Bulletin 28

of the Eurasian Dry Grassland Group

Dear members of the Eurasian Grassland Group,

We are pleased to present to you the new issue of the EDGG Bulletin, where you will find information about the forecoming EDGG conference which will be held in September next year in Sighişoara (Romania), a report on a research stay of two Ukrainian scientists in Slovakia, new publications of our members, as well as new book reviews. Besides that, we decided to strengthen the role of the Bulletin as publication venue of scientific articles (research papers, forum papers, review papers and reports) and offer you two such studies: one on a semi-dry basiphilous grassland (Bromion erecti) of Upper Franconia (Germany) and one on a sandy dry grassland (Festucion vaginatae) of Vojvodina (Serbia). We wish you a pleasant reading

Anna Kuzemko, Monika Janišová, & Idoia Biurrun (Chief Editors) with Didem Ambarlı, Jürgen Dengler, Péter Török, Stephen Venn & Michael Vrahnakis (Associate Editors)

Content

Left: Insecta eggs, Protected Site Jakub near Banska Bystrica Photo: Jürgen Dengler

November 2015

Grassland Research and Conservation

Eurasian Dry Grassland Group

The **Eurasian Dry Grassland Group (EDGG)** is a network of researchers and conservationists interested in Palearctic natural and semi-natural grasslands. It is an official subgroup of IAVS (http://www.iavs.org) but one can join our group without being IAVS member. We live from the activities of our members. Everybody can join EDGG without any fee or other obligation.

The basic aims of the EDGG are:

♠to compile and to distribute information on research and conservation in natural and semi-natural grasslands beyond national borders;

♠to stimulate active cooperation among grassland scientists (exchanging data, common data standards, joint projects).

To achieve its aims, EDGG provides seven instruments for the information exchange among grassland researchers and conservationists:

♠ **the Bulletin of the EDGG** (published quarterly);

♠ **the EDGG homepage** (www.edgg.org);

♠ e-mails via our **mailing list** on urgent issues;

♠ **the Europasian Dry Grassland Conference** - organized annually at different locations throughout Europe;

♠ **EDGG research expeditions and field workshops** to sample baseline data of underrepresented regions of Europe;

♠ **EDGG vegetation databases;**

♠ **Special Features** on dry grassland-related topics in various peer-reviewed journals.

The EDGG covers all aspects related to dry grasslands, in particular: plants — animals — fungi —microbia — soils — taxonomy — phylogeography —ecophysiology — population biology — species' interactions — vegetation ecology — syntaxonomy — landscape ecology — biodiversity — land use history — agriculture — nature conservation — restoration — environmental legislation — environmental education.

Anyone can join the EDGG without any fee or other obligation. To become a member of the Eurasian Dry Grassland Group or its subordinate units, please, send an e-mail to Idoia Biurrun, including your name and complete address, and specify any of the groups you wish to join. More detailed information can be found at: http://www.edgg.org/about_us.htm.

As of 16 November 2015 the EDGG had 1122 members from 64 countries all over the world. While we are well-represented in most European countries, few European countries are still not or hardly covered by members. Moreover, the extra-European part of the Palaearctic realm (which according to our Bylaws is the geographic scope of EDGG!) is still grossly underrepresented.

EDGG Subgroups

Regional Subgroup of the region in which they reside. If you additionally wish to join the Topical Subgroup Grassland Conservation and Restoration just send an e-mail to the Membership Administrator

(idoia.biurrun@ehu.es or Stephen.Venn@Helsinki.Fi).

Arbeitsgruppe Trockenrasen (Germany) (contact: Thomas Becker - beckerth@uni-trier.de), Ute Jandt—jandt@botanik.uni-halle.de : 238 members

Working Group on Dry Grasslands in the Nordic and Baltic Region (contact: Jürgen Dengler - juergen.dengler@uni-bayreuth.de): 92 members

South-East European Dry Grasslands (SEEDGG) (contact: Iva Apostolova - iva@bio.bas.bg): 277 members

Mediterranean Dry Grasslands (Med-DG) (contact: Michael Vrahnakis - mvrahnak@teilar.gr): 307 members

EDGG Executive Committee and responsibilities of its members

Topical Subgroup Grassland Conservation and Restoration (contact: Péter Török—molinia@gmail.com): 68 members

Didem Ambarli: Editor-in-Chief of homepage, Deputy Conferences Coordinator, *didem.ambarli@gmail.com*)

Idoia Biurrun: Membership Administrator, Deputy Editor-in-Chief of Bulletin, Deputy Field Workshop Coordinator, Deputy IAVS Representative *idoia.biurrun@ehu.es*

Jürgen Dengler: Coordinator for Special Features; Field Workshop Coordinator, *juergen.dengler@uni-bayreuth.de*

Monika Janišová: Editor-in-Chief of the EDGG Bulletin; *monika.janisova@gmail.com*

Anna Kuzemko: Book Review Editor, Facebook Group Administrator, Deputy Editor-in-Chief of Bulletin, Deputy Editor-in-Chief of homepage, *anya_meadow@i.ua*

Péter Török: IAVS Representative, Contact Officer to other organisations, Deputy Coordinator of Species Features, Deputy Secretary-General, Deputy Book Review Editor, *molinia@gmail.com*

Stephen Venn: Secretary-General, Deputy Membership Administrator, Deputy Policy Officer, Deputy Facebook Group Administrator, *Stephen.Venn@Helsinki.Fi*

Michael Vrahnakis: Conferences Coordinator, Policy Officer, Deputy Contact Officer to other organizations, *mvrahnak@teilar.gr*

13th Eurasian Dry Grassland Conference

Management and Conservation of Semi-natural Grasslands: from Theory to Practice

20-24th September 2016, Sighişoara, Romania

First call

The local organising committee is pleased to announce that the 2016 Eurasian Dry Grassland Conference will take place from the 20th to the 24th September 2016 in the historic town of Sighişoara in central Romania. This is the annual conference of the EDGG (formerly known as European Dry Grassland Meetings, EDGM), which aims to promote exchange and collaboration between those interested in all aspects of grassland research and conservation across Eurasia. The conference is intended to bring together latest research, and to link this to practical management and policy contributing to the sustainability of semi -natural grasslands. For the first time, **two optional pre-conference workshops** will be offered; one on scientific writing and another on science/policy interfaces concerning semi-natural grasslands.
The conference will include the following sessions:

Semi-natural grasslands and environmental policy and socio-economy

Landscape scale processes and historical evolution of semi-natural grasslands

Ecology and biodiversity of semi-natural grasslands

Management, conservation and restoration of semi-natural grasslands

as well as two field trips in local biodiversity hotspots. All other topics within the EDGG scope are also welcome.

Village of Viscri (Deutsch-Weißkirch), grassland party location, and its famous white church

Preliminary programme

Tue 20th – registration
Technical workshops *(optional)*

Wed 21st – talks and posters
Invited opening speaker
Session I: Semi-natural grasslands and environmental policy and socio-economy
Session II: Landscape scale processes and historical evolution of semi-natural grasslands
Evening tour of Sighișoara

Thu 22nd– mid conference excursion
High Nature Value grasslands in the hilly Târnava Mare landscape near Sighişoara (continental biogeographical region).
Grassland party in village of Viscri

Fri 23rd – talks and posters
Invited opening speaker
Session III: Ecology and biodiversity of semi-natural grasslands
Session IV: Management, conservation and restoration of semi-natural grasslands
General Assembly of the EDGG, including Young Investigator Prizes (the awarding of the YIPs)

Sat 24th – post-conference excursion
Mountain hay meadows in the Miercurea Ciuc (Csíkszereda) area including optional grassland-related activities such as meadow scything.

Landscape near Miercurea Ciuc (photo: Daniel Babai), and traditional mowing using a scythe .

Some species in flower in September

Methodological workshops

For the first time, the EDGG will organize technical workshops during its conference. Both technical workshops are optional and can be attended by a restricted number of participants. You can apply to participate in the workshops during registration on the conference web page.

a) Scientific writing: Conducted by Prof. Dr. Jürgen Dengler (University of Bayreuth, Germany), this workshop is aiming at PhD students and young Postdocs who wish to publish their research internationally. During one day you will learn to understand how the publishing business in international peer-reviewed journals works, what constitutes a good article and how you can prepare your manuscript to make it such a successful article.

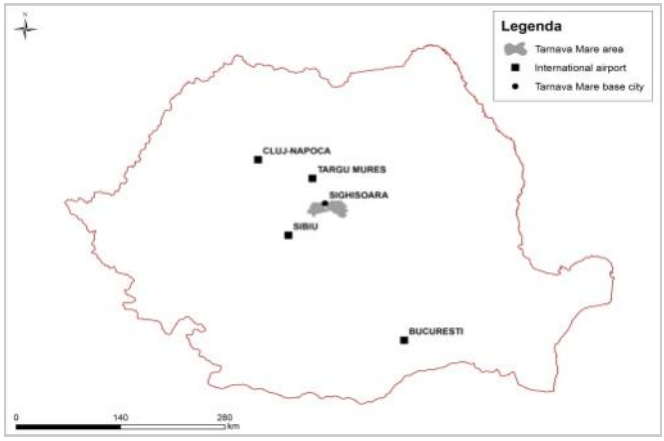
b) Reflecting ecology in policy: as simple as possible but no simpler: This workshop will be run by experts from the European Forum on Nature Conservation and Pastoralism (EFNCP). The objective is to analyse jointly whether CAP policy measures correspond to available scientific knowledge. Selected participants will be asked to bring an example of an RDP measure from their country/region for analysis and debate. The goal is to produce suggestions for policies that are simple (i.e. applicable to real farming conditions) but ecologically meaningful.

Conference location

Romania contains five biogeographical regions – Continental, Pannonian, Alpine, Pontic and Steppic – and as such supports a wealth of grassland species.

The region of Transylvania within the arc of the Carpathians is known for its low-intensity agriculture and species-rich semi-natural grasslands.

