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PALAEARCTIC GRASSLANDS

Journal of the Eurasian Dry Grassland Group

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Palaearctic Grasslands
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Palaearctic Grasslands, formerly published under the names *Bulletin of the European Dry Grassland Group* (Issues 1-26) and *Bulletin of the Eurasian Dry Grassland Group* (Issues 27-36), is the journal of the Eurasian Dry Grassland Group (EDGG). It publishes four issues per year. Palaearctic Grasslands publishes news and announcements of EDGG, its projects, related organisations and its members. At the same time it serves as outlet for scientific articles and photo contributions.

Palaearctic Grasslands is published from the Biocentre Klein Flottbek, University of Hamburg, c/o Jürgen Dengler, Ohnhorststr. 18, 22609 Hamburg, Germany. It is sent to all members of the group (1315 members from 67 countries as of 30th June 2018) and together with all previous issues, it is also freely available at http://www.edgg.org/publications.htm.

Text contributions should be submitted to the Chief Editor Anna Kuzemko (anyameadow.ak@gmail.com) with the Deputy Chief Editors (idoia.biurrun@ehu.es, juergen.dengler@uni-bayreuth.de) in cc. For style and format, please consult the last issue and in case of scientific contributions additionally the Author Guidelines, which are provided in this issue (pp. 6-8), and are also available online: (http://www.edgg.org/publ/bulletin/Author_guideline_Bulletin_EDGG.pdf).

Photo contributions (photos for general illustrative purposes with captions; proposals for Photo Stories; candidate photos for the Photo Competition) should be submitted to both Photo Editors, Rocco Labadessa (rocco.labadessa@gmail.com) and Jalil Noroozi (noroozi.jalil@gmail.com). Deadline for submissions to the next Photo Competition on "Plant-animal interactions" is 1 August 2018.

Contributions to the sections **"Recent publications of our members"** and **"Forthcoming events"** should be sent to Iwona Dembicz (iwodem@op.pl).

Editorial Board

On front cover page: ***Orchis longicornu on Mallorca (Spain). Photo: J. Dengler.***

Editorial

Dear readers,

With this 37th issue of the electronic journal of the EDGG, we want to introduce several novelties, all aimed at increasing the attractiveness of our publication venue for authors and readers. Most prominent is the new title *Palaearctic Grasslands* that replaces the lengthy *Bulletin of the Eurasian Dry Grassland Group*. *Palaearctic Grasslands* matches the widened scope of EDGG after the Bylaw changes on our conference in Mainz a couple of years ago. While *Palaearctic Grasslands* will continue to serve as newsletter for EDGG and its members, we intend to make it at the same time a more attractive publication outlet for scientific papers that are interesting beyond our membership. In parallel to the title change, we have spent some efforts in re-designing the cover page. The Table of contents and the Editorial have been moved to pages 2 and 3, respectively, in order to obtain a more attractive cover page.

Since our main motivation was to make the journal more attractive for scientific articles and give them more weight inside Palaearctic Grasslands, we decided to modify the acceptance mode. While in the past essentially any contribution from a member was accepted without a profound check of its content, all scientific articles now will be subject to "editorial review" by one of our Editorial Board members. The Editorial Board member will then send proposals to the authors which things need to be changed formally and which should be changed content-wise, and only when authors implement the requested changes in a satisfactory manner, the paper will be accepted for publication. Compared to the normal peer-review of big international journals (with two or more anonymous reviews and an editor who mainly serves as "judge"), our version of "editorial review" will be faster. It is aimed at improving the papers, but not at selecting only the 20%, 30% or 50% of best submissions. In fact, we intend to continue to publish all paper submissions from our members that meet a certain scientific standard, and we are prepared to increase the number of issues per year if this should become necessary due to a larger number of scientific papers. Four types of scientific articles are possible: Research Articles, Reviews, Forum Articles and Scientific Reports. We also accept studies that are local or based on limited sampling, which usually would be rejected by peer-reviewed international journals. Other advantages of publishing a scientific paper in *Palaearctic Grasslands* will remain the same as in the *Bulletin of the Eurasian Dry Grassland Group*, namely open access full-colour publication free of charge, provision of free linguistic editing of accepted papers (by native speakers from our Editorial Board) and the provision of DOIs (digital object identifiers).

The third important novelty, apart from the new title and the more scientific profile, is the expansion of our aesthetic-photographic profile, with two new sections focused on photographs of Palaearctic grasslands, their flora and fauna. More information about these new sections is given on page 9 of this issue.

To implement these changes in the journal, we had to enlarge the team responsible for it. The Executive Committee of EDGG has recently approved that *Palaearctic Grasslands* now in addition to Anna Kuzemko as Chief Editor has two Deputy Chief Editors, i.e. Idoia Biurrun and Jürgen Dengler. Their work is supported by a larger Editorial Board whose members generally help with the management and development of *Palaearctic Grasslands*, but mostly have also specific tasks. We present the whole team, together with their visions for the journal and their specific tasks on pages 4 –5 of this issue. We hope that you like the new concept of *Palaearctic Grasslands* and particularly that the improved options of submitting scientific articles and photo contributions is appealing to you. Any comments as well as criticism are most appreciated by the Chief Editors in order to finetune the journal concept so that it best meets the needs of EDGG members and other grassland researchers and conservationists. With the best wishes for a splendid season,

Anna Kuzemko, Idoia Biurrun & Jürgen Dengler

News

Expanded Editorial Board

Anna Kuzemko (Chief Editor)
anyameadow.ak@gmail.com

Grasslands is what united us into one working group, and they are the object of our scientific research, but also a source of aesthetic pleasure, thanks to the variety of forms, colors, fragrances and sounds. Therefore, I would like that our journal should not only be a source of useful information, but also a source of pleasure for our readers, fascinating and colorful, and also contribute to the emergence of new ideas and inspire new achievements.

Anna Kuzemko

Jürgen Dengler (new Deputy Chief Editor),
juergen.dengler@uni-bayreuth.de

The EDGG Bulletin is now close to its 10th birthday, and I had the pleasure to support its development from the beginning as a member of the Editorial Board. My wish for the future is that the Bulletin, in addition to its excellent function as working group newsletter, also becomes a respected publication venue that hosts interesting scientific papers on a wide variety of grassland types throughout the Palaearctic realm, their diverse fauna and flora as well as their threats, and illustrated with aesthetic photos. Thus, I am happy to help with mobilizing submissions of such contributions and with handling them editorially to increase their quality.

Jürgen Dengler

Idoia Biurrun (Deputy Chief Editor),
idoia.biurrun@ehu.es

Iwona Dembicz (Scientific Editor and responsible for the sections "Recent publications of our members" and "Forthcoming events"),
iwodem@op.pl

Peter Török (Scientific Editor and Book Review Editor),
molinia@gmail.com

For the future I hope that we can attract more researchers from Asia and North Africa to contribute regularly to our journal.

Peter Török

Steve Venn (Scientific Editor and Linguistic Editor),
stephen.venn@helsinki.fi

I think that the EDGG Bulletin may become an effective landmark for grassland enthusiasts from all disciplines, by improving it with an even more cross-disciplinary and straightforward approach.

Rocco Labadessa

Rocco Labadessa (Scientific Editor and Photo Editor),
rocco.labadessa@gmail.com

Gwyn Jones (Linguistic Editor),
dgl_jones@yahoo.co.uk

Laura Sutcliffe (Scientific Editor and Linguistic Editor),
sutcliffe.laura@gmail.com

The Bulletin plays a central role in the work of the EDGG: it should continue to be an essential source of relevant information from and for members, but also professionalise and ensure the high quality of the information for researchers and practitioners in the wider field of grassland conservation.

Laura Sutcliffe

Atushi Ushimaru
(Scientific Editor),
ushimaru8@gmail.com

I hope to introduce Japanese (and hopefully east-Asian) natural or semi-natural grasslands and their biodiversity by providing photos and writing papers concerning their floras and faunas.

Atushi Ushimaru

Jalil Noroozi
(Scientific Editor and Photo Editor),
noroozi.jalil@gmail.com

New Author Guidelines for scientific articles in Palaearctic Grasslands

Scope and outline

Palaearctic Grasslands (formerly published under the title *Bulletin of the Eurasian Dry Grassland Group*) is the electronic journal of the EDGG, published approx. 4–6 times per year. *Palaearctic Grasslands* publishes news and announcements of EDGG, its projects, related organisations and its members as well as scientific articles.

Scientific articles are those contributions that are not official announcements of EDGG, its projects or related organizations (such contributions are published in the announcement sections of the journal) and are longer than two pages in print (contributions up to two pages are published as Short Contributions). All EDGG members are invited to submit scientific articles dealing with **any aspect of natural and semi-natural grasslands of the Palaearctic realm**, 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. Also regional/local and/or descriptive studies based on a limited number of observations are welcome.

Scientific articles in *Palaearctic Grasslands* are subject to **editorial review**. This means that after a submission the Chief Editors will appoint one member of the Editorial Board as **Coordinating Editor** of this manuscript. This person will combine reviewer and editor functions. He or she will discuss with the authors the necessary steps needed so that the manuscript reaches the formal and qualitative requirements of *Palaearctic Grasslands*. The review process does not aim at selecting the best manuscripts, but at making all submissions good enough for publication if possible. Once the authors have implemented all required improvements, the Co-ordinating Editor will accept the manuscript and forward it to the Chief Editor for production. As a courtesy of *Palaearctic Grasslands*, a Linguistic Editor from the Editorial Board will check and improve the English language of all accepted manuscripts.

Note that the following rules specifically apply to scientific articles in Palaearctic Grasslands. Other types of contributions (e.g. Short contributions) have the same style of references, but otherwise a different format and are not subject to editorial review.

Benefits of publishing in *Palaearctic Grasslands*

Editorial review that aims at improving all submitted manuscripts instead of selecting only the best ones for publication.

Open access and full colour publication free of charges.

Complementary linguistic editing of accepted manuscripts.

Digital object identifier (DOI) provided.

Wide audience (all > 1300 EDGG members receive the issues automatically; additionally the issue is freely available from the EDGG website).

Types of scientific articles

Research Article: Article that is mainly based on own measurements / recordings / observations. Usually should have the main sections Introduction – Study area – Methods – Results – Discussion. Typically 5–15 (–20) printed pages.

Review: Article that is mainly based on the overarching assessment of measurements / recordings / observations that have previously been published in different sources. Main sections are flexible. Typically 5–15 (–20) printed pages.

Forum Article: Article that aims at discussing conceptual, methodological or science-policy issues, including responses to previous articles published in *Palaearctic Grasslands.* Main sections are flexible. Typically 3–10 printed pages.

Scientific Report: Article that reports about the start, major advancement or completion of a grassland-related activity or project. May contain some original data, but usually not an in-depth analysis of these. Main sections are flexible. Typically 3–10 printed pages.

