ru;

[2] Institute of Ecology of the Volga River Basin. Russian Academy of Sciences. Komzina 10. Togliatti, Russia 445003;

[3] Institute of Ecology of the Volga River Basin. Russian Academy of Sciences. Komzina 10. Togliatti, Russia 445003.

3. Plant communities of the class *Crypsietea aculeatae* Vicherek 1973 on the territory of Eurasia

Sorokin A. N.[1], Bondareva V. V.[2] & Golub V. B.[3]

[1] Phytosociological laboratory, Institute of Ecology of the Volga River Basin of Russian Academy of Sciences; 445003 Russia, Samara reg., Togliatti, Komzina str., 10; e-mail: an-sorokin@yandex.ru;

[2] Phytosociological laboratory, Institute of Ecology of the Volga River Basin of Russian Academy of Sciences;

[3] Phytosociological laboratory, Institute of Ecology of the Volga River Basin of Russian Academy of Sciences.

4. The vegetation dynamics of the northern part of the Volga-Akhtuba flood-plain.

I.S. Sharova[1], A.N. Barmin[2], K.A. Starichkova[3] & V.B.Golub[4]

[1] Astrakhan State University. Tatishcheva Str, 20a Astrakhan, Russia 414056, E-mail: kerina-best@mail.ru;

[2] Astrakhan State University. Tatishcheva Str, 20a Astrakhan, Russia 414056, E-mail: abarmin60@mail.ru;

[3] Institute of Ecology of the Volga River Basin. Russian Academy of Sciences. Komzina 10 Togliatti, Russia 445003. E-mail: kseniya-starichkova@yandex.ru;

[4] Institute of Ecology of the Volga River Basin. Russian Academy of Sciences. Komzina 10 Togliatti, Russia 445003. E-mail: vbgolub2000@mail.ru.

5. Microclimatic responses of forest associations to climatic change: a study case in the oak forests near Rome

Guidotti S., Testi A. & Pignatti S.

Sapienza University of Rome Dept. Plant Biology - Orto Botanico, email: silvia-guidotti@libero.it.

6. Local occurrence of *Artemisia chamaemelifolia* Will. on the Balkans

Pedashenko H., Vassilev, K. & Apostolova I.
Institute of Botany, Bulgarian Academy of Sciences, 23 Acad. Georgi Bonchev str. 1113, Sofia, Bulgaria, e-mail: Pedashenko@bio.bas.bg;

7. *Sesleria latifolia* termophylous grasslands in Bulgaria

Apostolova Iva, Meshinev Tenyo, Vassilev Kiril & Pedashenko Hristo
Insitute of Botany, Bulgarian Academy of Sciences, Sofia 1113, Acad. G. Bonchev bl.23, Bulgaria, e-mail: iva@bio.bas.bg.

8. The halophyte and subhalophyte inland communities in South-East Bulgaria

Sopotlieva Desislava G.
Institute of Botany, Bulgarian Academy of Sciences, 23, Acad. G. Bonchev Str., Sofia, 1113, Bulgaria, desisop@bio.bas.bg.

9. Tissue element concentrations as indicators of underlying factors for vegetation gradients in fens and wet meadows - comparison of community an individual-species level

Rozbrojová Zuzana, R.Z.[1] & Hájek Michal, H.M.[2]
[1] Institute of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-611 37 Brno, Czech Republic;
[2] Department of Ecology, Institute of Botany, Academy of Sciences, Poříčí 3b, CZ-60300 Brno, Czech Republic. E-mail zuzkaroz@sci.muni.cz.

10. Landscape approach for conservation-oriented management of Atlantic lagoons

Bonis Anne, Membrey Céline & Bouzillé Jan-Bernard
[1] CNRS UMR Ecobio Campus de Beaulieu 35042 Rennes (France) anne.bonis@univ-rennes1.fr;
[2] UMR Ecobio Campus de Beaulieu 35042 Rennes (France);
[3] Professeur UMR Ecobio Campus de Beaulieu 35042 Rennes (France).

11. Regularities of distribution of the xerothermic plant communities in the Islice river valley

Gustina Lauma
Department of Geography, University of Latvia. Rainis blvd. 19. LV-1586, Latvia.
E-mail: Lauma.Gustina@lu.lv.

12. Phytosociological affiliation of *Tephoseris longifolia* ssp. moravica and two related species in the Western Carpathians

Hegedüšová Katarína, Janišová Monika[2], Škodová Iveta[3] & Kochjarová Judita[4]
[1] Institut of Botany, SAS, Dúbravská cesta 14, 845 23 Bratislava, Slovak Republic, katarina.hegedusova@savba.sk;
[2] Institut of Botany, SAS, Dúbravská cesta 14, 845 23 Bratislava, Slovak Republic, monika.janisova@savba.sk, University of Matej Bel, Faculty of Natural Sciences, Tajovského 40, 974 01 Banská Bystrica, Slovak Republic;
[3] nstitut of Botany, SAS, Dúbravská cesta 14, 845 23 Bratislava, Slovak Republic, iveta.skodova@savba.sk;
[4] Comenius University Botanical garden, detached unit, 03815 Blatnica, Slovak Republic, kochjarova@rec.uniba.sk.

13. The comparison of long-term tree structure dynamic in Oranienbaum Park and LTA Park (North-West Russia)

Alexander Dobrovolsky
Saint-Petersburg State Forest Technical Academy Address: Institutsky, 5, Saint-Petersburg, Russia, e-mail: alexander-83@yandex.ru.