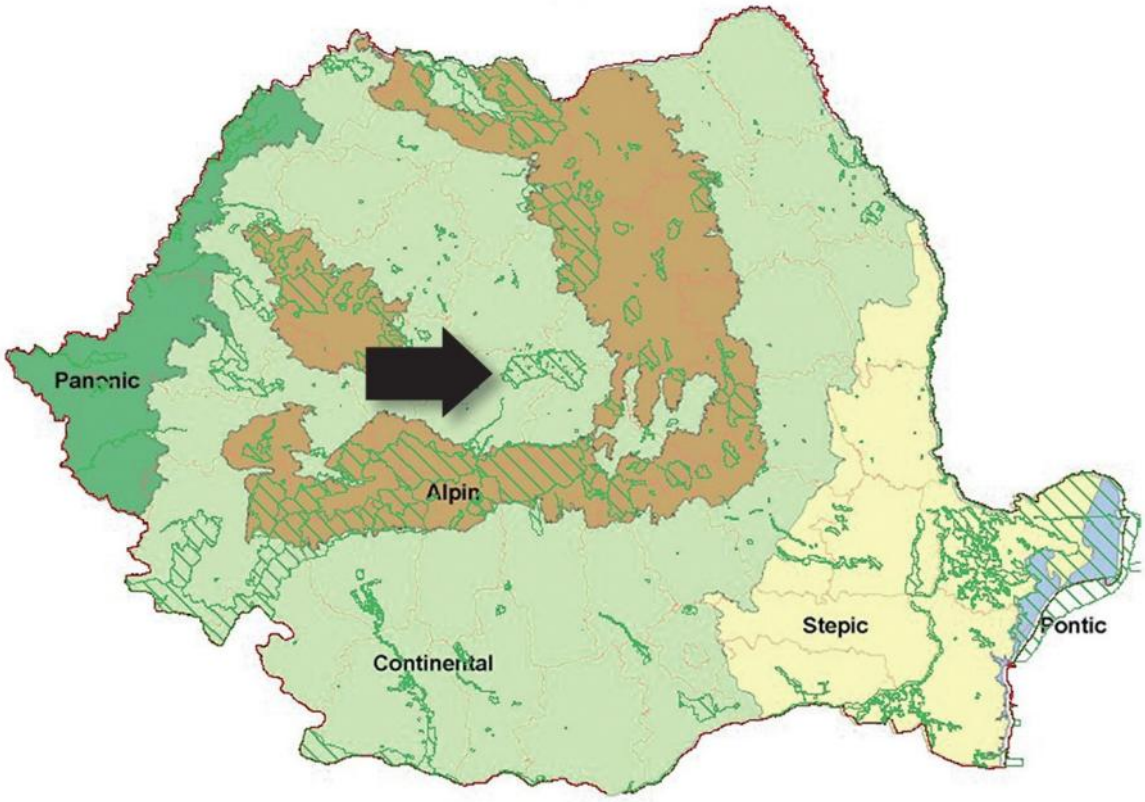
The town of Sighişoara is renowned as a UNESCO World Heritage site, but it is also at the edge of the Sighişoara-Târnava Mare Natura 2000 area. This Site of Community Interest contains large areas of the priority habitat types 6210* Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) with important orchid sites, and 6240* Sub-pannonic steppic grasslands.



The conference will take place in Hotel Cavalierul in Sighişoara.

Accommodation is available in Hotel Cavalierul (3-star, €50/night), as well as a range of other local guesthouses, and should be booked independently by each participant.

Sighişoara can be reached by train or by car, and is within reach of four international airports: Bucharest (4 hours by car from Sighişoara), Cluj (3 hours), Sibiu (2 hours) or Târgu Mureş (1 hour).



Location of Tarnava Mare area in central Romania, with biogeoraphical regions marked

e-Registration

You can register and submit your abstract via the web page of the conference, which will be launched soon (all EDGG members will be informed by e-mail when the website is available).

Important dates

e-Registration deadline – 30 April 2016

Abstract submission deadline– 30 April 2016

Fees and grants

We hope to offer a limited number of travel grants. To qualify, active participation at the conference (oral presentation or poster) is required and priority will be given to young scientists with financial constraints. Grants can be applied for during registration, by providing a short motivation letter. Applicants for IAVS travel grants must be IAVS members.

Conference publications

All participants will receive a Book of Abstracts, which will also be published online on the EDGG homepage. As in previous years, EDGG intends to organise one or several Special Features in international journals related to the EDGC.

Young Investigator Prizes

As in previous years, prizes will be awarded to young scientists for excellent presentation of their research (orally or in poster form). For these purposes, young scientists (less than 35 years old) will be asked during registration if they wish to participate in the contest.

Visas

In case you need a visa, please contact Nat Page (address given below).

Contact persons

Nat Page (Fundatia ADEPT coordinator): npage@copac.org.uk.

Mike Vrahnakis (EDGM coordinator): mvrahnak@teilar.gr

On behalf of the local organising committee

John Akeroyd | Fundatia ADEPT Transilvania, jrakeroyd@gmail.com

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On behalf of the EDGG Executive Committee

Mike Vrahnakis | EDGM coordinator, mvrahnak@teilar.gr

Didem Ambarli | EDGM coordinator, didem.ambarli@gmail.com

Organizers:

The Eurasian Dry Grassland Group (EDGG) (www.edgg.org) was established in August 2008 as the European Dry Grassland Group. Recently it expanded its ecological and geographical scope to cover all types of semi-natural grasslands of the whole Palearctic realm. The EDGG is an official working group of the International Association for Vegetation Science (IAVS, www.iavs.org). Its basic aims are to compile and to distribute information on research in and conservation of natural and semi-natural grasslands beyond national borders, and to stimulate active cooperation among scientists, practitioners and all who work with or are interested in grasslands.

Fundația ADEPT (www.fundatia-adept.org): ADEPT's objective is support and preservation of the High Nature Value landscapes of Romania, and of the small-scale farming communities that have created them. ADEPT works to improve design and implementation of EU and national support measures for these farmed landscapes and farming systems, helps farmers gain access to support and improve markets for their products. ADEPT trains farmers, farmer associations, producer groups and tourist associations to support development of sustainable sources of income. ADEPT won the top EU prize for communicating the CAP to farmers, at the CAP@50 competition in Brussels, 2012 and 2013, as well as the top EU Natura 2000 prize for the European project bringing most benefits to local communities in a protected area.

Babes-Bolyai University (http://www.ubbcluj.ro/en/despre/), Faculty of Biology and Geology, Cluj-Napoca: BBU is the oldest, the largest, and in many ways, the most prestigious university in Romania. Its approximately 40,000 students learn either in Romanian, Hungarian, German or English. The linguistic and cultural diversity are defining elements of BBU, which distinguishes not only among Romanian universities, but also within the European context. BBU has 21 faculties. The Faculty of Biology and Geology has 10 B.Sc. and 11 M.Sc. programs. It has an excellent Botanical Garden with a Botanical Museum and a Herbarium, and a Zoological Museum with a Vivarium as well.

Supporting organisations and institutions:

International Association for Vegetation Science (IAVS, www.iavs.org): its original precursor was the International Phytosociological Society (IPS) which was founded in 1939. IAVS is a worldwide union of scientists and others interested in theoretical and practical studies of all aspects of vegetation. The main goals of the IAVS are to facilitate personal contacts among vegetation scientists all over the world and to promote research in all aspects of vegetation science and its applications.

European Forum for Nature Conservation and Pastoralism (EFNCP, www.efncp.org) brings together ecologists, nature conservationists, farmers and policy makers. This non-profit network exists to increase understanding of the nature-conservation and cultural value of certain farming systems. Specialised in understanding how EU policies (notably the Common Agricultural Policy) affect the relationship between farming and natural capital, the EFNCP's ultimate objective is to achieve a viable economic future for High Nature Value farming across Europe.

John Wiley & Sons, Inc. (http://eu.wiley.com/WileyCDA/) was founded in 1807. It aspires to be a valued and respected provider of products and services that make important contributions to advances in knowledge and understanding, a role that is essential to progress in a healthy and prosperous society. Wiley's mission is to provide must-have content and services to professionals, scientists, educators, students, lifelong learners, and consumers worldwide.

Floristisch-soziologische Arbeitsgemeinschaft (FlorSoz) (http://www.tuexenia.de/) is a German speaking association of specialists and enthusiasts interested in the floristic structure of spontaneous vegetation, phytosociology and vegetation ecology. The association is a non-profit organization and will be pleased to welcome everyone who is interested.

EDGG Special Features

This is the final call for the submission of manuscripts for the EDGG-edited Special Feature in Hacquetia 2016. The topic of the Special Feature is 'Ecology and Conservation of Steppes and Semi-Natural Grasslands'. We welcome manuscripts on all taxa, and semi-natural and natural grasslands of the whole Palaearctic realm (Europe; West, Central and North Asia; North Africa). This special issue is a very attractive publication platform. Hacquetia is an international journal, indexed in the Scopus and BIOSIS literature databases, offering free open-access and free colour reproduction. Accepted papers will also benefit from complementary linguistic editing by a native speaker, courtesy of the Eurasian Dry Grassland Group. For further information, please see the call below.

Final call for contributions to the EDGG-edited Special Feature in Hacquetia 2016

Hacquetia

Journal: *Hacquetia* is the international journal of the biological branch of the Slovenian Academy of Sciences. It appears in two issues per year, both in print and online. Through offering longer articles, open access publication and free reproduction of colour figures, it is a very attractive publication venue. Currently it is indexed in the Scopus and BIOSIS literature databases, and it is likely to be included in the *Web of Science* in the near future (aided by our very international and high-quality Special Issues and your citations of these). **Accepted papers will benefit from free linguistic editing by a native speaker,** courtesy of the Eurasian Dry Grassland Group.

URL: http://www.degruyter.com/view/j/hacq

The 2nd EDGG-edited Special Issue in Hacquetia (2015/1) comprises 9 articles and can be accessed online (open access) via the following link: http://www.degruyter.com/view/j/hacq.2015.14.issue-1/issue-files/hacq.2015.14.issue-1.xml.

This Special Issue will be the **3rd EDGG-edited Special Issue in *Hacquetia***, following the two successful issues in 2014/1 and 2015/1. This Special Issue will appear as the second issue of 2016, to be published in June 2016, with about 150–250 pages reserved for our articles. It will also contain a report on the EDGG activities of the previous year.

Topic: *Ecology and Conservation of Steppes and Semi-Natural Grasslands.* This includes all taxa, and semi-natural and natural grasslands throughout the Palaearctic realm (Europe; West, Central and North Asia; North Africa).

Procedure and deadlines: The deadline for full-text submission is 30 November 2015 and manuscripts will undergo the normal peer-review process. If anyone wishes to submit a manuscript but cannot keep the 30th November deadline, then they should contact the Chairs of the editorial team at the addresses given below immediately. In the case of good manuscripts that do not require extensive editing, then inclusion in the Special Feature 2016 is still possible. Late submissions that do not meet these criteria will be considered for inclusion in subsequent Special Features. If you are interested in contributing a manuscript for this comprehensive Special Issue, then please contact the Chairs of the editorial team (see below) and submit your manuscript as soon as possible.