Form of submission

Please submit the full manuscript as a single editable text file (MS Word or rtf) to the Chief Editor Anna Kuzemko (anyameadow.ak@gmail.com) with the Deputy Chief Editors (idoia.biurrun@ehu.es, juergen.dengler@uni-bayreuth.de) in cc. Figures and tables should be included together with their captions in the text. Please carefully follow these author guidelines and indicate (on the title page) to which of the four article types your contribution belongs to.

Language

Manuscripts must be written in English language (either British or American throughout).

Manuscript structure

The manuscript should be organised in a single continuous document, with a title page, followed by the body of text and the figures and tables directly in the text. Always consult a recent issue of *Palaearctic Grasslands* for details on format, sequence of headings, citation style and arrangement of the manuscript (http://www.edgg.org/publications.htm).

Title page

Type: Indicate to which section and type of article (Research Article, Review, Forum Article, Scientific Report) your manuscript should be assigned.

Title: This should be strongly directed towards attracting the interest of potential readers. The shorter a title, the more citations an article usually attracts.

Author names: In the current format of the journal. Please spell first names out.

C. Nicole Flowers[1*], Annette Wiese[1,2] & Pablo F. Verde[2]

Author addresses: Affiliations, full addresses and e-mails for all authors, e.g.:

[1]Botany Department, Little Marsh University, 11 Main St., Little Marsh, Berkshire, United Kingdom; flowers@lmu.ac.uk;

[2]Community Ecology, Research Institute, Avenida verde 111, Porto Allegre, RS 915140-000, Brazil;
awiese@research.edu (A. Wiese),
mverde@research.edu (P.F. Verde)

*) Corresponding author

Body of text

Abstract: Up to 250 words, less for shorter articles; no references.

Keywords: There should be 6–12 singular keywords, including the most important title words, in alphabetical order and separated by semicolons, e.g.:

Agrostis; biodiversity; conservation; gradient analysis; grassland; transect

Nomenclature: Refer to one (or few) source(s) for unified nomenclature of plant species or vegetation units, unless there are few names and their authors are given in the text, e.g.:

Miller (2001) for vascular plants, except Myers et al. (2003) for *Asteraceae*

Abbreviations: List and explain any abbreviations that are frequently used in the text, e.g.:

DCA = Detrended Correspondence Analysis; ICPN = International Code of Phytosociological Nomenclature (Weber et al. 2000)

Main text: Up to three levels of unnumbered section headings are possible. Standard sequence of main sections in *Palaearctic Grasslands* is Introduction – Study area – Methods – Results – Discussion, but variation of this structure is acceptable when appropriate.

Author contributions: Required for any paper with more than one author, e.g.:

A.B. planned the research, C.T.F. and Z.K. conducted the field sampling, B.C. performed the statistical analyses and led the writing, while all authors critically revised the manuscript.

Acknowledgements: Keep them brief. References to research projects/funds and institutional publication numbers can go here as well as mentioning of individuals who helped but did not make a significant scientific contribution that would warrant authorship.

References: For details, see below.

Text

Headings, subheadings, and exceptionally third-level headings should be written in regular font (not in capital letters), and their hierarchy must be clearly indicated. Avoid footnotes.

Units of measurement must follow the International System of Units (SI), e.g. mg m^{-2} yr^{-1}. Use words rather than symbols where possible, especially in the Title, Abstract and Keywords, e.g. 'beta' rather than 'β'. One-letter mathematical symbols (*p*, R^2, *z*) are given in italics as are any non-English expressions in the English text (*ad hoc*, *a posteriori*).

Numbers with units of measurement must be in digits, e.g. 3.5 g. Numbers in the text of up to ten items (i.e. integers) should be in words, e.g. "ten quadrats", "five sampling times"; above ten in digits, e.g. "11 sampling times". Use '.' (dot) for a decimal separator. Thousands in large numbers (ten thousand and higher) should be indicated by a comma, e.g. 10,000, but 2000.

Scientific names of taxa of any rank are to be given in italics (*Carex curvula* subsp. *curvula, Asteraceae*) and without authorities (the nomenclatural reference(s) should be indicated in the section "Nomenclature" below the Abstract). Formal syntaxon names of the Braun-Blanquet approach are also to be given in italics (*Caricetum curvulae, Quercо-Fagetea*). Here the authorities and the year of publication should be presented at first mentioning (but not in the title or headings) or in a syntaxonomic overview unless one nomenclatural reference is used and followed throughout the manuscript.

Citations in the text

Use forms such as: Smith & Jones (2005) or (Smith & Jones 2005); for more than two authors: White et al. (2005); for combinations: (Smith et al. 2005a, 2005b; Jones 2006, 2010). Citations must be chronological by year, except where there is a list of years for the same author(s), e.g. (Zebedee 1950, 1970; Abraham 1960; Smith et al. 1965, 1974; Zebedee et al. 1969). Reference to articles and books should be limited to published work or work in press. Indicate all other material as "unpubl." or "pers. comm." (the latter with date and description of the type of knowledge, e.g. "local farmer"), or web-address (e.g. http://www.greenworld.info/global_redlist; accessed 20 November 2013).

References to computer programs: Computer programs used should be mentioned in the Methods section, e.g. "performed by DoStats (version 6.2, StatProgs Inc., Springfield, NY, US)" or "performed by Partition (version 3.0, www.users.muohio.edu/cristto/partition.htm)".

References section

The References section can contain only material that is published (including "early online"/"PrePub" publications with a DOI) or is a thesis. For books that have been published as numbered volumes within a series, this fact can be indicated in square brackets after the book title (but without series editors); for technical reports issued by institutions, this fact can be indicated in square brackets af-

ter the publishing institution. For details, see examples below.

The list is ordered alphabetically, with several works by the same author(s) (including all works of "Author et al.", irrespective whether the co-authors are the same) being arranged in chronological order. For references with up to eleven authors, all authors are listed. If there are twelve or more authors, only the first nine) and the last one are listed, while the others are replaced by "(...) &". Use the formats given below for the different reference types:

Weber, H.E., Moravec, J. & Theurillat, J.-P. 2000. International Code of Phytosociological Nomenclature. 3rd edition. *Journal of Vegetation Science* 11: 739–768.

López-Sáez, J.A., Alba-Sánchez, F., Sánchez-Mata, D., Abel-Schaad, D., Gavilán, R.G. & Pérez-Díaz, S. in press. A palynological approach to the study of *Quercus pyrenaica* forest communities in the Spanish Central System. *Phytocoenologia*. DOI: 10.1127/0340-269X/2014/0044-0572.

Blackburn, T.M., Essl, F., Evans, T., Hulme, P.E., Jeschke, J.M., Kühn, I., Kumschick, S., Marková, Z., Mrugała, A., (...) & Bacher, S. 2014. A unified classification of alien species based on the magnitude of their environmental impacts. *PLoS Biology* 12: e1001850.

Ellenberg, H. & Leuschner, C. 2010. *Vegetation Mitteleuropas mit den Alpen in ökologischer, dynamischer und historischer Sicht*. 6th ed. Ulmer, Stuttgart, DE.

Whittaker, R.H. 1969. Evolution of diversity in plant communities. In: Woodwell, G.M. & Smith, H.N. (eds.) *Stability and diversity in ecological systems*, pp. 178–196. Brookhaven National Laboratory, Brookhaven, NY, US.

Whittaker, R.H. 1973. Approaches to classifying vegetation. In: Whittaker, R.H. (ed.) *Ordination and classification of communities* [Handbook of vegetation science 5], pp. 323–354. Junk, The Hague, NL.

Rodwell, J.S., Schaminée, J.H.J., Mucina, L., Pignatti, S., Dring, J. & Moss, D. 2002. *The diversity of European vegetation – An overview of phytosociological alliances and their relationships to EUNIS habitats*. National Reference Centre for Agriculture, Nature and Fisheries [Report no. EC-LNV 2002(054)], Wageningen, NL.

Wallin, G. 1973. *Lövskogsvegetation i Sjuhäradsbygden* [*Deciduous woodlands in Sjuhäradsbygden*]. Ph.D. thesis, Uppsala University, Uppsala, SE.

Euro+Med 2015. *The Euro+Med PlantBase - the information resource for Euro-Mediterranean plant diversity*. URL: http://ww2.bgbm.org/EuroPlusMed/ [accessed 7 December 2015].

Oksanen, J., Blanchet, F.G., Kindt, R., Legendre, P., Minchin, P.R., O'Hara, R.B., Simpson, G.L., Solymos, P., Stevens, M.H.H. & Wagner, H. 2015. *vegan: Community Ecology Package. R package version 2.3-2*. URL: http://cran.r-project.org/package=vegan [accessed 7 December 2015].

References in other languages than English

1. References in languages that use the Latin alphabet are cited in the original language. For languages other than French, German or Spanish, titles of papers, book chapters or books should be followed by an English translation in square brackets. Titles of the journals or books in the citations of book chapters are not translated. Example:

Mucina, L. 1985. Používať či nepoužívať Ellenbergove indikačné hodnoty? [To use or not to use Ellenberg's indicator values?]. *Biológia* 40: 511–516.

2. References in Cyrillic and Greek alphabets are cited in the original language but transliterated to Latin alphabet (see principles of transliteration from the various languages using Cyrillic letters). Titles of papers, book chapters or books should be followed by an English translation in square brackets. Titles of the journals or books in the citations of book chapters are not translated. At the end of the citation, the original language is indicated in square brackets. Example:

Kholod, S.S. 2007. Klassifikatsiya rastitel´nosti ostrova Vrangelya [Classification of Wrangel Island vegetation]. *Rastitel'nost' Rossii* 11: 3–15. [In Russian]

3. References in languages that use other alphabets than Latin, Cyrillic and Greek: Titles of papers/chapters/books including book titles in the citations of chapters and also the titles of the journals are translated to English. At the end of the citation, the original language is indicated in square brackets. Example:

Chiu, C.-A., Lin, H.-C., Liao, M.-C., Tseng, Y.-H., Ou, C.-H., Lu, K.-C. & Tzeng, H.-Y. 2008. A physiognomic classification scheme of potential vegetation of Taiwan. *Quarterly Journal of Forest Research* 30: 89–112. [In Chinese]

Tables

Numerical results should be presented as either tables or figures, but not both. Table legends should be on the same page as the table to which they refer. The legend should contain sufficient information for the table to be understood without reference to the text of the paper. The first sentence of the legend should comprise a short title for the table. Units should appear in parentheses in the column headings, not in the body of the table. Vertical lines should be avoided. If some part of the table needs to be highlighted (e.g. groups of important species), use background shading (not framing or boldface). All cells with numeric values must be aligned at the decimal separator. For large tables with many empty cells, fill the empty cells with dots to facilitate reading. Tables should be planned in a way that they fit onto the size of the journal pages in readable size.