14. Invasion allien plants in thermophilous communities of steppe zone of South Urals

Abramova L.M.
Botanical Garden-Institute Ufa Scientific Centre RAS, e-mail: abramova.lm@mail.ru.

15. Numerical and syntaxonomical analysis of the class *Molinio-Arrhenatheretea* in Chile: preliminary results

Alvarez Miguel[1], Möseler Bodo Maria[2], San Martín Cristina[3] & Paulini Inge[4]
[1] INRES, Department of Geobotany and Nature Conservation, University of Bonn, Germany. e-mail: malvarez@uni-bonn.de;
[2] INRES, Department of Geobotany and Nature Conservation, University of Bonn, Germany;
[3] Botanical Institute, Austral University of Valdivia, Chile;
[4] INRES, Department of Geobotany and Nature Conservation, University of Bonn, Germany.

16. Comparative analysis of lawn flora of differently managed village yards in South-West Hungary

Pál Róbert[1], Pinke Gyula[2] & Botta-Dukát Zoltán[3]
[1] University of Pécs, Faculty of Natural Sciences, Department of Plant Systematics and Geobotany, H-7624 Pécs, Ifjúság u. 6, Hungary, e-mail: palr@gamma.ttk.pte.hu;
[2] University of West Hungary, Faculty of Agricultural and Food Sciences, Department of Botany, H-9200 Mosonmagyaróvár, Vár 2, Hungary;
[3] Institute of Ecology and Botany, Hungarian Academy of Sciences, H-2163 Vácrátót, Alkotmány u. 2-4, Hungary.

17. European Dry Grassland Group - a new network for dry grassland research and conservation

Janišová Monika[1], Rūsiņa Solvita[2] & Dengler Jürgen[3]
[1] Institute of Botany, Slovak Academy of Sciences, Dumbierška 1, 974 11 Banská Bystrica, Slovak Republic, e-mail:monika monika.janisova@savba.sk;
[2] Faculty of Geography and Earth Sciences, University of Latvia, Raina boul, 19, 1586 Riga, Latvia e-mail: rusina@lu.lv;
[3] Plant Systematics and Vegetation Ecology, Biocentre Klein Flottbek, University of Hamburg, Ohnhorststr. 18, 22609 Hamburg, Germany; email: dengler@botanik.uni-hamburg.de.

18. Halophytic vegetation of grass steppes and desert steppes between Volga and Ural (Russia)

Lysenko Tatiana
Institute of Ecology of the Volga river basin RAS, Komzin str. 10, Togliatti, 445003 Russia, e-mail: ltm2000@mail.ru.

19. Diagnostic, constant and dominant species of the higher vegetation units of Slovakia

Ivan Jarolímek[1], Jozef Šibík[1], Katarína Hegedüšová[1], Monika Janišová[1], Ján Kliment[2], Peter Kučera[2], Jana Májeková[1], Daniela Michálková[1], Jana Sadloňová[1], Ivana Šibíková[1], Iveta Škodová[1], Lubomír Tichý[3], Karol Ujházy[4], Mariana Ujházyová[4], Jana Uhlířová[5], Milan Valachovič[1] and Marica Zaliberová[1]

[1] Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, SK-845 23 Bratislava, Slovak Republic, e-mail: jozef.sibik@savba.sk;

[2] Botanical Garden of Comenius University, SK-038 15 Blatnica, Slovak Republic;

[3] Department of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-611 37 Brno, Czech Republic;

[4] Faculty of Forestry, Technical University in Zvolen, T. G. Masaryka 24, SK-960 53 Zvolen, Slovak Republic;

[5] Slovak National Museum - Nature Sciences Museum, Vajanského nábrežie 2, P.O. Box 13, SK-810 06 Bratislava 16, Slovak Republic.

20. Oak forests on loess in Hungary and Croatia

Purger Dragica[1], Csiky János[2], Lengyel Attila[3], Kevey Balázs[4], Lendvai Gábor[5] & Horváth András[6]

[1] DÉDUVIZIG Hungary1;

[2] University of Pécs, Faculty of Science, Institute of Biology, Department of Plant Taxonomy and Geobotany, H-7624 Pécs, Ifjúság u. 6., Hungary, e-mail: moon@ttk.pte.hu;

[3] University of Pécs, Hungary;

[4] University of Pécs, Hungary;

[5] freelancer, Hungary;

[6] MTA ÖBKI, Hungary.

21. Averaging and analysis of concentration of ecological indicator values - an example from the South Hungarian mesic meadows

Attila Lengyel[1], Zoltán Botta-Dukát[2] & János Csiky[3]

[1] Department of Geobotany and Phytotaxonomy, University of Pécs; Ifjúság u. 6., H-7624 Pécs, Hungary; lengyel.at@gmail.com;

[2] Institute of Ecology and Botany, Hungarian Academy of Sciences; Alkotmány utca 2-4., H-2163 Vácrátót, Hungary;

[3] Department of Geobotany and Phytotaxonomy, University of Pécs; Ifjúság u. 6., H-7624 Pécs, Hungary.

22. Coenological status of the *Iris* meadows (*Iridetum sibiricae* Philippi 1960) in Hungary

Salamon-Albert É.[1] & Lőrincz P.[2]

[1] University of Pécs, Biological Institute, Department of Systematic and Ecological Botany H-7624 Pécs, Ifjúság útja 6. albert@gamma.ttk.pte.hu;

[2] Radnóti Miklós Economic Secondary School H-7633 Pécs, Esztergár Lajos u. 6.