Contacts for questions and submission of manuscripts (Chairs of the guest editors): ***Orsolya Valkó:*** valkoorsi@gmail.com ***Stephen Venn:*** stephen.venn@helsinki.fi

Guest editor team:

Idoia Biurrun (Spain; https://scholar.google.de/citations?user=4GEi4OoAAAAJ; https://www.researchgate.net/profile/Idoia_Biurrun)

Rocco Labadessa (Italy; https://www.researchgate.net/profile/Rocco_Labadessa)

Jacqueline Loos (Germany; https://scholar.google.de/citations?user=zw_BB1YAAAAJ; https://www.researchgate.net/profile/Jacqueline_Loos)

Orsolya Valkó (Hungary; https://scholar.google.de/citations?user=PwD4cKcAAAAJ; https://www.researchgate.net/profile/Orsi_Valko)

Stephen Venn (Finland/United Kingdom; https://scholar.google.de/citations?user=lAbbyQEAAAAJ; https://www.researchgate.net/profile/Stephen_Venn)

Michael Vrahnakis (Greece; https://www.researchgate.net/profile/Michael_Vrahnakis)

Michal Zmihorski (Sweden/Poland; https://scholar.google.de/citations?user=1sF6YvQAAAAJ; https://www.researchgate.net/profile/Michal_Zmihorski)

Announcements of IAVS and its subgroups

Emerging IAVS Vegetation Classification Working Group(VCWG)

Some 60 IAVS members met during the IAVS Symposium in Brno in summer this year to discuss international cooperation regarding vegetation classification. For several years there has been an IAVS Special Committee on Vegetation Classification. Members of that committee and participants at the meeting decided to form, and have subsequently formed, a working group of IAVS to which we are currently seeking official status (Vegetation Classification Working Group; VCWG). Since that meeting, the **group has grown to 163 members from 41 countries of six continents**, and we have formerly accepted our By-laws. The general scope of the Working Group includes vegetation classification at any spatial or organizational scale, particularly the underlying methodologies and standards, ultimately allowing greater understanding and crosswalks among national classification systems. The focus, in contrast to other existing IAVS Working Groups, such as the Eurasian Dry Grassland Group (EDGG), the European Vegetation Survey (EVS) and the Circumboreal Vegetation Mapping (CBVM), who aim at developing classification schemes for the vegetation types within their scopes, is on developing and promoting concepts and methods of vegetation classification.

Here, we formally announce this group and welcome all others who would like to join (please contact John Hunter; jhunter8@bigpond.com). We have already developed subgroups with eight tasks outlined and several leaders determined, and we will soon make a call for participation on those tasks (so it is not too late to become involved). For more information regarding VCWG activities, please see our web page (https://sites.google.com/site/vegclassmethods/home). To join the VCWG, like in EDGG, no membership in IAVS is required.

In addition, any of the below Steering Committee members would be happy to answer further questions.

The Vegetation Classification WG Steering Committee

Scott Franklin (Chair: Scott.Franklin@unco.edu)

John Hunter (Secretary: jhunter8@bigpond.com)

Miquel De Cáceres (miquelcaceres@gmail.com)

Jürgen Dengler (juergen.dengler@uni-bayreuth.de)

Pavel Krestov (krestov@botsad.ru)

Flavia Landucci (flavia.landucci@gmail.com)

Announcements of EDGG

Save the date!

The **9th EDGG Field Workshop** (formerly known as EDGG Research Expedition) next year will take place in **Serbia from 2–10 July 2016**. A detailed call will be published in the December Bulletin.

The EDGG Field Workshop Coordinators
Jürgen Dengler (juergen.dengler@uni-bayreuth.de)
Idoia Biurrun (idoia.biurrun@ehu.es)

Announcements of EVS

The 25th Workshop of European Vegetation Survey

The 25th Workshop of European Vegetation Survey (IAVS Working Group) will be held in Roma from Wednesday 6 to Saturday 9 April 2016.

The Plenary Sessions and Registration will be held in the Auditorium of the "Accademia dei Lincei", in Palazzo Corsini, via della Lungara 10, Roma, next to the Botanic Garden (Orto Botanico) of Sapienza Università di Roma, Dept. of Environmental Biology, Largo Cristina di Svezia 24, Roma.

The topics for the25th EVS meeting are:

♠Present day coenology and the legacy of the past;
♠Describing and evaluating European habitats: EUNIS, Natura 2000 and the Red List;
♠The use of vegetation data for predictive modelling.

Meeting programme outline:

Wednesday. April 6, 2016—EVS Meeting (registration and sessions)
Thursday, April 7, 2016—EVS Meeting (sessions and EVS Business Meeting)
Friday, April 8, 2016—EVS Meeting (sessions, closing ceremony and social dinner)
Saturday, April 9, 2016—Excursion

Deadlines:

November 30, 2015 -Pre-Registration Form and Financial Support Form
December 31, 2015 -Abstract Submission, Letters of Invitation (especially for embassy visa)
January 31, 2016 - Fee Payment
March 6, 2016 - Last Call for Participants

The workshop webpage:

http://www.evsmeeting2016.it/about-the-meeting/

Scale-dependent species diversity in a semi-dry basiphilous grassland (*Bromion erecti*) of Upper Franconia (Germany)

Dominic Hopp[1] *&* ***Jürgen Dengler***[*,2,3]

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2) Plant Ecology, Bayreuth Center of Ecology and Environmental Research (BayCEER), University of Bayreuth, Universitätsstr. 30, 95447 Bayreuth, GERMANY; juergen.dengler@uni-bayreuth.de

3) Synthesis Centre (sDiv), German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig, Deutscher Platz 5e, 04103 Leipzig, GERMANY

*) Corresponding author

Abstract: We analysed a semi-dry basiphilous grassland near Bayreuth, Upper Franconia, Germany with nested-plot sampling on areas from 0.0001 to 100 m². The stand clearly belongs to the order *Brachypodietalia pinnati* of the class *Festuco-Brometea*. Within this order, the affinity to the subatlantic alliance *Bromion erecti* was higher than to the subcontinental *Cirsio-Brachypodion pinnati*, while the assignment to any of the current *Bromion erecti* associations remained unclear due to a lack of an up-to-date syntaxonomic revision of the dry grasslands in Germany. The species richness for the different grain sizes was always above those for *Brachypodietalia pinnati* communities in NE Germany, but below the extremely rich stands in the White Carpathians or Transylvania. The species-area relationships also had a very low slope (e.g. z = 0.18 for all species combined), pointing to an unusually high homogeneity of the stand or rather a limited regional species pool. The richness values in Bayreuth at smallest grain sizes reached about ¾ of the known maxima in European grasslands, but only about ½ for the areas from 1 m² upwards. When comparing our richness data with data from the literature, we came across one previously overlooked world record, namely 7 vascular plant species on 1 cm² in two Ukrainian grasslands (the old record was 5 species). In general, our small dataset is a valuable contribution to the envisaged synthesis of scale-dependent diversity patterns in grasslands across the Palaearctic.

Keywords: alpha diversity; Bavaria; beta diversity; biodiversity; *Brachypodietalia pinnati*; *Festuco-Brometea*; species-area relationship (SAR); species pool; species richness; syntaxonomy; world record

Nomenclature: GermanSL (Jansen & Dengler 2008), i.e. Wisskirchen & Haeupler (1998) for vascular plants, Koperski et al. (2000) for bryophytes and Scholz (2000) for lichens.

Introduction

Temperate grasslands hold the world records in vascular plant species richness for grain sizes smaller than 100 m² (Wilson et al. 2012; Chytrý et al. 2015). The majority of these extraordinarily rich grasslands are semi-dry basiphilous meadows in Europe with a long history of low-intensity land use (mostly mowing). While all the named parameters seem to play some role in the establishment and maintenance of extraordinary small-scale species richness, we are far from understanding what the decisive factors are and how they interact (see discussions in Dengler et al. 2014; Michalcová et al. 2014; Roleček et al. 2014). While semi-dry basiphilous grasslands (order *Brachypodietalia pinnati* = *Brometalia erecti* nom. ambig. propos.) are typically among the richest vegetation types in terms of vascular plants in many regions of Europe (Hobohm 1998; Berg et al. 2001; Dengler 2005), their richness varies greatly between regions, and it is poorly understood why. For understanding the scale-dependence of drivers of plant diversity, Dengler (2009b) has proposed a sampling scheme that allows standardised sampling of such data in different vegetation types and biogeographic regions to facilitate broad-scale comparisons. This approach has meanwhile been applied in (dry) grasslands in various regions throughout the Palaearctic, e.g. in Estonia (Dengler & Boch 2008), NE Germany (Dengler et al. 2004), and on the annual EDGG Research Expeditions/Field Workshops since 2009 (see Biurrun et al. 2014). The detailed analysis of the data from the first EDGG Research Expedition to Transylvanian yielded very interesting insights into scale-dependencies of grassland diversity (Turtureanu et al. 2014). As a contribution to a future European synthesis we report here the data from a semi-dry basiphilous grassland in Upper Franconia, Germany.

Study area

The sampling took place on the steep SSW-facing slope towards the river Roter Main (former river cliff; 49.9095° N, 11.6179° E; precision: 10 m; 388 m a.s.l.) near Schlehenmühle, Bayreuth, Upper Franconia, Bavaria, Germany, on 13 May 2015. The vegetation of the slope is a semi-dry basiphilous grassland while below the slope there is a wet meadow and the plateau above the slope is used as arable field. The slope itself is mown once a year late in summer and not fertilized. The bedrock is a sandstone of the Keuper, partly with dolomitic arkose. The climate of Bayreuth is temperate -subcontinental with 8.2 °C mean annual temperature and 654 mm mean annual precipitation (Hijmans et al. 2005).

Methods

One square plot of 100 m² was delimited in a homogenous part of the vegetation, following the modified version of Dengler (2009b) by Turtureanu et al. (2014). We recorded complete species composition (vascular plants, bryophytes, lichens) with the any-part system (see Dengler 2008) for two nested-plot series in the NW and SE corner for areas of 0.0001, 0.001, 0.01, 0.1, 1 and 10 m² as well as for the whole 100 m². Species cover (in %) was estimated for the two 10-m² plots, where also environmental parameters were assessed and a mixed soil sample of the uppermost 10 cm drawn for soil analyses (pH in water, C/N).

The species composition was compared with lists of diagnostic species provided from large German overviews (Oberdorfer 1993, Pott 1995, Schubert et al. 2001, Berg et al. 2001, 2004) to allow a placement in the syntaxonomic system. The species richness data for the seven different grain sizes were compared to literature data and used to construct a species-area relationship, as power-law function in the linearized version ($\log_{10} S \sim \log_{10} A$, where S is the species richness and A the area in m²; Dengler 2009a). The vegetation-plot data are stored in and available from the Database Species-Area Relationships in Palaearctic Grasslands (GIVD ID EU-00-003; Dengler et al. 2012b).