Figures

Figures in the submitted manuscript should be supplied at the size at which they are intended to be printed: either one-column or full-page width. Figure legends should be included within the manuscript text file on the same page as the figure to which they refer. The legend should contain sufficient information for the figure to be understood without reference to the text of the paper. The first sentence of the legend should comprise a short title for the figure. The definitions of symbols and lines should be given as a visual key on the figure itself, not as a word key (e.g. 'solid bars', 'open circle', 'dashed line') in the legend. Subgraphs within one figure should be headed with a lowercase letter and a brief heading. Wherever space allows, full labels instead of abbreviations should be used in the figures. Scale bars should be given on microphotographs and maps. Use a sans-serif font for figure labels, such as Arial or Helvetica. If possible, make use of the colour option of *Palaearctic Grasslands*. Colour photographs illustrating the study objects are particularly encouraged and can be arranged in full-page plates (please discuss options with the Chief Editor, if you are planning this).

Photo Story and Photo Competition - two new sections devoted to the beauty of Palaearctic grasslands

In this issue we want to launch two new sections devoted to the beauty of Palaearctic grasslands.

In addition to the photographs we usually ask for illustrative purposes, reflecting the diversity of grasslands and their flora and fauna through the seasons, we intend to devote several pages in each issue to the brand new sections "Photo Story" and "Photo Competition", which will need your contribution!

Photo Story is an open space where members can submit their own high-quality photo collection on a certain grassland-related topic of their choice. High-quality photos should be provided together with their captions (at least species names or landscape description), a brief text and possibly other graphical elements (like a map or a drawing). The selection of photos should fit for 1-4 pages and the proponents should already propose a preliminary layout (in PDF or MS Word format), which will be finally typeset by Editors. As an example, you may take a look at the Photo Story at pages 30-31.

Photo Competition is a call for grassland photographers, who can challenge each other on a predefined grassland theme. For the next issue, we are pleased to announce the first call for EDGG Photo Competition, which is dedicated to the theme "**Animal-plant interactions**" in order to celebrate grassland networks in their different meanings.

You are invited to send up to three high-quality photographs within the competition theme (full size JPEG or TIFF images, at least 300 dpi) together with captions giving information on the subject (species name, date, place name) and possibly technical details (camera, lens, aperture, exposure time). The selection will be made by the Photo Editors and two more members from the Editorial Board of the journal. The three best shots will be awarded with full space in the next issue, but we reserve the right to use further submitted photos for illustrative purposes in other parts of the issue.

If you want to contribute to Photo Story or Photo Competition, or if you simply want your photographs published in the journal, please submit your photos together with required information to Rocco (rocco.labadessa@gmail.com) or Jalil (noroozi.jalil@gmail.com).

Corrigenda

Bulletin 36, p. 36: the orchid labelled as *Ophrys apifera* is *Ophrys holosericea* subsp. *dinarica;*
Bulletin 36, p. 37: the butterflies in copula belong to the genus *Amata*, in the family *Erebidae* (subfamily *Arctiinae*, tribe *Syntominae*) rather than *Zygaenidae.*

Eremostachys azerbaijanica, southern slopes of Sabalan Mt. (Iran), May 2016. Photo: J. Noroozi.

Seeking volunteers for supporting us in EDGG homepage construction and maintenance

EDGG is constructing its homepage with a new layout and functionalities. The first phase was the construction of the EGC 2018 homepage which was launched at the beginning of March. Now it is time to finalize the EDGG homepage, make it attractive and functional and maintain it perfectly. For this purpose, we need two different types of supports: 1) a volunteer who can take long-term (2 years) responsibility and share the work of homepage management with Didem Ambarlı. Generally, the task includes the editing of some information once or twice a week but more work is needed before EDGG events like the EGC. Now we are at the first phases of construction and there is a bit more workload. Previous experience is desired but not necessary. Didem is happy to show what she has already done for the homepage. You do not have to worry about the most technical part of the work; there is also a code administrator who is dealing with the binaries, not us! 2) We also need a short-term help for the update of publications and preparation of a publications database. We would like to update our current publication list http://www.edgg.org/publ_members.htm and sort them to feed a database. Again you will get some technical support on how to do it.

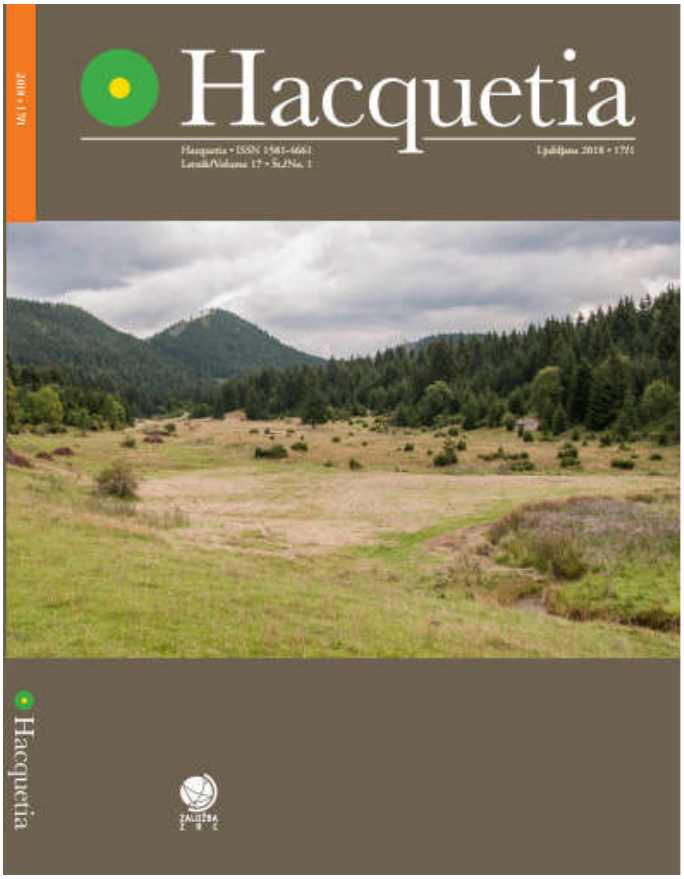
For you who voluntarily like to contribute to the renewal of the EDGG homepage, please get in contact with Didem Ambarlı (member of EDGG Executive Committee, responsible for EDGG homepage). And do not forget: Your work will be credited on the homepage!

Didem Ambarlı,
didem.ambarli@gmail.com

Aporia crataegi, Alta Murgia National Park (SE Italy), June 2016. Photo: R. Labadessa.

EDGG Special Features

The 4th EDGG-edited Special Issue in *Hacquetia* is published



The fourth Special Feature edited by EDGG (eds. O. Valkó, S. Venn, I. Biurrun, R. Labadessa, J. Loos & M. Zmihorski) in the journal *Hacquetia* is available online (https://www.degruyter.com/view/j/hacq.2018.17.issue-1/issue-files/hacq.2018.17.issue-1.xml) and in paper. The special feature was initiated by members of the EDGG attending the 13th Eurasian Dry Grassland Conference (EDGC) at Sighisoara, Romania in September 2016. It contains six papers dealing with the conservation (Balázsi 2018; Savchenko & Ronkin 2018), ecology (Cherednichenko & Borodulina 2018; Gracheva et al. 2018), syntaxonomy (Didukh et al. 2018) and zoology (Bragina & Khisametdinova 2018) of grassland and steppe habitats from East Europe to central Asia. The core topic of the issue is the challenge of abandonment in the conservation of Palaearctic grasslands, which is highlighted in a thematic editorial paper (Valkó et al. 2018). The Special Feature also includes a report of the EDGG activities in 2016 and 2017 (Venn et al. 2018).

Articles included

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Bragina, T.M. & Khisametdinova, D.D. 2018. The woodlouse (*Isopoda: Oniscidea*) fauna of steppe habitats in the Kostanay region of Kazakhstan. *Hacquetia* 17: 111–119. https://www.degruyter.com/view/j/hacq.2018.17.issue-1/hacq-2017-0016/hacq-2017-0016.xml?format=INT

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Call for contributions to the new EDGG-edited Special Issue in *Hacquetia*

5th EDGG Special Issue in Hacquetia 2019: Fauna, flora, vegetation and conservation of Palaearctic natural and semi-natural grasslands

This is the first call for the submission of manuscripts for the EDGG-edited Special Feature in *Hacquetia* 2019. We welcome manuscripts about natural and semi-natural grasslands, on all taxa and from any region in the Palaearctic realm (Europe; West, Central and North Asia; North Africa).

Hacquetia (http://www.degruyter.com/view/j/hacq) 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).

This Special Issue will be the 5th EDGG-edited Special Issue in *Hacquetia*, following the four successful issues in 2014/1, 2015/1, 2016/2 and 2018/1. This Special Issue will appear as the second issue of 2019, to be published approximately in July 2019, with about 150–250 pages reserved for our articles. It will also contain a report on the EDGG activities of the previous year.

Procedure and deadlines:

The **deadline for full-text submission is 30 July 2018** and manuscripts will undergo the normal peer-review process.

If you are interested in contributing a manuscript for this comprehensive Special Issue, then please contact the chair of the editorial team (see below) and submit your manuscript to her. Author guidelines can be found at the journal homepage: http://www.degruyter.com/view/j/hacq.

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Scorzonera purpurea, Zamosc region (SE Poland). Photo: P. Chmielewski.

Call for contributions to the 13th EDGG-edited Special Feature in *Tuexenia*

Problems, restoration, monitoring and conservation of semi-natural and natural grasslands in Central Europe

As usual, contributions on flora and vegetation of Central European grasslands as well as their conservation and restoration are welcome. Central Europe is defined following Wikipedia (https://en.wikipedia.org/wiki/Central_Europe) as consisting of Germany, Switzerland, Liechtenstein, Austria, Slovenia, Hungary, Slovakia, Czech Republic and Poland. Contributions of adjacent areas are also welcome if they make a clear connection to Central Europe, at least in the discussion part. Tuexenia is a geobotanical journal, thus the focus is on flora and vegetation. However, complex studies involving both vegetation and animals are also highly welcome.

The Special Feature is open to all EDGG members and particularly welcomes contributions that were presented on the Eurasian Grassland Conference and the EDGG Field Workshop of 2018. If you want to contribute, you are requested to send an abstract to the chair of editors, Balázs Deák (see below), not later than 15 September 2018. Based on these abstracts, we will decide which papers to invite. Deadline for submission is then 31 October 2018. If you have published in previous EDGG Special Features in *Tuexenia*, you could also directly submit the full paper without previous abstract evaluation, but you risk that then all "slots" are already filled. First-time authors in the Tuexenia Special Feature need to send an abstract first in any case. The expected publication time is July 2019.