23. Using phytosociological data analysis to assess vulnerability of European wetland habitats to the global change

Aidoud Ahmed[1] & Clément Bernard[2]

[1] University of Rennes 1 (France). Address: UMR Ecobio, Bat 14A (126/1), Campus de Beaulieu, Université Rennes1, F-35042 Rennes cedex (aidoud@univ-rennes1.fr);

[2] University of Rennes 1 (France).

24. Scale-dependence of species richness in European dry grasslands

Otýpková Zdenka, Merunková Kristina & Milan Chytrý
Masaryk University, Department of Botany and Zoology, Kotlarska 2, 611 37 Brno, zdenkao@sci.muni.cz.

25. Vegetation of the Middle Gediz Basin

Emin Ugurlu[1] & Ozcan Secmen[2]
[1] Department of Biology, Celal Bayar University, Manisa, Turkey; e-mail: emin.ugurlu@bayar.edu.tr
[2] Department of Biology, Ege University , Izmir , Turkey;
e-mail: secmen@sci.ege.edu.tr.

26. The vegetation of Mori (Trento) and its warmest district: the landscape unit of Mori-Talpina

Vittorio Ingegnoli & Elena Giglio
University of Milan, Faculty of Natural Sciences

27. Differentiation of thermophilous oak forest *Potentillo albae-Quercetum* Libb. 1933 nom. invers. in Europe

A. Brzeg[1], M. Kasprowicz[1], W. Rakowski[1], M. Wojterska[1] & D. Iakushenko[2]
[1] Department of Plant Ecology and Protection of Environment, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznan, Poland, email:mwzerios@amu.edu.pl;
[2] M.G. Kholodny Institute of Botany NAS Ukraine, Tereschenkivs'ka 2, Kyjiv 01601, Ukraine.

28. How can the noise elimination increase the reliability of classification?

Botta-Dukát, Z.
Institute of Ecology and Botany, HAS; H-2163 Vácrátót Alkotmány 2-4, Hungary; bdz@botanika.hu.

29. Ecological classification of forest communities in Central Apennines (Abruzzo) through soil parameters and ecoindicators

De Nicola C., Fanelli G. & Testi A.
Department of Plant Biology, Sapienza University of Rome, P.le A. Moro, 5 00185 Rome, Italy.
e-mail: kridn@libero.it

30. Fringe communities of the class *Trifolio-Geranietea* in the Wienerwald (Austria)

Pelikan Irma[1] & Willner Wolfgang[2]
[1] Wallrissstrasse 73/4, A-1180 Vienna, Austria;
[2] Vienna Institute for Nature Conservation and Analyses (VINCA), Giessergasse 6/7, A-1090 Vienna, Austria. E-mail: wolfgang.willner@vinca.at.

31. Dry grasslands of Southern Nechernozemje of Russia: syntaxonomy, habitats, management and protection

Yury A. Semenishchenkov
Bryansk State University, Dept. of Botany. 241036 Bryansk, Bezhitskaya, 14, r. 537.
e-mail: yuricek@yandex.ru.

32. The diversity of steppe communities (class *Festuco-Brometea*) of South Ural (Russia)

Yamalov S. & Bayanov A.
Bashkir State University, Frunze, 32 Ufa, Russia. e-mail: geobotanika@rambler.ru.

33. The vegetation on two significant gullies of Iblei mountains (Southern Italy)

E. Poli Marchese, M. Grillo & E. Magro
D.A.C.P.A.- Sez. di Biologia ed Ecologia vegetale, Università di Catania
Via Valdisavoia 5- 95125 Catania (Italy). E-mail:epolimar@unict.it; mgrillo@unict.it

34. Floristic changes along the topographical gradient in montane grasslands in Monti Picentini (Campania, South-Western Italy)

F. Spada[1], M. Cutini[2] & B. Paura[3]
[1] Dip.to di Biologia Vegetale, Università degli studi di Roma "La Sapienza", P.le A.Moro 5, 00185 Roma; e-mail: francesco.spada@uniroma1.it;
[2] Dip.to di Biologia, Università degli studi di Roma Tre, Viale G.Marconi 446, 00146 Roma; e-mail: cutini@bio.uniroma3.
[3] Dip.to SAVA, Università del Molise, Via De Sanctis 86100 Campobasso; e-mail: fobos@unimol.it.

35. Dry grasslands at Monte Gargano pedimont and the legacy of the last pleniglacials?

F. Spada[1] & M. D. Magri[1]
[1] Sapienza University of Rome Dept. Plant Biology - Orto Botanico e-mail: francesco.spada@uniroma1.it.

36. Sand dune vegetation on the Ionian coast of Calabria: SCI "Dune di Marinella"

Uzunov Dimitar[1], Gangale Carmen[2] & Caruso Giuseppe[3]
[1] Museo di Storia Naturalis della Calabria ed Orto Botanico, Universita della Calabria, Arcavacata di Rende - 87036 Italia. duzunov@libero.it ;
[2] Museo di Storia Naturalis della Calabria ed Orto Botanico, Universita della Calabria, Arcavacata di Rende - 87036 Italia. cgangale@inwind.it;
[3] Istituto Tecnico Agrario Statale "Vittorio Emanuele II", via V. Cortese 1, 88100, Catanzaro, Italy, caruso_g@libero.it.

37. Petrifying springs in the gorge of Reschia River (S Italy)

Gangale Carmen[1] & Uzunov Dimitar[2]
[1] Museo di Storia Naturalis della Calabria ed Orto Botanico, Universita della Calabria, Arcavacata di Rende - 87036 Italia. cgangale@inwind.it;
[2] Museo di Storia Naturalis della Calabria ed Orto Botanico, Universita della Calabria, Arcavacata di Rende - 87036 Italia. duzunov@libero.it.