Results and discussion

Syntaxonomy

Figure 1 shows the structure of the stand and some typical species. The assignment of the stand to the class *Festuco-Brometea* and the order *Brachypodietalia pinnati* (= *Brometalia erecti* nom. ambig. propos.) is straightforward based on a large number of widely accepted diagnostic species (e.g. Mucina et al. 1993; Berg et al. 2004) (Table 1). At the alliance level the decision between the two

Fig.1: Stand of the analysed *Bromion erecti* near Schlehenmühle, Bayreuth with some typical species. From left to right: *Ranunculus bulbosus* (Bulbous Buttercup), *Sanguisorba minor* (Salad Burnet), *Plantago media* (Hoary Plantain), *Ajuga genevensis* (Upright Bugle) and *Silene viscaria* (Sticky Catchfly) (Photos: J. Dengler, 2015/05).

Table 1.: Vegetation table of the two 10-m² plots in the NW and SE corner of the 100-m² biodiversity plot. Performance of species is given in percentage cover. Species are grouped into the following functional-taxonomic groups: VW = vascular plant, wood; VG = vascular plant, graminoid, VL = vascular plant, legume, VF = vascular plant, other forb, B = bryophyte, L = lichen. Character and differential species of the class and order are indicated with C and D, respectively; in case of joint differential species with other classes, the other class is indicated (TG = *Trifolio-Geranietea sanguinei*, MA = *Molinio-Arrhenatheretea*, KC = *Koelerio-Corynephoretea*, Sm = *Stellarietea mediae*). In the second column those species are highlighted that are considered as differential for *Bromion erecti* (Be) and *Cirsio-Brachypodion pinnati* (C-B) by Dengler (2003) (1) and Willner et al. (2014) (2).

Subplot					**NW**	**SE**
Aspect (°)					**205**	**200**
Slope (°)					**30**	**22**
Microrelief (cm)					**3**	**12**
Soil depth (cm)					**27**	**26**
pH (H2O)					**6.98**	**7.68**
C content (%)					**5.6**	**7.0**
C/N ratio					**11.0**	**12.6**
Cover vegetation (%)					**98**	**96**
Cover herb layer (%)					**90**	**80**
Cover cryptogam layer (%)					**25**	**65**
Cover litter (%)					**25**	**30**
Species richness (total)					**63**	**48**
Species richness (vascular plants)					**55**	**40**
Species richness (non-vascular plants)					**8**	**8**
Festuco-Brometea						
C	Be (1)	VG	*Bromus erectus*		40	40
C	Be (2)	VF	*Sanguisorba minor*		3	2
C	C-B (1,2)	VL	*Medicago falcata*		0.5	0.2
C		B	*Thuidium abietinum*		.	20
C		B	*Rhytidium rugosum*		.	0.01
D with TG	C-B (1,2)	VF	*Fragaria viridis*		10	1.5
D with TG		VG	*Poa angustifolia*		3	0.2
D with KC + TG		VF	*Galium verum*		1	1
D mit KC		VF	*Potentilla tabernaemontani*		0.5	0.5
D with TG		VF	*Knautia arvensis*		0.2	0.5
D with KC + TG		VL	*Ononis repens*		.	3
D with TG		B	*Fissidens dubius*		1	.
D mit KC		VF	*Taraxacum sect. Erythrosperma*		0.2	.
D with Sm		B	*Barbula unguiculata*		0.1	.
D with KC + TG		VF	*Silene viscaria*		0.01	.
Brachypodietalia pinnati						
C		B	*Thuidium delicatulum*		2.5	25
C	C-B (1)	VL	*Trifolium montanum*		15	3
C (also C class)		B	*Homalothecium lutescens*		10	7
C (also C class)		VG	*Carex caryophyllea*		6	0.5
C		VF	*Cirsium acaule*		1	5
C		VF	*Leontodon hispidus subsp. hispidus*		1	5
C		VL	*Lotus corniculatus*		1	3
C	Be (2)	VF	*Thymus pulegioides*		2	1
C		VF	*Plantago media*		0.02	2
C	Be (1)	VF	*Ranunculus bulbosus*		0.1	0.5
C (also C class)	Be (2)	VL	*Anthyllis vulneraria subsp. pseudovulneraria*		.	1
C	Be (2)	VF	*Prunella grandiflora*		0.5	.
C		VF	*Leontodon hispidus subsp. danubialis*		0.02	.
C		VF	*Polygala comosa*		0.01	.
D		VG	*Carex flacca*		5	15
D		VF	*Primula veris*		12	3
D		VG	*Brachypodium pinnatum*		10	2
D		VF	*Hieracium pilosella*		0.3	8
D		VG	*Briza media*		5	2
D		VF	*Plantago lanceolata*		2	3
D		B	*Plagiomnium affine*		1	2
D (also C class)		VL	*Medicago lupulina*		0.1	0.5
D		B	*Scleropodium purum*		1	.
D		VG	*Helictotrichon pubescens*		0.5	.
D		VF	*Agrimonia eupatoria*		0.1	.
D		VF	*Linum catharticum*		.	0.1
D		VF	*Leucanthemum ircutianum*		0.01	.
D		VG	*Luzula campestris*		0.01	.
Companion species						
		B	*Calliergonella cuspidata*		10	15
		VF	*Viola hirta*		3	0.5
		VF	*Centaurea jacea*		2	0.1
		VG	*Arrhenaterum elatius*		0.5	1
		VF	*Genista tinctoria*		0.5	0.5
		VG	*Dactylis glomerata*		0.5	0.1
		VF	*Taraxacum sect. Ruderalia*		0.3	0.3
C-B (2)		VF	*Veronica chamaedrys*		0.5	0.1
		VF	*Hypericum perforatum*		0.2	0.1
C-B (2)		VL	*Vicia cracca*		0.02	0.2
		VF	*Silene nutans*		0.1	0.1
		B	*Brachythecium rutabulum*		0.1	0.01
		VF	*Convolvulus arvensis*		0.05	0.05
C-B (2)		VF	*Rhinanthus minor*		0.01	0.02
		VG	*Bromus hordeaceus*		0.5	.
		VF	*Galium x pomeranicum*		0.5	.
		VG	*Anthoxanthum odoratum*		0.3	.
		VL	*Vicia angustifolia*		0.3	.
		VG	*Festuca pratensis*		0.2	.
		VF	*Rumex acetosa*		0.2	.
		VW	*Crataegus monogyna (juv.)*		.	0.1
		VF	*Galium album*		0.1	.
		VF	*Achillea millefolium agg.*		0.02	.
		VW	*Pyrus pyraster (juv.)*		.	0.02
		VF	*Tragopogon pratensis subsp. pratensis*		0.02	.
		VG	*Cf. Agrostis sp.*		0.01	.
		L	*Cladonia furcata*		.	0.001
		VF	*Veronica arvensis*		0.001	.

chorologically possible options, the subatlantic *Bromion erecti* and the subcontinental *Cirsio-Brachypodion pinnati*, is less clear. Taking the differential species elaborated by the two studies that analysed *Brachypodietalia pinnati* communities from a larger geographic area (Dengler 2003; Willner et al. 2013), it appears that in our stands there is a similar number of differential species of the *Bromion erecti* (e.g. *Bromus erectus*, *Thymus pulegiodes*, *Prunella grandiflora*; seven in total) as those of the *Cirsio-Brachypodion pinnati* (e.g. *Trifolium montanum*, *Fragaria viridis*, *Medicago falcata*, six in total), but the cover values of the first group is clearly higher (Table 1). Therefore, we tentatively assign our stands to the subatlantic *Bromion erecti*.

Within this alliance, however, a clear placement into an accepted association is currently not possible. Syntaxonomic overviews for Germany tend to recognise three associations within this alliance, ignoring those with high cover of *Sesleria albicans* and other dealpine species (e.g. Oberdorfer 1993; Pott 1995; Schubert et al. 2001 – names not checked nomenclaturally): *Onobrychido-Brometum* T. Müller 1966 (mown), *Gentiano-Koelerietum pyramidatae* Knapp ex Bornkamm 1960 (grazed), and *Viscario-Avenetum* Oberd. 1949 (loamy, slightly acidic soils,

dominated by *Helictotrichon pratense*). The dominance of *Bromus erectus* and the fact that the site is mown would support the placement into the *Onobrychido-Brometum*, but we did not find any of the more specific taxa, such as *Onobrychis viciifolia*, *Orchis militaris* or *Gymnadenia conopsea*. *Potentilla tabernaemontani*, *Carex caryophyllea* and *Cirsium acaule* would support the assignment to the *Gentiano-Koelerietum*, but *Koeleria pyramidata* itself occurred only rarely on the 100-m² plot. Finally, *Silene viscaria* is a differential species for the *Viscario-Avenetum*. This points to the long recognised need for a modern syntaxonomic revision of the dry grasslands in Germany based on a comprehensive vegetation-plot database of the whole country and followed by statistical elaboration of diagnostic species (Jandt et al. 2013).

Species richness

Both 1-cm² plots already comprised seven species (four vascular plants, three non-vascular plants). For the larger plot sizes, the plot series in the NW corner was systematically richer than that in the SE corner (+ 30-86%), reaching 51 species on 1 m² and 63 species on 10 m². The total richness on 100 m² was 77 species (Table 2). The contribution of non-vascular plants to total richness continuously decreased from 43% at 1 cm² to 16% at 100 m².

Compared to the documented maxima of vascular plant species richness in European grasslands, the values in our NW corner reach about ¾ for the scales from 10-1000 cm², but only around ½ for the smallest (1 cm²) and the three biggest grain sizes (Table 2). This might be a matter of chance for the 1 cm² because richness values become increasingly valuable towards smaller scales (Dengler 2006), and two replicates are certainly not enough to find the local maximum of the slope at the Schlehenmühle. However, for the grain sizes from 1 m² upwards, there should be much less variability, thus we should have a rather representative value, which is not too far below the maximum of Upper Franconia. While our 55 species on 10 m² are much less than found in Transylvania (98 maximum, but also an average of 70 species in the *Brachypodietalia pinnati* stands: Dengler et al. 2012a) or the White Carpathians (maximum of 88 species already on 4 m²: Chytrý et al. 2015), but on the other hand they clearly exceed the values found in similar communities in NE Germany, where the maximum in nearly 200 plots of that order was 51 vascular plant species on 10 m², with an average of only 29 (unpublished data underlying Dengler 2005). For grain sizes from 1 m² upwards the plot-scale richness values seem to parallel the regional species pools (Transylvania/White Carpathians > Bavaria > NE Germany). By contrast, richness values at the smallest grain sizes seem to be largely independent from the size of regional species pools.