Benefits of submitting to our Special Feature in Tuexenia include:

- Indexed in the Web of Science and Scopus
- Full colour and open access
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- Competent and sympathetic guest editor team.

Balázs Deák

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Orchis purpurea, Borowa Gora Natura 2000 site (SE Poland). Photo: P. Chmielewski.

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Research article

Syntaxonomy and scale-dependent species diversity of plant communities on chalk outcrops in the Kharkiv region (Ukraine)

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Abstract: We studied extremely basiphilous plant communities representing all stages of succession on chalk outcrops (from almost pure chalk with open vegetation to well-developed steppe phytocoenoses) in the Kharkiv region in the valleys of the Oskol and Vovchha rivers. We recorded all vascular plants and bryophytes in eight biodiversity-plots with seven grain sizes (0.0001-100 m^2). The vegetation of the studied plots was divided into two groups which were interpreted syntaxonomically as two different classes (*Helianthemo-Thymetea* and *Festuco-Brometea*) based on species composition. Comparison of the structure of these two groups of communities, their ecological characteristics, soil analysis and the results of the phytoindicative assessment proved the validity of assigning them to different vegetation classes. Species richness at various spatial scales for extreme basiphilous communities of the chalk outcrops showed that both total species richness and the richness of vascular plants for communities of the *Helianthemo-Thymetea* class was less than half that of the *Festuco-Brometea* communities. This can be explained by extreme environmental conditions due to the structure and chemistry of the soil, as well as harsh microclimatic conditions. Within the communities of more advanced stages of succession towards steppe the species richness of all the analyzed taxonomic groups within all spatial scales was higher. Our results indicate that the studied communities have high conservation value (rare and endangered species can reach one-third of their composition) and we propose special conservation measures for them.

Keywords: biodiversity; taxonomic-functional group; bryophyte; chalk outcrop; conservation; *Festuco-Brometea*; *Helianthemo-Thymetea*; Kharkiv region; species richness; syntaxonomy; vegetation.

Nomenclature: Euro+Med PlantBase (Euro+Med 2018) for vascular plants, Ignatov & Afonina (1992) for bryophytes, Mucina et al. (2016) for syntaxa, except Romashchenko et al. (1996) for *Helianthemo-Thymetea*.

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Co-ordinating Editor: Iwona Dembicz

Linguistic Editor: Laura M.E. Sutcliffe

Introduction

Cretaceous outcrops are unique geomorphological formations that occur mainly within the Central Russian Upland in the Don River basin. These outcrops are habitats of very peculiar basiphilous vegetation with dominance of small shrubs, mainly belonging to the *Lamiaceae* family. They are obligate carbonatophiles, which have adapted to survive in extreme conditions of chalk slopes on underdeveloped soils with a high content of carbonates.

In Eastern Ukraine, in the basin of the Siverskyi Donets River, the chalk rocks come to the surface. They are related with unique plant communities, which are of great interest of researchers, as well as heated discussions on their origin and syntaxonomic affiliation.

The first major studies of the vegetation of chalk outcrops in the Siversky Donets river basin were carried out at the end of the 19th and early 20th centuries (Krasnov 1893; Taliev 1897, 1905). One of the works of V. Taliev (1905), in which the author substantiated and defended the hypothesis of a synanthropic origin of the flora of chalk substrates, had a great role in attracting attention to the vegetation of the chalk outcrops. This hypothesis was at one time highly controversial among researchers. The most significant works of the early 20th century include the papers of Kotov (1927a, b) and Gryn' (1938), which provide detailed information on the flora of chalk outcrops with

the distribution of species by microhabitats, depending on the characteristics of the soil and other factors. Moreover, Gryn' (1938) provides syntaxa according to the dominant classification which was generally accepted at that time in the USSR, and characterizes the composition of plant communities and their succession status. In the second half of the 20th century, ecological and geographical analysis of chalk flora was made (Morozyuk 1971), edificators and dominants (Alekseeenko 1968), rare and endemic species (Ermolenko et al. 1981) were studied, as well as some revised data for the most widespread syntaxa (associations) according to the dominant classification (Ermolenko et al. 1981) were published. At the beginning of the 21st century, the focus of research was on rare and endemic species (Gorelova & Gorelova 2003).

Vegetation formed on chalk outcrops are attributed to tomillares, that is, plant communities with domination of xerophytic and mesoxerophytic, mesothermal evergreen small shrubs and semi-shrubs with forced winter dormancy, common on non-saline soils or rocky outcrops (Didukh 1981). They were originally considered to belong to the *Festuco-Brometea* class (Didukh 1989), but considering their floristic and eco-biomorphological peculiarities, they were later included in the new class *Helianthemo-Thymetea* (Romashchenko et al. 1996). Such communities are assigned to this class in Ukrainian and Russian sources (Solomakha 2008; Ermakov 2012). However, in European syntaxonomic surveys, this class is usually considered as the order *Thymo cretacei-Hyssopetalia cretacei* within the *Festuco-Brometea* class (Rodwell et al. 2002; Mucina et al. 2016). Problems of syntaxonomy of vegetation of chalk outcrops are discussed in detail in a recent paper of Didukh et al. (2018).

The vegetation of chalk outcrops is characterized by a very high level of endemism. Almost all researchers (except Taliev 1905) relate this phenomenon to their relic nature and the intensity of the processes of speciation, but differ in opinion on the time of the first development of chalk vegetation (Litvinov 1902; Kozo-Polyanskiy 1931; Oksiyuk 1940). That is why so many species listed in the Red Data Book of Ukraine are concentrated here (Didukh 2009), as well as various international red lists – IUCN Red List and European Red List (http://www.iucnredlist.org/initiatives/europe, accessed 30 April 2018), Resolution No. 6 of the Berne Convention (http://eunis.eea.europa.eu/references/2443/species, accessed 30 April 2018). This habitat type is so far the only type proposed by Ukraine that was included in Resolution 4 of the Berne Convention, as E1.13 Continental dry rocky steppic grasslands and dwarf scrub on chalk outcrops (Schaminée et al. 2016). This determines the high conservation value of this habitat type and the need to develop effective measures for it conservation.

Given the above, we set the following objectives: 1) establishment of the syntaxonomic affiliation of the plant communities of different successional stages on the chalk outcrops in Eastern Ukraine; 2) comparison of the peculiarities and habitat properties between the surveyed units of these phytocoenoses; 3) comparison of the species richness of vascular and non-vascular plants in different plot sizes and between distinguished syntaxonomic units; 4) assessment of the conservational value of the studied plant communities.

Study area

The study was conducted in Kharkiv region in the valleys of the Oskol and Vovcha rivers - tributaries of the Siversky Donets River (Fig. 1).

Geomorphology and geology. The study area belongs to the Burluk-Oskilsky geomorphological district, which is part of the Kharkiv Donets'k-Don Watershed Plateau (southern spurs of the Middle Russian Upland). On the right steep slopes of the river valleys of the Burluk-Oskilsky geomorphological district, the ravine-gully network is well developed. Its density reaches 0.75-1 km per km^2, the depth of erosion is up to 100-200 m. The peculiarity of the right steep banks of the Oskil and Vovcha rivers is the appearance of chalk at the surface. These are the rocks of the Cretaceous period, which lie close to the surface, reaching up to 350 m deep (Vilenkin & Demchenko 1971).

Soils. Chernozems of varying degrees of leaching are prevailing. The degree of development of the soil layer on the surface of the chalk outcrops varies significantly, which depends on the relief peculiarities. On the chalk outcrops all stages of the soil layer development are observed. The study area contains the following microbiotopes: steep slopes of chalk rock, newly formed chalk screes, the bottom of chalk slopes with alluvial soils from chopped chalky particles, bottom of gullies with alluvial chernozem soils, slopes with chernozem soils of varying degree of leaching (Boboshko 1971).

Climate. In the study area, the mean annual rainfall during 2012-2016 was about 630 mm (from 540 to 750 mm) with a peak in June, and the mean annual temperature was 9.1° C (Anon. 2016). The hottest months are July and August, and the coldest are January and February. The maximum temperature during 2012-2016 was 38.2°C (July 2016), the minimum temperature −30.3°C (February 2012).

Methods

In selecting study plots, we tried to take into account all stages of succession on chalk outcrops from almost pure chalk with open communities to completely formed steppe phytocoenoses (Fig. 2a, b). For the data collection we used the standardised EDGG sampling methodology with seven standard plot sizes: 0.0001 m² - 0.001 m² - 0.01 m² - 0.1 m² - 1 m² - 10 m² - 100 m² (Dengler et al. 2016b). All living terricolous (i.e. soil dwelling) vascular plants, bryophytes, lichens and macro-algae were recorded. For all plot sizes from 0.0001 m² to 100 m² we used presence/absence recording with the shoot presence system. For the 10 m²