38. Are European coastal dune systems so similar? A comparison between Atlantic (Aquitaine region, France) and Mediterranean (Lazio region, Italy) coastal dunes

Izzi Carmela Francesca[1] & Acosta Alicia[2]
[1] Dipartimento di Biologia - Università degli Studi Roma Tre - Viale G. Marconi 446 - 00146 ROMA acosta@uniroma3.it
[2] Dipartimento di Biologia - Università degli Studi Roma Tre - Viale G. Marconi 446 - 00146 ROMA c.izzi@uniroma3.it

39. Restoration of biotopes of aquatic vegetation of Natura 2000 Habitat type: a case study from the floodplain of the river Tiber (Central Italy)

Casella L., Agrillo E. & Spada F.
Sapienza University of Rome Dept. Plant Biology & Orto Botanico e-mail: laura.casella@uniroma1.it.

40. European beach and foredune habitat types (92/43/EEC). A comparison between Atlantic and Mediterranean habitats using large scale vegetation databases.

Feola Silverio[1], Carranza M. Laura[1], Janssen John[2], Schaminée Joop[2 3] & Acosta Alicia T.R.[4]
[1] EnviX-lab. Dip. STAT, Molise University, Contrada Fonte Lappone, Pesche 86090 (IS) Italy. silverio.feola@unimol.it; carranza@unimol.it;
[2] Alterra Wageningen UR, P.O. Box 47, 6700 AA Wageningen, The Netherlands
[3] Radboud University Nijmegen, P.O. Box 9010, 6500 GL Nijmegen, The Netherlands
[4] Dip. of Biology, Roma 3 University. V.le Marconi 446-I 00146 Roma, Italy

41. Thermophilous grasslands and some forms of semi-moist meadows *(Bromion erecti, Molinion)* as a result of a long-term military activity

Stachnowicz Wojciech
Adam Mickiewicz University, Faculty of Biology, Department of Plant Taxonomy, ul. Umultowska 89, 61-614 Poznań, Poland; e-mail: wsta@op.pl

42. Grasslands on the sands of the nemoral zone of Ukraine: syntaxonomy, ecological evaluation, distribution patterns

Dmytro M. Iakushenko
M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Tereschenkivska 2, Kyiv, 01601, Ukraine

43. A quick method for mapping Natura 2000 habitat types

John A.M. Janssen & Sander (C.) A. Mücher
[1]Alterra Wageningen UR, The Netherlands - email: John.Janssen@wur.nl

44. Phytosociologycal and historical landscape ecological change of open sand grasslands (Festucetum vaginatae) in the last 200 years

Biró Marianna, Molnár Zsolt, Horváth Ferenc & Kröel-Dulay György
[1]Hungarian Academy of Sciences, Institute of Ecology and Botany, MTA ÖBKI, Vácrátót, Alkotmány út 2-4. H-2163. e-mail: Biró Marianna (mariann@botanika.hu); Molnár Zsolt (molnar@botanika.hu);Horváth Ferenc (horvfe@botanika.hu); Kröel-Dulay György (gyuri@botanika.hu).

45. JUICE and R: new developments in visualization of unconstrained ordination analysis of vegetation data

David Zelený & Lubomír Tichý
Department of Botany and Zoology, Faculty of Science, Masaryk University Brno, Kotlarska 2, CZ-61137 Brno, Czech Republic; zeleny@sci.muni.cz

Oral Presentations:

1. Dry grasslands of the *Bromo pannonici-Festucion pallentis* and *Diantho lumnitzeri-Seslerion* in Slovakia - a formalized classification

Monika Janišová [1,2] & Daniela Dúbravková [1,3]

[1] *Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 14, 845 23 Bratislava, Slovakia, e-mail: monika.janisova@savba.sk;*

[2] *Faculty of Natural Sciences, Matej Bel University, Tajovského 40, 974 01 Banská Bystrica, Slovakia;*

[3] *Homeland Museum in Považská Bystrica, Ul. Odborov 244/8, 017 01 Považská Bystrica.*

2. Conservation Status of Habitats in Germany: results of the National report (Art. 17) on Natura 2000 and options for future nature conservation

Axel Ssymank

Bundesamt für Naturschutz (Federal Agency for Nature Conservation) I.2.2, Konstantinstrasse 110, 53179 Bonn, Germany. e-mail: Ssymanka@bfn.de.

3. Floristic changes in thermophilous woodland and "pozzine" in the surrounding of Rome - years 2004-2008

Giuliano Fanelli, Mafalda Cerrito, Daniele Cicuzza & Anna Testi

Sapienza University of Rome Dept. Plant Biology - Orto Botanico, e-mail: giuliano.fanelli@gmail.com.

4. The Red Data Book of Bulgarian habitats - some preliminary conclusions

Rossen Tzonev[1]; Chavdar Gussev[2]; Veska Rusakova[3] & Marius Dimitrov[4]

[1] *Department of ecology and environmental protection, Sofia University"St. Kliment Ohridski", Faculty of biology, 8 Dragan Tzankov blvd. Sofia 1164; rosssentzonev@abv.bg;*

[2] *Department of applied botany, Bulgarian Academy of Science, Institute of Botany, 23 Acad. Georgi Bonchev 23' Sofia 1113; chgussev@bio.bas.bg;*

[3] *Bulgarian Society of Phytocoenology, Bulgarian Academy of Science, Institute of Botany, 23 Acad. Georgi Bonchev 23' Sofia 1113; v.rusakova@abv.bg;*

[4] *Department of Dendrology, University of Forestry, Kliment Ochridski 10, BG-1756 Sofia.*

E-mail: mariusdimitrov@abv.bg.