Table 2: Maximum richness values found in this study compared to the documented maximum richness values in European grasslands. BT = Bayreuth; EU = Europe; * = this value is currently the highest value recorded in any vegetation type worldwide; ** = this is a new global maximum that was not documented in the "world record papers" by Wilson et al. (2012) and Chytrý et al. (2015) and not highlighted in the original source (7 species instead of 5 species); the same value was found in two plots of different localities and associations. All mentioned alliances belong to the order *Brachypodietalia pinnati* (semi-dry basiphilous grasslands) except the *Stipion lessingianae* (*Festucetalia valesiacae*).

Plot size [m²]	BT all species	BT vascular plants	EU vascular plants	Ratio BT / EU	Country	Alliance	Reference
0.0001	7	4	7	57%	Ukraine**	*Agrostio-Avenulion schelliianae* & *Stipion lessingianae*	Kuzemko et al. (2014)
0.001	12	9	12	75%	Sweden*	*Filipendulo-Helictotrichion*	van der Maarel & Sykes (1993)
0.01	26	19	25	76%	Estonia*	*Filipendulo-Helictotrichion*	Kull & Zobel (1991)
0.1	38	31	43	72%	Romania*	*Cirsio-Brachypodion*	Dengler et al. (2012a)
1	51	43	82	52%	Czechia	*Cirsio-Brachypodion*	Chytrý et al. (2015)
10	63	55	98	56%	Romania*	*Cirsio-Brachypodion*	Dengler et al. (2012a)
100	77	65	133	49%	Czechia	*Cirsio-Brachypodion*	Chytrý et al. (2015)

Species-area relationships

The species-area relationships could be well described by power laws as can be seen from the relatively good fit and lack of systematic deviations for the three linear regressions in the log-log space (Fig. 1). The slopes (*z*-

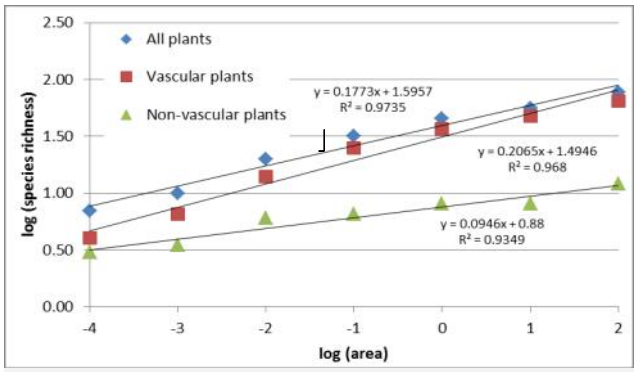

Fig. 1: Species-area relationships in double-log representation for the averaged richness values of both corners together with linear regression functions (equivalent to power laws).

Low *z*-values indicate, from the vegetation perspective, a homogeneous stand and low patchiness. From the species point-of-view they stand for low species turnover, which in abiotically heterogeneous patches would indicate wide niche breadths and in homogenous environments good dispersal capabilities – compared to species groups with higher *z*-values in the same situation. We assume that the second reason is decisive as bryophytes with their very light spores can reach potential sites much more easily than vascular plants with their diaspores being several orders of magnitude heavier. Lower *z*-values for bryophytes vs. vascular plants have been consistently reported both at plot scale (e.g. Dengler & Allers 2006) and at biogeographic scales (Patiño et al. 2014).

Typically, z-values in dry grasslands for total species composition are in the range of 0.17–0.34 (0.18–0.25 for community means: Dengler 2005; Dengler & Boch 2008; Pedashenko et al. 2013) and only exceptionally reach higher values (0.20–0.40 or 0.26–0.29 for community means in Transylvania: Dengler et al. 2012a). However, our observed value of only z = 0.18 is at the lowest end of what was observed elsewhere and can be seen as an expression of particular low beta-diversity (for possible explanations, see under Species richness).

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Cirsium acaule . Photo: J. Dengler

Campanula patula. Photo: J. Dengler

Scabiosa columbaria. Photo: J. Dengler

Pulsatilla vulgaris. Photo: J. Dengler

Scale-dependent species diversity in a sandy dry grassland (*Festucion vaginatae*) of Vojvodina (Serbia)

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Abstract: We analysed a stand of Pannonian subcontinental fescue sandy grassland in the Deliblato Sands (Deliblatska peščara; South-Eastern Banat, Vojvodina, Serbia) with nested-plot sampling on areas from 0.0001 to 100 m² (= "EDGG biodiversity plot"). The stand belongs to the class *Koelerio-Corynephoretea*, order *Sedo acris-Festucetalia* (syntax. syn.: *Festucetalia vaginatae*) and alliance *Festucion vaginatae*. Mean species richness values (e.g. 27.5 species on 10 m², with 25.0 vascular plants and 2.5 non-vascular plants) were low (only about 25%) compared maximum values known from other European dry grasslands at the different scales, but they matched well data of base-rich sandy grasslands in other parts of Europe. Only the diversity contribution of bryophytes and lichens (less than 10% on 10 m²) was unusually low for that type of vegetation. The overall species-area relationship had a *z*-value of 0.177, which indicates low species turnover (low beta-diversity). As in other studies the specific *z*-value of vascular plants was much higher than that of non-vascular plants. This paper sheds a first light on scale- and taxon-dependent phytodiversity patterns in Serbian grasslands and calls for more extensive follow-up studies.

Keywords: alpha diversity; beta diversity; biodiversity; *Festucetalia vaginatae*; *Koelerio-Corynephoretea*; *Sedo acris-Festucetalia*; species-area relationship (SAR); species richness; syntaxonomy

Nomenclature: Euro+Med (2006–2015) for vascular plants.

Abbreviations: ICPN = International Code of Phytosociological Nomenclature (Weber et al. 2000)

Introduction

Dry grasslands of Europe host a particularly big fraction of the biodiversity of the continent (Vrahnakis et al. 2013; Dengler et al. 2014), while at the same time they are highly threatened and thus of high conservation priority (WallisDeVries et al. 2002; Janišová et al. 2011; Baumbach & Pfützenreuter 2013; European Commission 2013). Various semi-natural dry grassland types of Europe have been demonstrated to hold the highest small-scale vascular plant species richness globally for grain sizes below 100 m² (Wilson et al. 2012; Chytrý et al. 2015), but they also can have outstanding diversity of bryophytes and lichens (e.g. Boch & Dengler 2006; Löbel & Dengler 2008).

Serbia, a land-locked country located in SE Europe and partly belonging to Central Europe (north of the Danube) and partly to the Balkan Peninsula (south of the Danube), despite its relatively small size of less than 90,000 km² has a very rich flora (see Stevanović et al. 1995), with 3,730 known vascular plant species and subspecies (Tomović 2007). Vegetation diversity is also high with approximations ranging from about 600 to 1,200 plant communities (Lakušić 2005). Regarding grasslands, the most abundant are semi-natural types, formed in the forest zone as a consequence of deforestation, while there are also natural grasslands, distributed as final vegetation stage on places inappropriate for forest development, including high-mountainous (above timberline) areas, flooded land in lowland valleys and xeric steppe and/or salinized habitats in the northern part of the country (Vojvodina) (Dajic Stevanovic et al. 2010). Major research on grassland biodiversity in Serbia started in 1950s and was conducted with the Braun-Blanquet approach, resulting in many remarkable reports on floristic and vegetation diversity of different geographic areas of the country (see Kojić et al. 2004). However, for a long time vegetation classification in Serbia developed relatively independently from the rest of Europe,

resulting in idiosyncratic classification schemes. Only recently increasing efforts have been made to place the Serbian vegetation diversity into a European context, most remarkably for saline grasslands (Eliáš et al. 2013). Also the recent works by Aćić et al. (2014, 2015) for nomenclatural and syntaxonomic revision of the dry grasslands at a national scale can be seen as a first, important step towards European integration.

While in other European regions, diversity patterns of dry grasslands have been extensively studied (see reviews by Dengler 2005; Dengler et al. 2014), only little is known from Serbia so far. The analysis of the alpha diversity (total species number) of the classes of grassland vegetation s.l. of Serbia showed that the highest and lowest floristic richness was found in the *Festuco-Brometea* and *Salicetea herbaceae*, respectively (Dajic Stevanovic et al. 2010).

Here we took the opportunity of the preparatory meeting for the EDGG Field Workshop 2016 in Belgrade in June 2015, to carry out a first sampling of the so-called "EDGG biodiversity plots" (Turtureanu et al. 2014) with the aim to document scale- and taxon-dependent diversity patterns in Serbian grasslands. For this purpose we chose the Special Nature Reserve "Deliblato Sands" northeast of the capital, and there a stand belonging to the alliance *Festucion vaginatae* (Pannonian sandy dry grasslands). This is at the same time a priority habitat of the European Union: 6260 = * Pannonic sand steppes (European Commission 2013). In the following, we give some first insights into synthaxonomy, species richness patterns and species-area relationships of these grasslands in Serbia. At the same time, our contribution can be seen as an "appetizer" to attend next year's EDGG Field Workshop in Serbia, where many more and diverse grasslands will be studied by an international expedition team (see Vrahnakis et al. 2013; Biurrun et al. 2014).

Study area

The sampling took place on an open sand dune 3 km northeast of the village Deliblato, Vojvodina, Serbia (44.86457° N, 21.05903° E, precision: 10 m, elevation: 142 m a.s.l.) on 6 June 2015. This dune belongs to the Special Nature Reserve "Deliblato Sands" (Deliblatska peščara). This Special Nature Reserve is a unique geomorphological and biogeographical phenomena and one the largest inland sand dune systems in Europe. It is located in South-Eastern Banat, in the northern Serbian province of Vojvodina. The protected area spreads over 34,829 ha (348 km²) in southeast-northwest direction. It is characterized by specific geological structure – thick layers of silica-carbonate sand originating from the Pleistocene (Butorac et al. 2002). The wind *Košava* has shaped an impressive and unique dune relief, with altitudes between 70 and 200 m.

The unusual relief and soil substrates, with a moderate continental climate and the absence of surface waters has caused the formation of diverse specialised phytocoenoses. The specificity of the Deliblato Sands is sandy open and forest-steppe vegetation, but also wetlands and aquatic vegetation on the banks of the Danube. As the largest oasis of sands in the Pannonian Basin, the Special Nature Reserve "Deliblato Sands" is an important center of biological diversity of Europe and the most important sand-steppe area in Serbia. First fragments of this area were protected in 1912, while the Nature Reserve was founded in 1977, and transformed into a Special Nature Reserve by the Government of the Republic of Serbia in 2002. The Deliblato Sands are also Important Bird Area (since 1989).