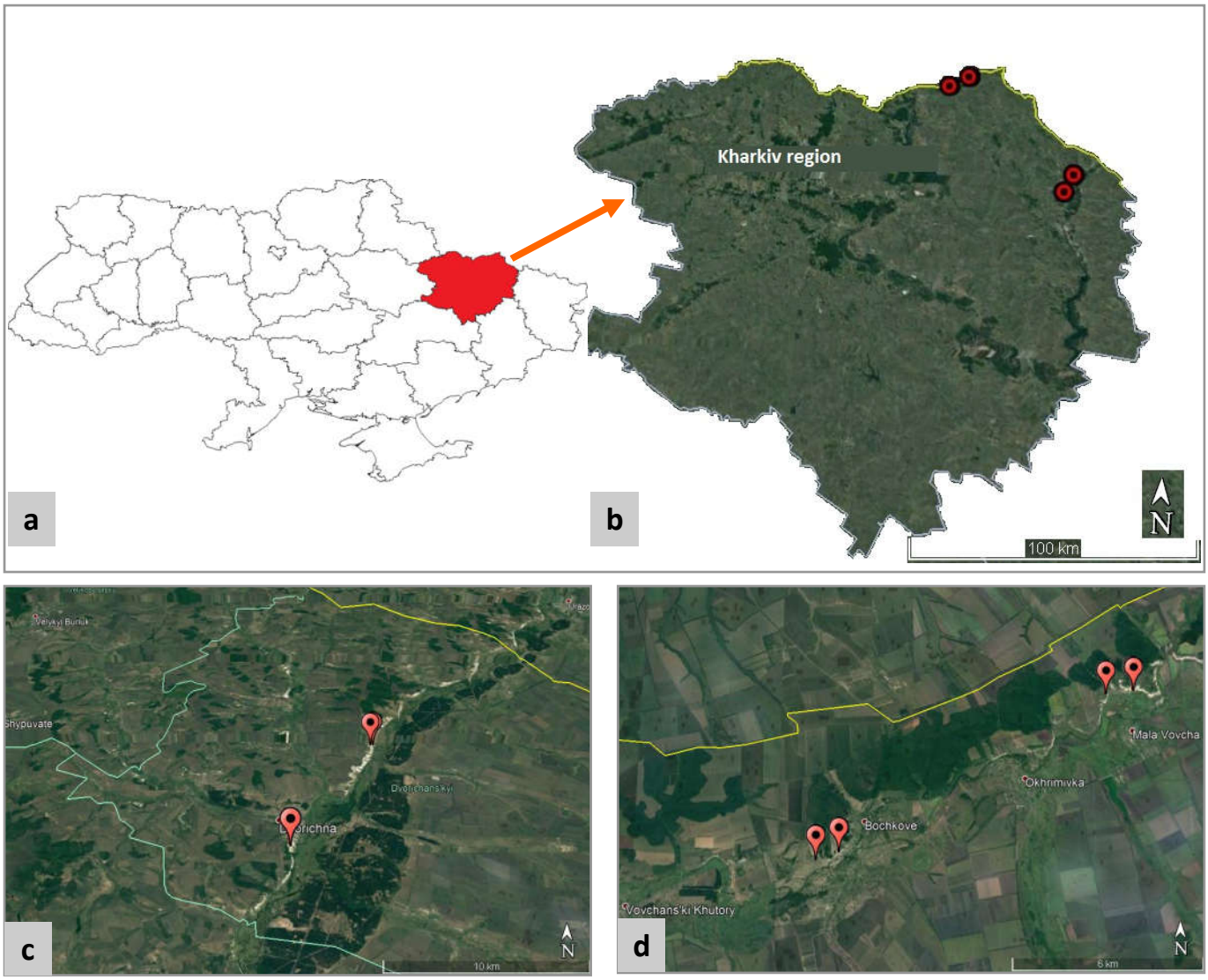

Fig. 1. ***Location of the study plots: a – Kharkiv region on the map of Ukraine; b – location of the study plots on the map of Kharkiv region; c – location of the study plots in the Oskol River valley; d – location of the study plots in the Vovcha River valley***.

plots we additionally recorded percentage cover estimations. For each nested plot we estimated the following structural and environmental parameters: total vegetation cover, cover herb layer, cover cryptogam layer, cover litter, cover dead wood, cover stones and rocks, cover gravel, cover fine soil, maximum height shrub layer, maximum height herb layer, mean height of herb layer, elevation, aspect, inclination, heat load index, maximum microrelief. Geographic coordinates and altitude were determined by GPS device (Garmin Dakota 20), aspect by compass, inclination by the smartphone app "Inclinometer". The latter two parameters were used to calculate the heat load index according to Olsson et al. (2009). Microrelief was measured as maximum vertical deviation from an imaginary plane through the plot. For the soil analysis we used a mixed soil sample of the uppermost 10 cm of the mineral soil taken from five random locations within the 10 m² plot and air dried. The following parameters were determined in the soil samples: humus content by the method of Tyurin in the modification of Simakov (Simakov 1957), organic carbon content (Tykhonenko 2009), nitrogen content (Tykhonenko 2009), pH by potentiometric method (Lyko et al. 2015) and hydrolytic acidity following Kappen (1929).

We sampled eight biodiversity plots (BP1-8) with 16 nested -plot series in total. For syntaxonomic interpretation of the communities we used only 10 m^2 plots with cover data and imported them into the Juice program (Tichý 2002), where they were analyzed using the integrated PC-Ord program (McCune & Mefford 2006); as distance measure we used Sørensen (Bray-Curtis) index, and Group Linkage Method was Flexible beta -0.25. The phytoindicative assessment was made in the Juice program using Didukh ecological scales (Didukh 2011).

Results

Syntaxonomy. According to the results of the cluster analysis, the studied plots were divided into two groups. By

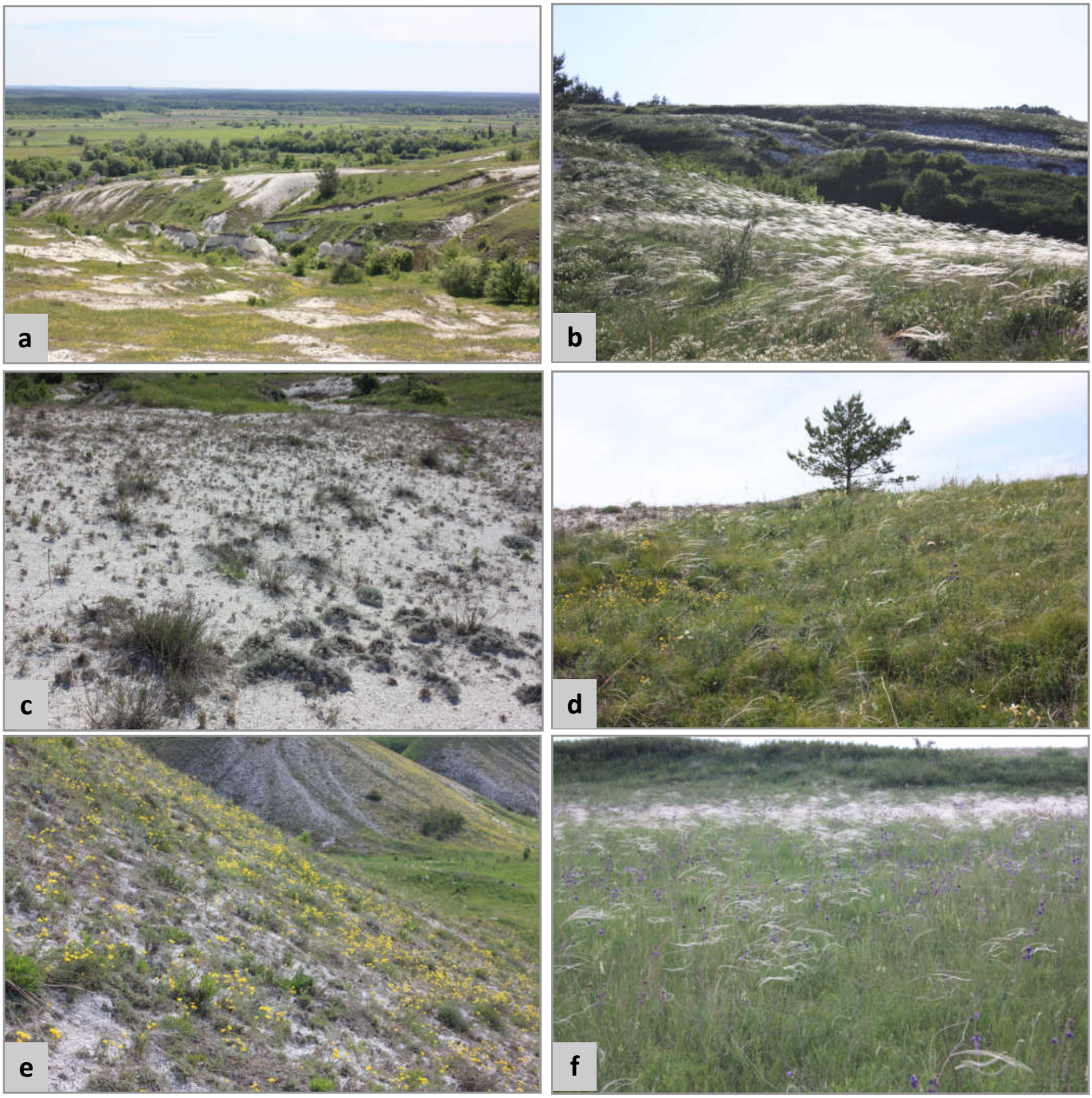

Fig. 2. ***Studied areas: a - Chalk outcrops landscape in "Korobochkine" nature reserve near Dvorichna town, Kharkiv region; b - Steppe landscape in National Nature Park "Dvorichansky", Oskol river valley; c - chalk outcrops plot in Oskol River valley (2 NW); d - steppe plot in Oskol River valley (3NW); e - chalk outcrops plot in Vovcha River valley (6NW), f - steppe plot in Vovcha River valley (8NW). Photos: A. Kuzemko.***

the complex of diagnostic species, the first group was interpreted as the *Helianthemo-Thymetea* class (hereafter HT Group), and the second group was assigned to the *Festuco-Brometea* class (hereafter FB Group) (Fig. 3, Table 1).

Diagnostic species of the HT Group are mainly obligatory carbonatophiles, most of which belong to small shrubs or semi-shrubs by the life form, are endemic and included in the Red Data Book of Ukraine (Didukh 2009) and international red lists (Figs. 3, 4). Diagnostic species of the FB Group are typical steppe species.

Classification scheme of the studied communities:

Helianthemo-Thymetea Romashchenko et al. 1996
Thymo cretacei-Hyssopetalia cretacei Didukh 1989
Artemisio hololeucae-Hyssopion cretacei Romashchenko et al. 1996
Artemisio hololeucae-Polygaletum cretaceae Didukh 1989 (BP1, BP2, BP4, BP5, BP6)
Festuco-Brometea Br.-Bl. et Tx. ex Soó 1947
Festucetalia valesiacae Soó 1947
Festucion valesiacae Klika 1931
Carici humilis-Stipetum pennatae Tkachenko et al. 1987 (BP3, BP7, BP8)