5. Lime at the limits: climatic, economic and religious intolerance in a *Tilio - Acerion* landscape.

Rodwell John S.[1] & Hey David[2]

[1] *Honorary Research Fellow, Lincoln Institute, Manchester University, Oxford Road, Manchester M13 9PL, UK (johnrodwell@tiscali.co.uk);*

[2] *Emeritus Professor, of Local & Family History, Sheffield University, UK.*

6. Studying altitudinal distribution of tree species in the Bavarian Alps using the BERGWALD databank

Ewald Joerg

Weihenstephan University of Applied Sciences, Am Hochanger 5, D-85354 Freising, Germany, joerg.ewald@fh-weihenstephan.de

7. Ammassalik vegetation revisited (1968/1969 - 2007) - Vegetation Change and Global Warming in the coastal low-arctic tundra of Southeast Greenland

Daniëls Fred J.A.[1] & De Molenaar Hans G.[2]

[1] *Institute of Plant Ecology, Hindenburgplatz 55, 48143 Münster, Germany, daniels@uni- muenster.de;*

[2] *Gruttostraat 24, 4021 EX Maurik, The Netherlands.*

8. Are plants moving upwards during the 20th century ? An inventory based on the French data bank Sophy

Grandjouan Gilles[1] & Brisse Henry[2]

[1] *Emeritus Professor, 60 rue de Lunaret, F34090 Montpellier (France) E-mail: gilles.grandjouan@free.fr;*

[2] *Emeritus Professor, 36 rue Henri Dunant, Pas-des Lanciers, F13700 Marignane (France).*

9. How natural are thermophilous oakwoods in sub-continental conditions of Central Europe? Half-century succession in the Milovicky Wood, Pannonian biogeographical province of the Czech Republic.

Hedl Radim[1], Szabo Peter[2], Kopecky Martin[3], Wernerova Veronika[4] & Komarek Josef[5]

[1] *Institute of Botany of the Czech Academy of Sciences, Porici 3b, CZ-603 00 Brno, Czech Republic; e-mail: rhe_at_centrum.cz, hedl_at_ibot.cas.cz;*

[2] *Institute of Botany of the Czech Academy of Sciences, Porici 3b, CZ-603 00 Brno, Czech Republic;*

[3] *Institute of Botany of the Czech Academy of Sciences, Porici 3b, CZ-603 00 Brno, Czech Republic;*

[4] *Institute of Botany and Zoology, Faculty of Sciences, Masaryk University, Kotlarska 2, CZ-611 37 Brno, Czech Republic;*

[5] *Agency for Nature Conservation and Landscape Protection of the Czech Republic, Husova 2115, CZ-580 01 Havlickuv Brod, Czech Republic.*

10. The Construction of the National Vegetation Survey Databank "EGYPT Vegetation Archive"

El-Sheikh A. Mohamed[1] & Zakareyia M. Mohamed[2]

[1] *Dept of Botany, Faculty of Science, Alexandria University (Damanhour Branch), Damanhour, Egypt. e-mail: el_sheikh_eg@yahoo.co.uk;*

[2] *Dept of Botany, Faculty of Science, Tanta University, Tanta, Egypt.*

11. Thermophilous deciduous forests in Southeastern Europe

Andraž Čarni[1], Petra Košir[1], Branko Karadžić[2], Vlado Matevski[3], Sulejman Redžić[4] & Željko Škvorc[5]

[1] *Institute of Biology, Scientific Research Centre of the Slovenian Academy of Sciences and Arts, Novi trg 2, P.B. 306, SI-1001 Ljubljana, e-mail: carni@zrc-sazu.si, petraKo@zrc-sazu.si*

[2] *Institute for Biological Research "Siniša Stanković", 29. novembra 142, SRB-11060 Beograd, e-mail: branko.karadzic@ ibiss.bg.ac.yu*

[3] *Institute of Biology, Faculty of Natural Sciences and Mathematics, Gazi baba b/b, P.B. 162, MK-91 000 Skopje; e-mail: vladom@iunona.pmf.ukim.edu.mk*

[4] *Department of Biology, Faculty of Science, University of Sarajevo, BiH-71 000 Sarajevo, e-mail: sredzic@pmf.ba*

[5] *Faculty of Forestry, University of Zagreb, Svetošimunska 25, P.B. 422, HR-10 000 Zagreb, e-mail: zeljko.skvorc@zg.t-com.hr*

12. Pasture landscapes with high biodiversity - a favourable nature conservation strategy in woodland types of the EU Habitats Directive?

Bergmeier Erwin[1], Petermann Jörg[2] & Schröder Eckhard[3]

[1] Albrecht von Haller Institute of Plant Sciences, University of Göttingen, Untere Karspüle 2, 37073 Göttingen, Germany. erwin.bergmeier@bio.uni-goettingen.de;
[2] German Aerospace Center (DLR), EUREKA/COST Bureau, Heinrich-Konen-Str. 1, 53227 Bonn, Germany;
[3] Federal Agency for Nature Conservation (BfN), Mallwitzstr. 1-3, 53177 Bonn, Germany.

13. A simple yet precise method to impute missing pH and conductivity values in ecological data sets using species composition

Lubomír Tichý[1], Michal Hájek & David Zelený

[1] Institute of Botany and Zoology, Masaryk Univ., Kotlářská 2, 61137 Brno, Czech Republic; tichy@sci.muni.cz.