The Deliblato Sands are an example of a large and long-term human commitment to overcoming natural processes, which he caused by irrational management of natural habitats in the past. Almost 150 years ago, this commitment was reflected in the actions of preventing the movement of sand mass from the Deliblato Sands to the fertile agricultural soils of the surrounding Pannonian Basin. However, today more than half the surface of the Deliblato Sands is overgrown with planted forests of *Robinia pseudoacacia* and pines. Afforestation, changes in the water regime and the lack of management in the protected areas of sand and steppe allowed the expansion of shrub vegetation and further succession, which led to the reduction in numbers or even regional extinction of typical steppe and sand species.

Methods

One square plot of 100 m² was delimited in a homogenous part of the vegetation, following the modified version of Dengler (2009b) by Turtureanu et al. (2014). We recorded complete species composition (vascular plants, terricolous bryophytes and lichens) with the any-part system (see Dengler 2008) for two nested-plot series in the NW and SE corner for areas of 0.0001, 0.001, 0.01, 0.1, 1 and 10 m² as well as for the whole 100 m². Species cover (in %) was estimated for the two 10-m² plots, where also environmental parameters were assessed and a mixed soil sample of the uppermost 10 cm drawn for soil analyses (pH in water, skeleton).

The species composition was compared with lists of diagnostic species provided from both regional and supraregional sources to find the proper syntaxonomic placement to allow a placement in the syntaxonomic system. The species richness data for the seven different grain sizes were compared to literature data and used to construct a species-area relationship, as power-law function in the linearized version ($\log_{10} S \sim \log_{10} A$, where S is the species richness and A the area in m²; Dengler 2009a). The vegetation-plot data (RS01) are stored in and available from the *Database Species-Area Relationships in Palaearctic Grasslands* (GIVD ID EU-00-003; Dengler et al. 2012b) and in the *Balkan Dry Grassland Database* (GIVD ID EU-00-013; Vassilev et al. 2012).

Fig.1: Sampled 100-m² biodiversity plot (RS01), belonging to the allliance *Festucion vaginatae* near Deliblato, Vojvodina. Below two aspects of the community with some typical species. Left: *Stipa borysthenica*, *Festuca vaginata*, *Astragalus onobrychis*; right: *Koeleria glauca*, *Artemisia campestris*, *Euphorbia seguierana* and *Dianthus gigantiformis* (Photos: J. Dengler, 2015/06).

Results and discussion

Syntaxonomy

There is a broad agreement that the perennial-dominated grasslands of base-rich sands from the Pannonian Basin belong to the alliance *Festucion vaginatae*. However, regarding the placement of this alliance into the syntaxonomic system, opinions diverge from subordinating it to the *Festuco-Brometea* (e.g. Mucina & Kolbek 1993; Aćić et al. 2015), or the *Koelerio-Corynephoretea* (e.g. Borhidi 2003) or placing it into a class of its own, *Festucetea vaginatae* (e.g. Stanová 1995; Sanda et al. 2006; Chytrý 2007). However, these treatments usually just follow their national traditions, without statistical evaluation at national or supra-national level. By contrast, J. Dengler compiled an extensive set of synoptic tables of all dry grassland classes across Europe to evaluate their floristic relationships (unpublished; but see selected results in Dengler 2001, 2003), according to which the connection of the *Festucion vaginatae* to the class *Koelerio-Corynephoretea* is largely predominant, and neither a subordination to the *Festuco-Brometea*, nor a class of its own seem to be justified.

Within the *Koelerio-Corynephoretea*, the *Festucion vaginatae* belongs to a group of closely related syntaxa on base-rich, very dry and very nutrient-poor sands under subcontinental to continental climate. Three

vicariant alliances with perennial tussock grasses can be distinguished, *Koelerion glaucae* (Germany, Poland, Czech Republic, N Ukraine, countries surrounding the Baltic Sea), *Festucion vaginatae* (Pannonian Basin) and *Festucion beckeri* (S Ukraine), plus one or two pioneer alliances, dominated by annuals (*Sileno conicae-Cerastion semidecandri*, *Bassio laniflorae-Bromion tectorum*). The three "perennial" alliances are dominated by the tussock grasses *Koeleria glauca* and *Stipa borysthenica* (throughout most of the range) and by various vicariant species of *Festuca ovina* agg., mostly from Ser. *Psammophilae*, namely *F. polesica*, *F. psammophila*, *F. tomanii* (*Koelerion glaucae*), *F. vaginata*, *F. wagneri* (*Festucion vaginatae*) and *F. beckeri* (*Festucion beckeri*). Despite the stands of these three alliances are floristically, physiognomically and ecologically very similar, this has hardly ever been reflected in syntaxonomic classification, probably because most researchers did not know this community type throughout its entire range. Only Dengler (2001, 2003, 2004) proposed to join all four to five alliances in one order, which according to priority rules then should be named *Sedo acris-Festucetalia* Tx. 1951 nom. invers. propos. (for nomenclature, see Dengler et al. 2003), of which *Festucetalia vaginatae* Soó 1957 would become a younger syntaxonomic synonym. Note that originally the *Festuco-Sedetalia acris* also contained an alliance of meso-xeric sandy grasslands (*Armerion elongatae*), which now normally is placed into a separate order (*Trifolio arvensis-Festucetalia ovinae*) together with other meso-xeric sandy grasslands of Europe (e.g. Schaminée et al. 1996; Dengler 2004; Pedashenko et al. 2013).

The stands in Vojvodina confirm the placement into the *Koelerio-Corynephoretea* because diagnostic species of that class clearly prevail over those of the *Festuco-Brometea* (Table 1). They are particularly similar to the association *Jurineo-Koelerietum glaucae* of the Upper Rhine Valley (Korneck 1974), which have been visited during the European Dry Grassland Meeting 2015 (Becker & Becker 2015). Important joint taxa are *Koeleria glauca*, *Euphorbia seguierana*, *Alyssum montanum* subsp. *gemlinii*, *Artemisia campestris*, *Cerastium semidecandrum*, *Bassia laniflora*, *Galium verum*, *Cynodon dactylon*, *Fumana procumbens* and the dominant species of the cryptogam layer, *Syntrichia ruralis* agg., while the genera *Festuca*, *Jurinea* and *Silene* are represented by vicariant species (*Festuca tomanii*, *Jurinea cyanoides* and *Silene conica* in the Upper Rhine Valley vs. *F. vaginata*, *F. wagneri*, *J. mollis* and *S. subconica* in Vojvodina).

In the past (Stjepanović-Veseličić 1956, 1957, 1979; Parabućski et al. 1986), fescue sandy grassland communities in Serbia had been defined by their

Table 1.: Vegetation table of the two 10-m² plots in the NW and SE corner of the 100-m² biodiversity plot. Performance of species is given in percentage cover. Species are grouped into the following functional-taxonomic groups: VW = vascular plant, wood; VG = vascular plant, graminoid, VL = vascular plant, legume, VF = vascular plant, other forb, B = bryophyte, L = lichen. Character and differential species are

		Subplot	NW	SE
		Land use	no	no
		Aspect (°)	135	-
		Inclination (°)	1	0
		Microrelief (cm)	10	4
		pH (H_2O)	8.23	8.15
		Soil texture class	Sand	Sand
		Skeleton content of the soil (%)	0.0	0.0
		Cover vegetation (%)	85	92
		Cover herb layer (%)	60	60
		Cover cryptogam layer (%)	55	70
		Cover litter (%)	50	NA
		Species richness (total)	**29**	**26**
		Species richness (vascular plants)	26	24
		Species richness (non-vascular plants)	3	2
Alliance: *Festucion vaginatae*				
C	VG	*Festuca vaginata*	1.5	5
C	VG	*Festuca wagneri*	.	15
C	VF	*Centaurea arenaria*	2	.
C	VF	*Trogopogon floccosus*	0.1	.
C	VG	*Bromus squarrosus*	.	0.02
D	VG	*Festuca rupicola*	3	15
D	VG	*Carex liparocarpos* subsp. *liparocarpos*	5	8
C	VF	*Fumana procumbens*	5	4
D	VG	*Cynodon dactylon*	5	.
D	VF	*Erysimum diffusum*	.	0.02
Order: *Sedo acris-Festucetalia*				
C	VF	*Euphorbia seguierana*	20	8
C	VG	*Koeleria glauca*	3	5
C	VG	*Stipa borysthenica*	5	2
C	VF	*Bassia laniflora*	0.01	0.1
C	VF	*Silene subconica*	0.01	0.01
C	VF	*Alyssum montanum* subsp. *gmelinii*	.	0.02
D	VG	*Poa bulbosa*	2	1
Subclass: *Koelerio-Corynephorenea*				
C	VF	*Cerastium semidecandrum*	1	1
Class: *Koelerio-Corynephoretea*				
C	B	*Syntrichia ruralis* agg.	25	25
Joint species of the classes *Koelerio-Corynephoretea* and *Festuco-Brometea*				
D	VF	*Artemisia campestris*	10	5
D	VF	*Galium verum*	.	1
D	L	*Cladonia pyxidata* agg.	0.05	.
Class: *Festuco-Brometea* and subordinate units				
	VG	*Botriochloa ischaemum*	25	7
	VF	*Jurinea mollis*	0.5	0.1
	VF	*Scabiosa ochroleuca*	0.2	0.3
	VF	*Thymus pulegioides subsp. pannonicus*	0.5	.
	VF	*Dianthus giganteiformis*	0.2	.
	VF	*Allium flavum*	0.1	.
Other companion species				
	B	*Tortella tortuosa*	30	45
	VF	*Minuartia verna*	3	5
	VF	*Crepis foetida* subsp. *rhoeadifolia*	1	0.2
	VF	*Minuartia glomerata*	1	0.2
	VF	*Echinops ritro* subsp. *ruthenicus*	0.5	0.3
	VF	*Clinopodium acinos*	0.5	.

Table 2: Maximum richness values found in this study (RS) compared to the documented maximum richness values in European grasslands (EU).

Plot size [m²]	RS all species	RS vascular plants	EU vascular plants	Ratio RS / EU	Country	Alliance	Reference
0.0001	3	1	7	14%	Ukraine**	*Agrostio-Avenulion schelliianae* & *Stipion lessingianae*	Kuzemko et al. (2014)
0.001	4	2	12	17%	Sweden*	*Filipendulo-Helictotrichion*	van der Maarel & Sykes (1993)
0.01	8	6	25	24%	Estonia*	*Filipendulo-Helictotrichion*	Kull & Zobel (1991)
0.1	14	12	43	28%	Romania*	*Cirsio-Brachypodion*	Dengler et al. (2012a)
1	23	20	82	24%	Czechia	*Cirsio-Brachypodion*	Chytrý et al. (2015)
10	29	26	98	27%	Romania*	*Cirsio-Brachypodion*	Dengler et al. (2012a)
100	38	35	133	26%	Czechia	*Cirsio-Brachypodion*	Chytrý et al. (2015)

geographical origin and distribution: *Festucetum vaginatae deliblaticum* Stjepanović-Veselčić 1953 (Deliblato Sands), *Festucetum vaginatae danubiale* Soó 1929 (sandy areas near Subotica), *Festucetum vaginatae kladovense* Stjepanović-Veselčić 1956 and *Festucetum vaginatae ramo-požežense* Stjepanović-Veselčić 1956 (on sands in Eastern Serbia), but these names are all illegitimate according to Art. 34a of the International Code of Phytosociological Nomenclature (ICPN; Weber et al. 2000).