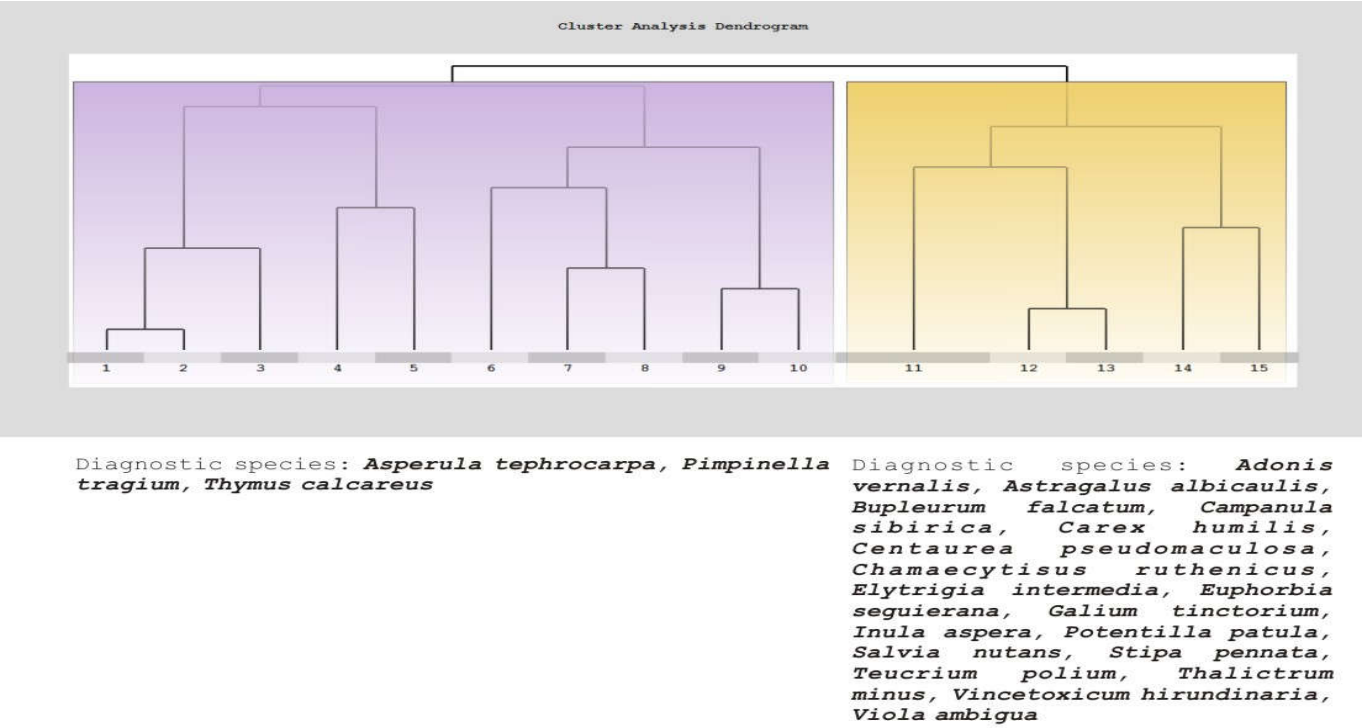

Fig. 3. ***Dendrogram of the cluster analysis results for 10 m^2 plots with highly diagnostic species. HT Group indicated by violet, FB Group indicated by orange.***

Androsace villosa subsp. *koso-poljanskii*

Artemisia hololeuca

Scrophularia cretacea

Odontarrhena tortuosa subsp. *cretacea*

Fig. 4. ***Typical species of chalk outcrops. Photos: A. Kuzemko.***

Table 1: Vegetation table of the 16 10-m² plots in the NW and SE corners of the 100-m² biodiversity plots. Cover of the species is given in percent. Species are grouped into the following functional-taxonomic groups: VW = vascular plant, tree; VS = vascular plant, shrub, VSS = vascular plant, small shrub or semi-shrub, VHG = vascular plant, graminoid, VHL = vascular plant, legume, VHF = vascular plant, other forb, B = bryophyte, L = lichen, A = algae. Character and differential species of the classes, orders and alliances follow Romaschenko et al. (1996) for *Helianthemo-Thymetea* and Willner et al. (2017) for *Festuco-Brometea.* Species listed in the Red Data Book of Ukraine indicated by red.

	Group	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	FB	FB	FB	FB	FB	FB
	Plot ID	**BP1**	**BP1**	**BP2**	**BP2**	**BP4**	**BP4**	**BP5**	**BP5**	**BP6**	**BP6**	**BP3**	**BP3**	**BP7**	**BP7**	**BP8**	**BP8**
	Subplot	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**
	Total vegetation cover [%]	9	7	16	9	30	65	13	37	40	60	85	90	45	60	50	60
	Cover herb layer [%]	9	7	15.5	9	28	52	13	37	40	60	83	90	44	60	50	60
	Cover moss layer [%]	0	0	0.5	0.1	2	13	0	0	0	0	0.2	0.5	1	0	20	0
	Area [m²]	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**
	Class *Helianthemo-Thymetea*																
VHF	*Androsace villosa* subsp. *koso-poljanskii*	0.001	0.1	0.5	0.5	5	2	.	.	2	10	0.1	.	2	2	0.1	.
VS	*Genista tinctoria (tanaitica)*	1	0.5	.	.	.	.	.	.	0.5	2	0.01	0.1	.	0.1	0.5	.
VHF	*Brassica elongata* subsp. *pinnatifida*	.	.	0.001	.	0.05	0.05	.	.	.	.	0.1	0.1	0.05	0.05	0.1	.
VHF	*Odontarrhena tortuosa* subsp. *cretacea*	.	.	.	.	2	3	.	.	.	.	.	.	.	.	.	.
VSS	*Helianthemum cretaceum*	.	.	.	.	.	.	.	.	.	.	0.5	0.1	.	.	.	.
	Order *Thymo cretacei-Hyssopetalia cretacei*																
VHF	*Asperula tephrocarpa*	0.1	0.5	0.1	1	0.5	0.5	0.2	0.1	1	1	.	.	1	.	.	.
VHF	*Pimpinella tragium* subsp. *titanophila*	0.1	1	0.1	2	3	3	10	1	0.5	1	0.01	.	0.5	.	.	.
VSS	*Thymus calcareus*	3	0.01	3	.	10	40	0.5	30	10	10	2	.	0.1	.	.	.
VHF	*Gypsophyla oligosperma*	.	.	0.1	0.5	5	3	.	0.1	5	1	0.5	0.5	0.5	1	5	3
VHF	*Linum ucranicum*	0.001		0.05		0.5	0.1	0.001	.	5	2	0.5	1	1	3	.	.
VHF	*Hyssopus officinalis* subsp. *montanus*	0.1	1	.	0.5	.	.	0.5	0.4	.	.	.	.	.	.	.	.
VSS	*Scrophularia cretacea*	0.1	0.5	.	3	.	.	.	.	.	.	.	.	.	.	.	.
VHF	*Bupleurum falcatum*	.	.	0.05	.	.	.	.	.	.	0.1	0.1	0.01	0.1	0.5	.	0.05
VHF	*Onosma simplicissima*	.	.	.	.	.	.	.	.	2	10	8	1	2	.	.	.
VSS	*Teucrium polium*	.	.	.	.	0.5	0.5	.	.	.	.	1	1	2	15	1	1
	Alliance *Artemisio hololeucae-Hyssopion cretacei*																
VHF	*Matthiola fragrans*	.	.	0.5	0.01	0.5	.	0.1	.	0.5	.	.	.	.	1	.	.
VHF	*Silene supina*	.	.	1	.	.	.	1	5	20	30	.	.	.	.	.	.
VSS	*Artemisia hololeuca*	4	3	10	1	.	.	.	.	.	.	.	.	.	.	.	.
VHF	*Polygala nicaeensis* subsp. *mediterranea*	0.1	.	0.1	.	.	.	.	.	0.001	0.05	0.5	0.1	0.5	2	.	.
	Class Festuco-Brometea																
VHF	*Cephalaria uralensis*	0.1	0.5	0.05	0.1	0.05	.	.	.	.	0.5	1	0.5	0.1	0.5	0.1	0.1
VSS	*Astragalus albicaulis*	.	.	.	.	.	.	.	.	.	.	0.5	1	1	0.5	1	.
VHG	*Bromopsis riparia*	.	.	.	.	0.05	1	.	.	.	0.5	1	0.5	1	0.5	.	1
VHG	*Carex humilis*	.	.	0.1	.	.	.	.	.	.	.	25	20	25	2	.	1
VHG	*Stipa pennata*	.	.	.	.	.	.	.	.	.	.	1	0.5	.	1	10	25
VHF	*Adonis vernalis*	.	.	.	.	.	.	.	.	.	.	.	.	0.5	1	0.5	3
VHF	*Jurinea arachnoidea*	.	.	.	.	.	.	.	.	0.01	0.5	0.5	0.5	0.1	0.5	0.5	0.5
VHF	*Campanula sibirica*	.	.	.	.	.	.	.	.	.	.	0.01	.	0.5	0.05	.	.
VHF	*Centaurea* cf. *pseudomaculosa*	.	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.5	0.05
VHF	*Inula aspera*	.	.	.	.	.	.	.	.	.	.	3	5	.	.	20	.
VHF	*Aster amellus*	.	.	.	.	.	.	.	.	.	.	0.001	0.1	.	.	.	.
VHF	*Psephellus marschallianus*	.	.	0.001	.	.	.	.	.	.	.	2	0.1	.	.	.	.
VHF	*Rhaponticoides ruthenica*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	0.5
VHG	*Festuca* cf. *pseudodalmatica*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2
VHF	*Galium octonarium*	.	.	.	.	.	0.05	.	.	.	.	0.5	0.1	.	.	.	.
VHL	*Hedysarum grandiflorum*	.	.	.	.	.	.	.	.	.	.	2	2	.	.	.	.
VHF	*Hypericum elegans*	.	.	.	.	.	.	.	.	.	.	.	.	0.05	0.1	.	.
VHF	*Linum hirsutum*	.	.	.	.	.	0.1	.	.	.	.	0.001	0.01	.	.	.	.
VHL	*Medicago falcata*	.	.	.	.	.	0.1	.	.	.	.	.	.	.	.	0.5	0.5
VHL	*Onobrychis arenaria*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	0.5
VHG	*Stipa lessingiana*	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.
VHF	*Adonis wolgensis*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.1
VHF	*Plantago media*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.05
VHG	*Poa angustifolia*	.	.	.	.	.	.	.	0.1	.	.	.	.	.	.	.	1
VHF	*Verbascum lychnitis*	.	.	.	.	.	0.05	.	.	.	.	.	.	.	.	.	.