14. Dry grasslands in the Western Carpathians and northern Pannonian Basin - a numerical classification

Dúbravková Daniela[1], Chytrý Milan[2], Illyés Eszter[3], Janišová Monika[4],
Kállayné Szerényi Júlia[5] & Willner Wolfgang[6]

[1] Institute of Botany, Slovak Academy of Sciences, Bratislava, Slovakia; Homeland Museum, Považská Bystrica, Slovakia e-mail: daniela.dubravkova@savba.sk;
[2] Department of Botany and Zoology, Masaryk University, Brno, Czech Republic;
[3-5] Institute of Ecology and Botany, Hungarian Academy of Sciences, Vácrátót, Hungary;
[4] Institute of Botany, Slovak Academy of Sciences, Bratislava, Slovakia; Faculty of Natural Sciences, Matej Bel University, Banská Bystrica, Slovakia;
[6] Vienna Institute for Nature Conservation and Analyses (VINCA), Vienna, Austria.

15. On the concept of ecological similarity in vegetation science

Roleček Jan[1] & Kintrova Katerina[2]

[1] Institute of Botany, Masaryk University, Brno, Czech Republic, Kotlarska 2, 611 37; honza.rolecek@centrum.cz.
[2] Institute of Botany, Masaryk University.

16. The Role of the Southern Species in the Flora and Vegetation of Jaba Valley Region (Somogy County, Hungary)

Szabo Istvan & Kercsmar Vilmos

[1]Pannon University Georgicon Faculty Dept of Plant Science and Biotechnology, Hungary 8360 Keszthely P.O.B. 66. il-szabo@georgikon.hu.

17. Thermophilous wetland plant species in the Czech Republic - distribution changes as a consequence of human impact

Sumberova Katerina

Institute of Botany, Department of Ecology, Academy of Sciences of the Czech Republic, Porici 2b, 603 00 Brno; sumberova@brno.cas.cz.

18. Vegetation cover of thermal fields and hot spring environs of the Kamchatka Peninsula (Russian Far East)

Neshataeva Valentina
Komarov Botanical Institute Russian Academy of Science, Prof. Popov Str., 2, St.-Petersburg, 197376, Russia e-mail: vneshataeva@mail.ru.

19. Adaptative strategies of psammophilous species.

Gratani L., Varone L. & Crescente M.F.
Department of Plant Biology, Sapienza University of Rome, P.le A. Moro, 5 00185 Rome, Italy. E-mail of correspondig author: loretta.gratani@uniroma1.it.

20. In wild *ex situ* conservation of a rare and endangered species: the self-sustaining translocation of the thermophilous *Cyperus polystachyos* in a agricultural Protected Area

Crosti R.[1], Fabrini G.[2] & Morgutti A.[3]
[1] *School of Environmental Science, Murdoch University, Western Australia robertocrosti@libero.it;*
[2] *Department of Plant Biology, Sapienza University of Rome, P.le A. Moro 5, 00185 Roma, Italy;*
[3] *Climax Cooperativa Ambientale Via A. Fava 46, 00135 Roma, Italy.*

21. Temporal trends of occurrence and species composition of calcareous dry grasslands in the German vegetation database

Jandt Ute & Bruelheide Helge
Institute for Biology/Geobotany and Botanical Garden, Am Kirchtor 1, D-06108 Halle.
e-mail: ute.jandt@botanik.uni-halle.de.

22. The basiphilous semi-dry grasslands (*Festuco-Brometea*) in N and NE Europe: from a vegetation database to a consistent large-scale classification

Dengler Jürgen[1], Rūsiņa Solvita[2], Boch Steffen[3] & Löbel Swantje[4]
[1] *Plant Systematics and Vegetation Ecology, Biocentre Klein Flottbek, University of Hamburg, Ohnhorststr. 18, 22609 Hamburg, Germany; email: dengler@botanik.uni-hamburg.de;*
[2] *Faculty of Geography and Earth Sciences, University of Latvia, Raina boul, 19, 1586 Riga, Latvia e-mail: rusina@lu.lv;*
[3] *Institute of Plant Sciences, University of Bern, Altenbergrain 21, 3013 Bern, Switzerland; e-mail: steffen.boch@ips.uni-bern.ch;*
[4] *Department of Plant Ecology, Evolutionary Biology Centre, Uppsala University, Villavägen 14, 75236 Uppsala, Sweden; email: swantje.lobel@ebc.uu.se.*

23. Effects of habitat fragmentation on population biology and seed bank of four plant species in calcareous grasslands

Luisa Steiner[1] & Rainer Buchwald[2]
[1] *IFÖ, Kandelstr. 26, D - 79106 Freiburg, Germany; luisa.steiner@web.de;*
[2] *AG Vegetationskunde und Naturschutz, IBU, Carl von Ossietzky Universität, D - 26111 Oldenburg, Germany; rainer.buchwald@uni-oldenburg.de.*

24. Nutrient relationships and management history in European thermophilous grasslands

Merunková Kristina, Otýpková Zdenka & Chytrý Milan
Department of Botany and Zoology, Masaryk University Brno, Kotlářská 2, 611 37 Brno, Czech Republic, e-mail: merunkova@sci.muni.cz.

25. Simulation of the Dynamics of European Boreal Vegetation under the Influence of Global Warming

Neshataev Vasiliy
Dept of Botany & Dendrology, Saint-Petersburg State Forest-Technical Academy, Institutsky per., 5. LTA. Saint-Petersburg, 194021, Russia; email: vn1872@yandex.ru.

26. Thermal flora and vegetation of Hévíz lake and ditches near Keszthely (Hungary) regarding colonizing neophytes

Szabó István
Pannon University Georgicon Faculty Dept of Plant Science and Biotechnology. Hungary 8360 Keszthely P.O.B. 66. il-szabo@georgikon.hu.