According to Stjepanović-Veselčić (1956), sand vegetation of Deliblato Sands and the sands of eastern Serbia can be grouped into a single community *"Alyseto-Festucetum vaginatae"* Stjepanović-Veselčić 1956. As Aćić et al (2014) indicated, according to the ICPN, this original name must be orthographically corrected to *Alysso gmelini-Festucetum vaginatae* Stjepanović-Veselčić 1956.

If we consider the high coverage of such species as *Botriochloa ischaemum*, *Euphorbia seguierana*, *Artemisia campestris*, *Syntrichia ruralis* agg. and *Tortella tortuosa*) as well as the relief position (plateau between the slopes of the dunes), we can accept the proposal of Stjepanović-Veselčić (1979) for segregation of a subassociation defined by mosses. It should be noted that typical species of pioneer, mobile sands (*Festuca vaginata*, *Koeleria glauca*) under such conditions lose vitality and are replaced by *Artemisia campestris*, *Botriochloa ischaemum* and later *Stipa borysthenica*. In this subassociatoin, the sand is less exposed to the wind, it is stable and thus conditions are created for further succession towards steppe vegetation of the *Festucion valesiacae* (*Festuco-Brometea*), which indeed occupied some nearby patches that were even more stable, more humus rich and probably also richer in fine-soil fractions.

In the past (Stjepanović-Veselčić 1956, 1957, 1979; Parabućski et al. 1986), fescue sandy grassland communities in Serbia had been defined by their geographical origin and distribution: *Festucetum vaginatae deliblaticum* Stjepanović-Veselčić 1953 (Deliblato Sands), *Festucetum vaginatae danubiale* Soó 1929 (sandy areas near Subotica), *Festucetum vaginatae kladovense* Stjepanović-Veselčić 1956 and *Festucetum vaginatae ramo-požežense* Stjepanović-Veselčić 1956 (on sands in Eastern Serbia), but these names are all illegitimate according to Art. 34a of the International Code of Phytosociological Nomenclature (ICPN; Weber et al. 2000).

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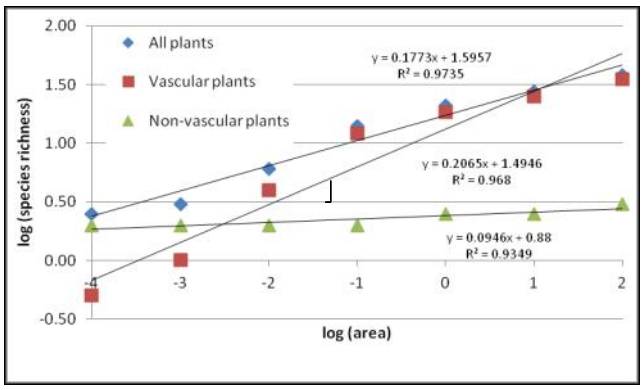

Fig.2 Species-area relationships in double-log representation for the averaged richness values of both corners together

Species-area relationships

With a *z*-value of 0.177 (Fig. 2), our stands are more homogenous (have less species turnover or lower beta-diversity) than most other European dry grasslands, for which *z*-values of 0.193–0.249 (Dengler 2005) and 0.174–0.278 (Dengler & Boch 2008) are reported. As frequently reported (Dengler & Allers 2006; Hopp & Dengler 2015 in this issue), also in our case the *z*-value of the vascular plants alone (0.207) was much higher than that of the non-vascular plants (0.095).

Outlook

This short article provides, based on a single "EDGG biodiversity plot", a first glance at the scale- and taxon-dependent phytodiversity patterns of the grasslands in Serbia. However, the country has a very diverse dry grassland vegetation (Aćić et al. 2015), so that similar studies in other grasslands types and regions of the country appear promising and important to understand how small-scale biodiversity patterns emerge and are maintained, what the average richness values are and where maximum richness values can be found. Here the next EDGG Field Workshop, scheduled for summer 2016 in Serbia, provides the opportunity to get involved in these baseline studies. Details on the Field Workshop (dates, prices, itinerary, registration) will be published in this or the next issue of the EDGG Bulletin.

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Stipa borysthenica. Photo: A.Kuzemko

Research stay in Slovakia in spring 2015

Two Ukrainian researchers and EDGG members, Dr. habil. Anna Kuzemko and PhD. Liubov Borsukiewich participated in a research stay in a team of Slovak researchers and EDGG members, lead by Dr. Monika Janišová and Dr. Iveta Škodová from Institute of Botany, Slovak Academy of Sciences.

These activities were carried out within the framework of a long-term project to study the grassland vegetation of Ukrainian Carpathians, which has been conducted jointly by Slovak and Ukrainian scientists since 2011. These are phytosociological data based on the Braun-Blanquet approach from one of poorest documented

Working process in the Institute of Botany Slovak Academy of Sciences. Monika Janišová, Milan Zajac and Liubov Borsukiewich. Photo: I. Škodová

regions of Europe.

The area is unique in its widespread traditional agriculture and high diversity of semi-natural grassland vegetation. The main aim of the common research is to unify the classification of the studied mesic grasslands with the classification system used in other Carpathian countries, based on the evaluation of abstracts submitted for publication in a special issue of Phytocoenologia focusing on classification of Palearctic grasslands.

The research stay contributed to the official aims of EDGG and IAVS by: i) increasing knowledge on grassland composition in understudied region of European contribute to building public vegetation databases registered in GIVD, ii) indicating diversity patterns and their relation to the traditional agriculture, iii) unification of grassland classification in the Carpathian Mts., iv) strengthening international collaboration within EDGG and IAVS.

Dr. Monika Janišová (in Banská Bystrica) and Dr. Iveta Škodová (in Bratislava) supervised the research stay. Also further local researchers cooperated during the research stay: Dr. Karol Ujházy, Dr. Eva Uhliarová, Dr. Ingrid Turisová and Milan Zajac, all of them participating during the field research. The guests participated in the workshop, which was held in Banská Bystrica with majority of the co-authors of the paper, where were discussions on syntaxonomy of mesic grasslands of the Carpathians, as well as on different methodological approach to the processing and interpretation of the phytosociological data.
During the research stay in Slovakia, work on a paper titled «Classification of mesic grasslands of the Ukrainian Carpathians" for the target journal "Phytocoenologia" was carried out. The Ukrainian participants were involved in the analysis of the literary sources and charcteristics of the study area, identified missing geographical coordinates for about 400 relevés on the basis of information about their location using

Paper writing workshop in Banská Bystrica. Photo: M. Janišová

the information system Google Earth. They aligned the species lists in dataset with Flora Europaea and Nomenclatural Checklist of Vascular Plants of Ukraine. Using ecological scales of Ellenberg and Didukh, they carried out the phytoindication evaluation of the syntaxa. During the collaborative work with the Slovak colleagues, the Ukrainian researchers considerably improved their knowledge of working with the JUICE software, and in particular learned to use different models of data stratification, gained skills with new methods to separate vegetation units (non-supervised, semi-supervised and supervised K-means, PAM etc.). In addition, the guests had the opportunity

Ski walk in the vicinity of Banská Bystrica: Monika Janišová, Liubov Borsukiewich and Ingrid Turisová. Photo: V. Janiš

to work with modern phytosociological literature, get an idea about the features of the organizational work at the Institute of Botany of the Slovak Academy of Sciences.

In addition to the actual research work, there was a rich excursion program. Anna Kuzemko and Liubov Borsukiewich visited a number of sites with rich natural flora and vegetation in surroundings of Bratislava and Banská Bystrica (Reserve Sandberg, Devínska Kobyla, Malé Karpaty Mts, Nízke Tatry Mts), visited the Botanical Garden of the University of Bratislava and the exhibition of landscape architecture at the Bratislava Expocentre. In general, the research stay was very productive and useful.

We are extremely grateful to the International Association for Vegetation Science for the financial support of the research stay and personally to director of the Institute of Botany SAV, Dr. Anna Gutová and staff of the Geobotany Department for their hospitality and help. Special thanks to Monika Janišová and Iveta Škodová for organization, management and administration of the research stay.

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Liubov Borsukiewich on the ruins of an ancient castle Pajštún. Photo: I. Škodová

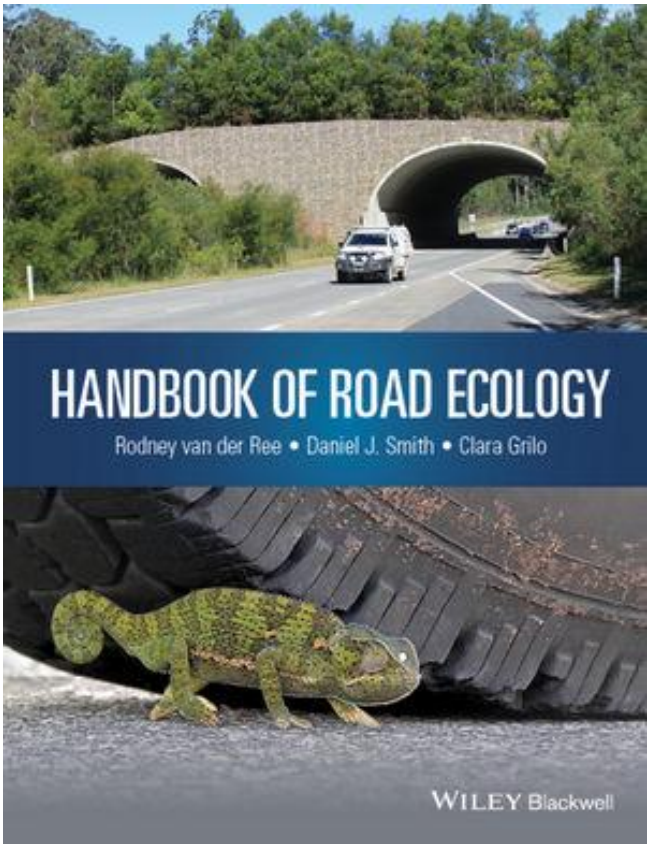
Iveta Škodová and Anna Kuzemko on the Danube embankment in Bratislava Photo: R. Škoda

Anna Kuzemko communicates with the locals in Bratislava. Photo: R. Škoda

Book reviews

Here we present recently published books that might be relevant for grassland scientists and conservationists, both specific grassland titles as well as faunas, floras, or general books on ecology and conservation biology. If you (as an author, editor or publisher) would like to propose a certain title for review, or if you (as an EDGG member) would like to write a review (or reviews in general), please contact the Book Review Editors Anna Kuzemko (anya_meadow@i.ua) and Péter Török: (molinia@gmail.com).

van der Ree, R., Smith, D. J., Grilo, C. (eds.) (2015): Handbook of Road Ecology -552 pp. Wiley Blackwell, ISBN: 978-1-118-56818-7, Hardcover: 128.30€, E-book 115.99€.