Table 1: ***continuation***

	Plot ID	BP1	BP1	BP2	BP2	BP4	BP4	BP5	BP5	BP6	BP6	BP3	BP3	BP7	BP7	BP8	BP8
	Subplot	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**	**NW**	**SE**
	Order *Festucetalia valesiacae*																
VHF	*Salvia nutans*	.	.	0.001	.	1	.	.	.	.	.	5	3	5	25	1	10
VHF	*Viola ambigua*	.	.	.	.	.	.	.	.	.	.	1	0.5	0.1	0.1	0.5	0.1
VHG	*Koeleria macrantha*	.	.	.	.	0.001	1	.	.	.	1	.	.	1	0.1	1	1
VHL	*Astragalus austriacus*	.	.	.	.	0.1	0.1	.	.	.	.	.	.	0.05	0.1	0.5	0.5
VHG	*Festuca* cf. *valesiaca*	.	.	.	.	0.1	2	.	.	.	.	3	1	.	.	.	.
VHG	*Stipa capillata*	.	.	.	.	.	.	.	.	.	.	.	0.5	3	.	.	.
VHF	*Nonea pulla*	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.05	.	.
VHF	*Euphorbia nicaeensis* subsp. *stepposa*	.	.	.	.	.	.	.	.	.	.	.	0.1	.	.	.	.
VHL	*Astragalus onobrychis*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.1	.
	Other species																
VHF	*Thesium arvense*	.	0.01	0.1	.	0.1	0.05	.	.	.	0.01	0.1	0.01	0.05	0.05	0.01	.
VHF	*Euphorbia seguierana*	.	.	.	.	0.1	0.01	.	.	.	.	0.1	.	0.1	0.01	0.1	0.05
VHF	*Polygala sibirica*	.	.	0.01	.	0.5	0.01	.	.	.	.	.	.	0.1	0.5	0.5	.
VHF	*Potentilla patula*	.	.	.	.	.	.	.	.	.	.	0.01	0.1	0.05	0.1	0.5	0.1
VHF	*Stachys recta*	.	.	.	.	0.05	0.05	.	.	.	.	.	.	1	1	0.5	1
VHF	*Thalictrum minus*	.	.	.	.	.	0.5	.	.	.	.	1	.	.	0.1	0.5	2
VHL	*Securigera varia*	.	.	.	.	0.01	.	.	1	.	.	.	.	.	.	1	0.5
VHG	*Schedonorus arundinaceus*	.	.	.	.	.	.	.	0.01	.	1	.	.	0.5	0.5	.	.
VW	*Acer negundo* (juv.)	.	0.001	.	.	.	.	0.001	0.001	.	.	.	.	.	.	.	.
VS	*Cytisus ruthenicus*	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	5
VHG	*Elytrigia intermedia*	.	.	.	.	.	.	.	.	.	.	0.5	.	1	1	.	.
VHF	*Asperula tinctoria*	.	.	.	.	.	.	.	.	.	.	0.001	.	.	0.4	0.1	.
VHG	*Poa compressa*	.	.	0.05	.	.	.	.	0.01	.	.	.	.	.	0.1	.	.
VHF	*Reseda lutea*	.	.	.	.	.	0.5	.	.	0.5	.	.	.	.	0.5	.	.
VHF	*Vincetoxicum hirundinaria*	.	.	.	.	.	.	.	.	.	.	2	0.01	.	.	.	0.1
VHG	*Calamagrostis epigejos*	.	.	.	.	.	.	.	.	.	.	0.5	0.5	.	.	.	.
VHF	*Centaurea jacea*	.	.	.	.	.	.	.	.	.	.	.	.	.	0.1	0.5	.
VHF	*Convolvulus arvensis*	.	.	.	.	.	.	.	0.5	.	.	.	.	.	0.01	.	.
VHF	*Cuscuta* sp.	.	.	.	.	.	.	.	0.01	.	.	.	.	0.001	.	.	.
VHF	*Helichrysum arenarium*	.	.	.	.	.	.	.	.	.	.	1	0.01	.	.	.	.
VW	*Pinus nigra* subsp. *pallasiana* (juv.)	.	.	.	.	.	.	0.1	.	.	.	.	.	.	.	.	.
VHF	*Achillea millefolium* agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.001
VHF	*Ajuga chamaepitys* subsp. *chia*	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	.	.
VHF	*Cychorium intybus*	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.
VHF	*Euphorbia esula* subsp. *tommasiniana*	.	.	.	.	.	.	.	.	.	.	0.001	.	.	.	.	.
VHF	*Pilosella caespitosa* agg.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.1	.
VHF	*Hieracium* sp.	.	.	.	.	.	.	0.001	.	.	.	.	.	.	.	.	.
VHL	*Medicago sativa* nothosubsp. *varia*	.	.	.	.	0.01	.	.	.	.	.	.	.	.	.	.	.
VHL	*Melilotus* sp.	.	.	.	.	.	.	.	.	.	0.001	.	.	.	.	.	.
VHL	*Odontites vulgaris*	.	0.001	.	.	.	.	.	.	.	.	.	.	.	.	.	.
VHF	*Polygala vulgaris*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	.
VHF	*Senecio leucanthemifolius* subsp. *vernalis*	.	.	.	.	.	0.001	.	.	.	.	.	.	.	.	.	.
	Cryptogams											.	.	.	.	.	.
B	*Syntrichia ruralis*	.	.	0.001		2	10	.	.	.	.	.	.	.	.	10	.
B	*Bryum caespiticium*	.	.	0.001	.	.	0.5	.	.	.	.	.	.	.	.	.	.
B	*Trichostomum crispulum*	.	.	.	.	.	.	.	.	.	.	.	0.5	.	0.05	.	.
B	*Barbula unguiculata*	.	.	.	.	.	3	.	.	.	.	.	.	1	.	.	.
B	*Didymodon fallax*	.	.	0.001	.	.	.	.	.	.	.	.	.	.	.	.	.
B	*Weissia levieri*	.	.	0.001	.	.	.	.	.	.	.	.	.	.	.	.	.
B	*Weissia longifolia*	.	.	.	.	.	.	.	.	.	.	0.2	.	.	.	.	.
B	*Hypnum vaucheri*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10	.
B	*Weissia* sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
L	*Cladonia* sp.	.	.	0.001	.	.	.	.	.	.	.	.	.	.	.	.	.
A	*Stratonostoc commune*	.	.	0.5	0.1	0.1	0.05	.	.	.	.	0.1	0.1	0.5	.	.	.

Table 2: Vegetation structure and environmental conditions and comparison of the two studied classes. HT Group indicated by violet, FB Group indicated by orange; statistically significant *p*-values of the *t*-test are indicated in red.

Parameters	HT N=10 (5 BP)			FB N=6 (3 BP)			*p*-values from *t*-test (p<0.05)
	Min	Max	Mean±SD	Min	Max	Mean±SD	
Total vegetation cover [%]	7	65	28.4±21.5	45	90	65±18.4	0.004
Cover herb layer [%]	7	60	27.1±19.3	44	90	64.5±18.2	0.002
Cover cryptogam layer [%]	0	13	1.6±4.1	0	20	3.9±7.9	0.440
Cover litter [%]	0	30	4.3±9.5	2	20	11.2±6.0	0.140
Cover dead wood [%]	0	1	0.4±0.4	0	0.5	0.1±0.2	0.124
Cover stones and rocks [%]	0	5	0.5±1.6	0	0	0.0±0.0	0.458
Cover gravel [%]	15	85	69±22.3	0	75	20.3±30.9	0.003
Cover fine soil [%]	15	75	30±19.7	25	100	79.7±30.9	0.001
Maximum height shrub layer [cm]	0	140	14±44.3	0	0	0.0±0.0	0.458
Maximum height herb layer [cm]	12.5	103	48.7±31.1	67	101	79.3±12.6	0.039
Height herb layer mean [cm]	7.4	13.6	10.9±2.4	8.2	25.4	18.0±6.3	0.006
Elevation [m a.s.l.]	133	150	142±6.1	120	161	141.8±17.6	0.978
Aspect [°]	150	320	197±48.5	80	230	141.7±70.3	0.082
Inclination [°]	2	20	11±6.2	8	14	11.5±2.5	0.855
Heat index	0.00	0.30	0.13±0.10	-0.14	0.25	0.01±0.18	0.106
Microrelief (maximum) [cm]	5	18	8.6±4.0	1	23	7.7±8.2	0.762
Humus content [%]	0.21	2.19	1.15±0.83	1.93	3.21	2.52±0.57	0.003
C org [%]	0.12	1.27	0.67±0.48	1.12	1.86	1.46±0.33	0.003
N total [%]	0.01	0.11	0.06±0.04	0.10	0.16	0.13±0.03	0.003
pH	7.3	8.7	8.04±0.49	7.10	7.80	7.38±0.33	0.012
Hydrolytic acidity [mg • eq / 100 g]	0.26	0.70	0.51±0.18	0.53	1.05	0.76±0.22	0.027
IV Soil Humidity	7.22	8.86	7.86±0.49	7.98	8.52	8.25±0.18	0.085
IV Acidity	9.32	10.39	9.70±0.34	9.11	9.45	9.25±0.15	0.008
IV Salt Regime	8.86	9.94	9.28±0.34	8.64	9.03	8.85±0.14	0.010
IV Carbonate Content	9	11.68	10.45±0.73	9.38	10.25	9.85±0.31	0.078
IV Nitrogen Content	4.19	5.13	4.58±0.28	4.68	4.77	4.7±0.04	0.306
IV Soil Aeration	4.72	5.33	5.10±0.18	5.25	5.53	5.41±0.09	0.002
IV Thermoregime	9.11	9.69	9.35±0.16	9.15	9.34	9.25±0.09	0.195
IV Ombroregime	9.50	10.33	9.86±0.28	10.35	10.97	10.64±0.20	0.000
IV Continentality	10.00	11.18	10.69±0.43	9.98	10.43	10.21±0.19	0.022
IV Cryoregime	7.83	8.41	8.20±0.20	8.10	8.36	8.20±0.10	0.958
IV Light	7.82	8.42	8.14±0.19	7.82	8.05	7.93±0.08	0.025

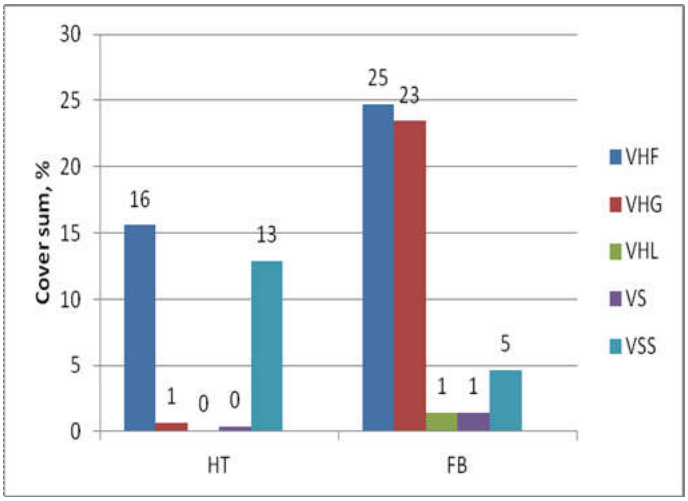

Fig. 5. ***Comparison of studied classes of vegetation by biomorphological structure. HT – Helianthemo-Thymetea, FB – Festuco-Brometea, abbreviations of the functional taxonomic groups correspond to the notes for Table 1.***

Vegetation structure. For the two groups derived from the results of the cluster analysis, which were classified into different vegetation classes, a comparative structural analysis was performed. The analysis of the biomorphological structure of the communities by the cumulative coverage of the species of different biomorphological groups showed that in the HT Group there is a predominance of forbs and small shrubs, and other biomorphological groups are almost absent. In the FB Group, there is a clear prevalence of forbs and graminoids. It should be noted that there is an almost complete absence of legumes in the communities of both groups (Fig. 5). The communities of both classes are also significantly different by other structural features (Table 2). Thus, the total cover as well as cover of the herb and cryptogam layer of the FB Group is approximately three times higher than the HT Group. Also, the FB Group has approximately three times more litter cover. Instead, the communities of the HT Group form on substrates with a significantly higher proportion of

Table 3: Scale-dependent richness values (minimum, maximum, mean and standard deviation) for the two phytosociological classes in which we sampled nested-plots. The number of replicates (*n)* apply to all plot sizes except for 100 m² where the number is half of these.