27. Forests of the Southern Urals - a modern analogy of the early Holocene forests of Central Europe

Chytrý Milan[1], Danihelka Jiří[1,2], Horsák Michal[1], Kočí Martin[1], Kubešová Svatava[1,3], Lososová Zdeňka[1,4], Otýpková Zdenka[1], Tichý Lubomír[1], Martynenko Vassiliy[5] & Baisheva Elvira[5]
[1] Department of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-61137 Brno, Czech Republic, e-mail: chytry@sci.muni.cz;
[2] Institute of Botany, Academy of Sciences of the Czech Republic, Brno, Czech Republic;
[3] Moravian Museum, Brno, Czech Republic;
[4] Department of Biology, Faculty of Education, Masaryk University, Brno, Czech Republic;
[5] Institute of Biology, Russian Academy of Sciences, Ufa, Russia.

28. Functional response traits to climatic gradients in alpine dry grassland ecosystems

Wellstein Camilla[1] & Kuss Patrick[2]
[1] Biogeography, University of Bayreuth, Universitätsstr. 30, D-95440 Bayreuth, Germany. e-mail: camilla.wellstein@uni-bayreuth.de;
[2] Institute of plant sciences, University of Bern, Altenbergrain 21, CH-3013 Bern, Switzerland.

29. From thermophily to cryophily: similarities of lichen floras from Italy to Greenland

Bueltmann Helga
Institute of Plant Ecology, Univ. Münster, Hindenburgplatz 55, D-49143 Münster, bultman@uni-muenster.de.

30. Correlation analysis between ecological pattern and distribution of vegetation communities in mountain grassland landscape of Umbria-Marches Apennines (Central Italy)

Catorci Andrea[1], Cesaretti Sabrina[1], Gatti Renata[1], Pieruccini Pierluigi[2] & Tardella Federico Maria[1]

[1] Department of Environmental Science - University of Camerino, via Pontoni 5 - 62032 Canerino (MC). andrea.catorci@unicam.it;

[2] Department of Earth Science - University of Siena, via Laterina 8 - 53100 Siena.

31. Vegetation plot data and databases in Europe: an overview

Joop H.J. Schaminée[1], Stephan M. Hennekens[1], Milan Chytrý[2] & John S. Rodwell[3]

[1] Centre for Ecosystem Studies, Alterra, Wageningen University and Research Centre, P.O. Box 47, NL-6700 AA Wageningen, The Netherlands;

[2] Department of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-61137 Brno, Czech Republic;

[3] Ecological Consultant, Lancaster, United Kingdom.

32. Effects of fragmentation in the forest clearings of the central Apennines.

D'Angeli D., Fanelli G. & Testi A.

Department of Plant Biology, Sapienza University of Rome, P.le A. Moro, 5 00185 Rome, Italy.
e-mail: anna.testi@uniroma1.it

33. The *Lygeo-Stipetea* class in Sicily

S. Brullo[1], G. Giusso del Galdo[1], R. Guarino[2], P. Minissale[1], G. Siracusa[1], L. Scuderi[1] & Spampinato[3]

[1] Università di Catania, Dipartimento di Botanica, via Longo, 19, I-95125 Catania

[2] Università di Palermo, Dipartimento di Scinze Botaniche, via Archirafi, 38, I-90123 Palermo

[3] Università Mediterranea di Reggio Calabria, Dipartimento S.T.A.F.A, Loc. Feo di Vito, I-89100 Reggio Calabria

34. Thermal symmetry breaking at sunrise in ecosystems of extreme habitats.

Sandro Pignatti

Emeritus Professor, of Sapienza University of Rome, P.le A. Moro, 5 00185 Rome, Italy.

35. Effects of temperatures on the spatial arrangement in Mediterranean annual dry grasslands

Riccardo Guarino[1] & Gianpietro Giusso del Galdo[2]

Dipartimento di Scienze Botaniche, Università di Palermo, via Archirafi, 28 - 90123 Palermo, Italy
e-mail: guarinotro@hotmail.com

Dipartimento di Botanica, Università di Catania, via A.Longo, 19 - 95125 Catania, Italy

36. The origin, dynamics and syntaxonomy of thermophillous calcareous vegetation of class *Festuco-Brometea* Br.-Bl. et R.Tx in Br.-Bl. 1943 at the Dinaric Alps (W. Balkan)

Sulejman Redzic

Academy of Sciences and Art of B-H7 Bistrik St., 71 000 Sarajevo, Bosnia and Herzegovina

37. Biomization: Historical Phytogeography revisited

Francesco Spada

Sapienza University of Rome Dept. Plant Biology - Orto Botanico, P.le A. Moro, 5 00185 Rome, Italy.

38. Vegetation Survey of High-Rank Syntaxa of Europe (EuroChecklist): A Brief Story of a Long Journey

Mucina L & The Team of the Euro-Checklist

Dept. of Botany & Zoology, Stellenbosch University, Private Bag X1, 7602 Matieland, Stellenbosch, South Africa; Email: LM3@sun.ac.za

39. Assessing the conservation status of habitats of European Community Interest

Doug Evans

ETC/BD - European Topic Centre - Biological Diversity Paris, France - e-mail: evans@mnhn.fr

40. Recent vegetation history of the Northern Adriatic karst and flysch areas: shifts in thermophilly

Mitja Kaligarič [1], Metka Culiberg[2] & Andrej Pašič[2]

[1] FNM, University of Maribor, Koroška 160, 2000 Maribor, Slovenia

[2] Biological Institute, SRC SASA, Novi trg 4, 1000 Ljubljana, Slovenia

41. Phytogeographical and syntaxonomical vicissitudes at European level related to the phytosociological analysis of the termophilous chasmophytic vegetation of southern Italy

Di Pietro R.[1], D'Amico F.[2], Terzi M.[3] & Wagensommer R.P.[4]

[1] Department ITACA, University of Rome "La Sapienza" Via Flaminia 70, I-00196, Rome. Italy. e-mail: romeo.dipietro@uniroma1.it;

[2] Department of Plant Production Science, University of Bari, Botanical Garden, Via Orabona 4, Bari, Italy;

[3] Institute of Plant Genetics, CNR, Via Amendola 165/a - I-70126 Bari - Italy;

[4] Dipartimento di Biologia Vegetale, Università di Firenze, Via G. La Pira 4, I-50121 Firenze.