The editors provided a very impressive synthesis in a form of a handbook summarising the current knowledge on the possible effects of linear infrastructure (i.e. roads, railways) on the natural habitats including also the natural biota, abiotic factors and their interactions. The topic is very important from the grassland ecological perspective, as habitat fragmentation caused also by linear infrastructures is one of the main drivers for biodiversity decline in grasslands embedded in human mediated landscapes (Habel et al. 2013, Dengler et al. 2014). In particular, the building of roads can cause significant habitat loss, and can also lead to the degradation of adjacent habitats. They can increase the mortality rate of wildlife both by collisions or by falsely attracting of water bugs or lizards. They can also form a dispersal barrier or filter and can isolate populations causing genetic drift over long periods (Young et al. 1996). All these issues are well covered in the present comprehensive book with altogether 115 authors from 25 countries contributing to the 62 chapters.

The editors made a great job and provided a comprehensive and consistent chapter outline and structure. Each chapter is supported by a short summary at the beginning and closed with a conclusion section, which makes it easy for readers to navigate through the book to find essential information for their particular research interest. It is also nice that most of the authors of chapters provided a couple of papers for further reading and a comprehensive list of literature cited. The book has also a webpage dedicated especially for students and lecturers (www.wiley.com\go\vanderree\roadecology), where all figures and tables are available in downloadable format (*.pdf or *.ppt files) for educational purposes. Importantly, the chapter authors went beyond simply providing their scientific results, and also made recommendations for policy, practice and conservation planning to mitigate the negative effects of linear structures on wildlife.

In conclusion, the book provides a very important contribution to the understanding of the effects of linear infrastructures on wildlife. It is 'reader friendly' and practice driven, and I'm sure it will generate both further research and collaboration in the field, so that the highest beneficiary will be the natural vegetation and fauna.

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Hegedüšová Vantarová K., Škodová I. (eds.), 2014 Rastlinné spoločenstvá Slovenska. 5. Travinno-bylinna vegetácia. 581 p. Veda, Bratislava, **ISBN 978-80-224-1355-8. Price: 17 €.**

The new volume of the series "Vegetation of Slovakia", which was released in 2014, is dedicated to grassland vegetation. It presents the results of modern syntaxonomic revision of eight vegetation classes: *Festuco-Brometea*, *Trifolio-Geranietea*, *Molinio-Arrhenatheretea*, *Nardetea strictae*, *Calluno-Ulicetea*, *Crypsietea aculeatae*, *Festuco-Puccinellietea*, and *Scorzonero-Juncetea gerardii*.

The basis for this monographic survey was publication "Grassland vegetation of Slovak Republic – electronic expert system for identification of syntaxa" (Janišová 2007), therefore the methodology used is similar to this monograph and somewhat different from the previous volumes of the "Vegetation of Slovakia" (Valachovič 1995, Jarolímek et al. 1997, Valachovič 2001, Kliment &Valachovič 2007).

The dataset for syntaxonomic revision were extracted from the Central Database of Phytosociological Relevés. After removing duplicates, as well as the relevés not of the appropriate size, the dataset contained 48 432 relevés including 13 064 relevés assigned by original authors to target alliances of non-forest vegetation. It should be noted that for halophytic vegetation, historical relevés were used regardless of the minimum area due to the rarity of such communities in Slovakia. Using the dataset prepared for analysis, the formal definitions of association as well as sociological species groups published in Janišová (2007) were tested and modified. Several new sociological species groups were created using the Cocktail method. Relevés were selected in the dataset using formal definitions. The geographical stratification of the dataset was carried out in the same manner as in the book "Vegetation of the Czech Republic" (Chytrý 2007). Diagnostic species were determined using the phi coefficient as fidelity measure. To delimit the diagnostic species for associations and alliances, the relevé group size was standardized to 1% of the total size of the dataset and the threshold of the phi coefficient to 0.2. For orders and classes, the relevé group size was standardized to 8% and phi values to 0.25. Diagnostic species were regarded as character-taxa, transgressive character-taxa or differential taxa.

The synoptic tables are presented individually for classes (columns are alliances) and for alliances (columns are associations). They were generated from the non-stratified data set and contained all relevés that satisfied to the formal definitions. The synoptic tables have a combined form and included constancy (in %) and cover (expressed as median value of the Braun-Blanquet cover/abundance scale). For each synoptic table of alliance provides a list of relevé sources indicating author, year and locality.

Description of the syntaxa from class to orders, alliances and associations (subassociations and variants characterized in the text) include nomenclature details: valid scientific name with author citation, national (Slovak) vernacular name (except of associations), original name (if it differs from the valid name), and list of synonyms subdivided into several categories. This is followed by the number of the table and the column of the particular syntaxon, the list of diagnostic species (for the syntaxa since the order level they divided into aforementioned categories), nomenclatural type as well as the text of description. For the associations also provide formal definition and the text of description includes several sub-sections: synmorphology, synphenology, synecology, syndynamics, syntaxonomy, synchorology and level of endangerment. A description of each class is preceded by picture of its typical community.

The main classes of grassland vegetation *Festuco-Brometea* and *Molinio-Arrhenatheretea* as well as *Trifolio-Geranietea* are presented in a traditional scope for European phytosociology. However, in my opinion, the scope of some alliances and associations is somewhat narrower than in the other countries of Central Europe. At first glance, the absence of the *Koelerio-Corynephoretea* among the classes of grassland vegetation is surprising, but this class was considered in the first volume of "Vegetation in Slovakia" (Valachovič 1995), which deals with pioneer vegetation. It is also notable that mat-grass swards (*Nardetea strictae* class) are separated from heath vegetation (*Calluno-Ulicetea* class), which the majority of syntaxonomical surveys consider together in the *Nardo-Callunetea* class. This decision is fully justified from the point of view of the environmental characteristics of communities and in terms of their morphology, but in this case the inclusion of the class

of heath vegetation — *Calluno-Ulicetea* in the volume of grassland vegetation, slightly blurs the boundaries of this type of vegetation. The same applies to the inclusion in this volume of one association of the *Scheuchzerio-Caricetea fuscae* class, which was not included in the volume dealing with wetland vegetation (Valachovič 2001). Halophytic vegetation, which is very rare in Slovakia, is considered as three classes of vegetation, and two of them — *Festuco-Puccenellietea* and *Scorzonero-Juncetea gerardii* — are often treated as synonyms in Eastern European literature.

In general, the reviewed book has a great theoretical value for phytosociologists and vegetation ecologists since it significantly complements the overall picture of grassland vegetation, not only in Slovakia and neighboring countries, but in Europe as a whole. It is also of considerable practical value, as the electronic expert system developed by the authors and available on the webpage of Institute of Botany SAS http://ibot.sav.sk allows high-quality vegetation classification to be performed by specialists who do not have sufficient expert knowledge, and in particular, workers in the fields of environmental protection and agriculture.

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Iris pumila in the Devínska Kobyla reserve. Photo: L. Borsukiewich

Recent publications of our members

*With this section, the contents of which will also be made available via our homepage, we want to facilitate an overview of **grassland-related publications** throughout Europe and to improve their accessibility. You are invited to send lists of such papers from the last three years following the format below to anya_meadow@i.ua and didem.ambarli@gmail.com. We will include your e-mail address so that readers can request a pdf. For authors who own full copyright, we can also post a pdf on the EDGG homepage. As we plan to publish a book about the Pelaearctic dry grasslands at some point in the future, under the auspices of the EDGG, we would appreciate if you could send a pdf (or offprint) of each of your dry grassland publications to juergen.dengler@uni-bayreuth.de.*

Mauchamp L., Mouly A., Badot P.M., **Gillet F**. (2014): Impact of management type and intensity on multiple facets of grassland biodiversity in the French Jura Mountains. Applied Vegetation Science 17: 645-657. DOI:10.1111/avsc.12116

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Ancient castle Devin at the confluence of the Morava River into the Danube. Photo: A. Kuzemko

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Aurinia saxatilis on the ruins of the Pajštún castle. Photo: A. Kuzemko

Forthcoming events

15th Meeting of the Working Group on Vegetation Databases
Topic: resurvey studies
2-4 March 2016, University of Potsdam, Potsdam, Germany

25th European Vegetation Survey Meeting
13–16 April 2016, Rome, Italy
The meeting will be hosted by Università di Roma "La Sapienza" (Emiliano Agrillo, Fabio Attorre, Laura Casella, Francesco Spada and colleagues). The meeting webpage is not yet available.

Special Meeting of International Biogeography Society
5-6 May 2016, Beijing, China
Please check back for updates at: http://www.biogeography.org/html/Meetings/index.html

59th Symposium of the International Association for Vegetation Science (IAVS)
Conservation of Plant Communities: From Environmental Drivers to Ecosystem Services
12–17 June 2016, Pirenópolis, Brazil
The venue is in the central region of Brazil, in a Cerrado (savanna) landscape.
The meeting webpage is not yet available.

8th Biennial IBS Conference
9-13 January 2017, Bahia, Brazil
Please check back for updates at: http://www.biogeography.org/html/Meetings/index.html

26th European Vegetation Survey Meeting
spring 2017, Bilbao, Spain
The meeting will be hosted by University of the Basque Country (Javier Loidi and colleagues).
The meeting webpage is not yet available.

60th Symposium of the International Association for Vegetation Science (IAVS)
20-25 June 2017, Palermo, Italy
The meeting webpage is not yet available.

27th European Vegetation Survey Meeting
spring 2018, Wrocław, Poland
The meeting will be hosted by University of Wrocław (Zygmunt Kącki and colleagues).

61th Symposium of the International Association for Vegetation Science (IAVS)
23-27 July 2018, Bozeman (Montana), U.S.A.
The meeting webpage is not yet available.

Senecio erucifolius—the typical species of the halophytic grasslands in Eastern Ukraine. Photo: A. Kuzemko

Halophytic vegetation of the Oril River valley, Dnipropetrovsk region, Ukraine. Photo: A. Kuzemko

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