42. Phytosociological survey of the temporary pools systems in Apulia region (South-Eastern Italy)

Beccarisi Leonardo[1], Ernandes Paola[2], Gigante Daniela[3], Venanzoni Roberto[4] & Zuccarelli Vincenzo[5]

[1] Di.S.Te.B.A., University of Salento, Ecotekne, via Monteroni, I-73100 Lecce, Italy, e-mail: l_beccarisi@libero.it

[2] Di.S.Te.B.A., University of Salento, Ecotekne, via Monteroni, I-73100 Lecce, Italy, e-mail: paola.ernandes@unile.it

[3] Dept. of Applied Biology, University of Perugia, Borgo XX giugno, 74, I-06121 Perugia, Italy, e-mail: daniela.gigante@unipg.it

[4] Di.S.Te.B.A., University of Salento, Ecotekne, via Monteroni, I-73100 Lecce, Italy, e-mail: zuc@unile.it

[5] Dept. of Applied Biology, University of Perugia, Borgo XX giugno, 74, I-06121 Perugia, Italy, e-mail: rvenanzo@unipg.it

43. What is exactly the *Roso sempervirentis-Quercetum pubescentis* Biondi 1986?

Edoardo Biondi[1], Simona Casavecchia[1] & Daniela Gigante[2]

[1] *Dipartimento di Scienze Ambientali e delle Produzioni vegetali, Sezione di Biologia vegetale, Università Politecnica delle Marche (Ancona, Italy)*

[2] *Dipartimento di Biologia Applicata, Sezione Biologia vegetale e Geobotanica, Università degli Studi di Perugia (Italy)*

44. Effect of climate change on forest ecosystems in Italy

Attorre F., Francesconi F., Valenti R., De Sanctis M., Vitale M., Di Traglia M. & Bruno F.

Plant Biology Department, Sapienza University of Rome, P.le A. Moro 5, 00185, Rome, Italy. e-mail fabio.attorre@uniroma1.it

45. WEB-GIS application of the Lazio Biodiversity Observatory

Attorre F.[1], Cattena C.[2], De Sanctis M.[1], Francesconi F.[1], Spada F.[1], Valenti R.[1], Casella L.[1], Agrillo E.[1] & Bruno F.[1]

[1] *Plant Biology Department, Sapienza University of Rome, P.le A. Moro 5, 00185, Rome, Italy.e-mail fabio.attorre@uniroma1.it*

[2] *Regione Lazio Area Conservazione e Natura 2000. e-mail: ccattena@regionelazio.it*

46. Application of Zurich-Montpellier method for studying tropical plant communities.

Borhidi A.[1], Capote R.P.[2] & Fernández M.Z[2]

[1] *Department of Systematic Botany and Geobotany, University of Pécs, H-7624 Pécs, Ifjusag u. 6. e-mail: borhidi@gamma.ttk.pte.hu*

[2] *Instituto de Ecología y Botánica AC Cuba, La Habana, La Chata e-mail: botanica.ies@ama.cu*

47. Compositional divergence among ancient and recent forests: evidences from the field

Alessandro Chiarucci[1,2], Giovanni Bacaro[1,2], Sara Landi[1], Valerio Amici[1], Francesco Geri[1] & Duccio Rocchini[1,2]

[1] *Dipartimento di Scienze Ambientali "G. Sarfatti", Università di Siena, Via P.A. Mattioli 4, 53100, Siena corresponding author: chiarucci@unisi.it*

[2] *TerraData s.r.l. environmetrics, Università di Siena, Via P.A. Mattioli 4, 53100, Siena.*

Author Index:

18th Workshop European Vegetation Survey "Thermophilous Vegetation"

ROMA, March 25th-28th 2009,
Orto Botanico - Dipartimento di Biologia Vegetale
Università di Roma "La Sapienza"

Edited by
Emiliano Agrillo & Laura Casella

Preface by
Sandro Pignatti & Francesco Spada

Published by
EVS Italia

About the book:
this book was printed on recycled paper (FSC Certified Papers)

ISBN -978-88-90409-14-1

Printing and bookbinding by

Stabilimento Poligrafico
Arpinate Stampa s.r.l.
Via dei Porcini, 21
03033 Arpino (FR) - ITALY
Tel. +39 (0)776 849508
Fax +39 (0)776 850366
E-mail: arpinatestampasrl@libero.it

Organized by:

EVS-Italia
Orto Botanico di Roma - Dipartimento di Biologia Vegetale Università di Roma "La Sapienza"
Largo Cristina di Svezia, 24
00165 Roma (Italia)
Tel/fax +39 6 49917133
www.evsitalia.eu e-mail: staff@evsitalia.eu

© EVS-Italia

ISBN 88904091 4-2

9 788890 409141

Printed on recycled paper - (FSC Certified Papers)