Plot size	HT N=10 (5)			FB N=6 (3)		
	Min	Max	Mean±SD	Min	Max	Mean±SD
Species richness all taxa						
0.0001 m²	0	3	1.2±1.1	2	5	2.8±1.2
0.001 m²	0	5	1.9±1.4	2	5	3.7±1.2
0.01 m²	1	7	3.5±1.8	3	8	5.5±1.9
0.1 m²	3	11	6.1±3.2	9	15	12.2±2.1
1 m²	5	20	10.3±5.5	21	26	23.0±2.4
10 m²	10	28	16.5±6.9	30	42	36.0±4.1
100 m²	20	41	29.8±10.4	49	53	50.7±2.1
Species richness vascular plants						
0.0001 m²	0	3	1.1±1.0	1	5	2.7±1.4
0.001 m²	0	5	1.8±1.4	2	5	3.5±1.4
0.01 m²	1	6	3.2±1.6	3	8	5.3±2.1
0.1 m²	3	9	5.5±2.5	8	15	12.0±0.4
1 m²	5	15	9.0±3.7	19	25	21.7±2.7
10 m²	9	24	15.2±5.3	30	40	34.3±3.8
100 m²	20	37	27.4±8.0	46	50	47.7±2.1
Species richness non-vascular plants						
0.0001 m²	0	0	0.0±0.0	0	1	0.2±0.4
0.001 m²	0	0	0.0±0.0	0	1	0.2±0.4
0.01 m²	0	2	0.2±0.6	0	1	0.2±0.4
0.1 m²	0	3	0.5±1.0	0	1	0.2±0.4
1 m²	0	6	1.2±2.0	0	3	1.3±1.0
10 m²	0	6	1.3±2.1	0	3	1.7±1.0
100 m²	0	6	2.4±2.5	3	3	3.0±0.0

gravel and hence a significantly lower cover of fine soil (Table 2).

Environmental conditions. We did not detect significant differences in elevation, aspect or inclination between the two groups. In contrast, the heat index values are slightly higher for the HT Group. Microrelief is more pronounced in the HT Group, although the maximum value was noted for the FB Group, and these differences are statistically insignificant (Table 2). However, we found statistically significant differences in the soil properties for communities of both groups. The FB Group was characterized by more than twice the humus content, organic carbon and nitrogen. The HT Group was characterized by high pH, indicating a clear alkaline reaction of the soil solution, while the FB Group was characterized by almost neutral pH and significantly higher hydrolytic acidity (Table 2).

Phytoindicative assessment. Comparison of the two groups according to the environmental factors obtained on the basis of ecological scales of Didukh showed that the communities of the HT Group are more xerophytic, characterized by higher pH, saline regime and carbonate content, but lower nitrogen content and aeration, higher thermoregime and continentality but lower ombroregime. For cryoregime values no significant differences between groups were found. The HT Group had significantly higher light values than the FB Group. The differences were statistically significant for acidity, salt regime, soil aeration, ombroregime, continentality, and light (Table 2).

Biodiversity patterns. For all analysed taxonomic groups (i.e. species richness of all taxa, species richness of vascular plants and species richness of non-vascular plants), the FB Group showed higher values than the HT Group (Table 3). Moreover, this pattern was observed for all spatial scales. It is noteworthy that the maximum values of total species richness are almost the same for the two groups on the plots from 0.0001 m² to 0.1 m², after which the maximum total species richness and richness of vascular plants of the FB Group starts to grow abruptly. However, for non-vascular plants, the opposite pattern is observed - with the exception of the two lowest scales, the HT Group exceeds the FB Group regarding the maximum richness of non-vascular plants. As regards the mean value of species richness, the FB Group exceeds the HT Group for all scales and all analysed taxonomic groups.

Conservation value. In the studied plots, we found 13 species listed in the current edition of the Red Data Book of Ukraine (Table 1). Comparison of the two studied groups regarding the mean of the rare species cumulative cover

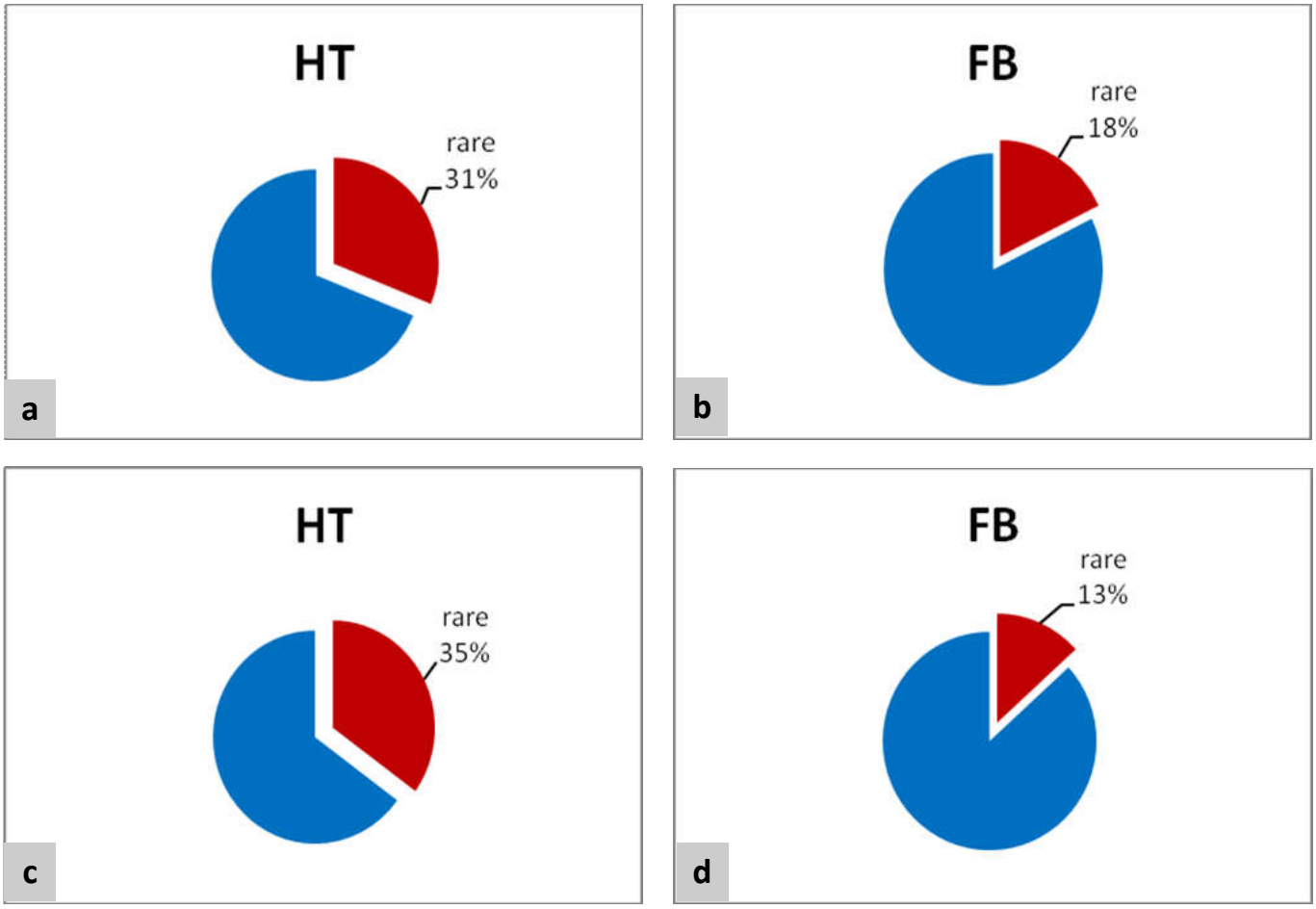

Fig. 6. ***Comparison of the studied groups regarding the proportion of rare species included in the Red Data Book of Ukraine (Didukh 2009) by cumulative cover (a, b) and absolute number (c, d); HT Group - Helianthemo-Thymetea class, FB Group - Festuco-Brometea class.***

showed that the HT Group significantly exceeds the FB Group (Fig. 6a, b). These differences are even more pronounced when comparing the mean of absolute number of rare species in both groups (Fig. 6c, d). Thus, despite the fact that steppe vegetation has high conservation value in Ukraine and in Europe, the chalk outcrop vegetation has even higher conservation value, and its narrow endemicity (14 species are endemic to the Don or Don and Volga basins) further increases this value at European scale.

Discussion

The analysis showed that chalk outcrops vegetation can hardly be attributed to grasslands, since graminoids are almost not represented, whereas small shrubs play an essential role in their composition. This vegetation also differs from the typical steppe communities by other structural features such as low cover, and almost complete absence of litter. According to the soil analysis results, it was revealed that in the first stages of chalk outcrops overgrowing, the soil cover is represented by almost pure chalk with very low content of humus, organic carbon and nitrogen compounds. Only in the more advanced stages of succession after the formation of genuine steppe communities, soil fertility increases, which manifests itself in increasing the content of humus, organic carbon and nitrogen compounds. Significant differences between typical steppe phytocoenoses and vegetation of chalk outcrops were also revealed by the results of phytoindicative assessment, and these differences were manifested both for edaphic and climatic factors. Significantly higher xericity of the chalk outcrops communities was noted, because due to their low cover values and rather high heat index values they are well warmed up, although due to the white color of the soil, the sun's rays are reflected from surface. The low cover also explains the considerably higher values of light factor for the communities formed on the chalk, in comparison with the steppe phytocoenoses.

The obtained results of species richness on various spatial scales for extreme basiphilous communities, which are formed at different stages of vegetation development on chalk outcrops, show very low values of both total species richness and the richness of vascular and non-vascular species for communities of the *Helianthemo-Thymetea* class. This can be explained, first of all, by extreme environmental conditions due to the structure and chemistry of the soil cover, as well as the microclimatic conditions that only a small number of species can survive in. During the transformation of chalk vegetation into genuine steppe

communities the species richness of all the analyzed taxonomic groups on all spatial scales is rapidly increasing, but nevertheless remains significantly lower than the fixed peaks for meso-xeric, basiphilous grasslands, which is obviously due to too high soil pH values that are constantly enriched by bases, which are washed away from the surrounding chalk outcrops. Comparative studies of the species diversity of various types of grassland habitats have shown that the highest species richness in different sized plot areas is characteristic for meso-xeric, basiphilous grasslands of the order *Brachypodietalia pinnati*, *Festuco-Brometea* class (Dengler et al. 2016a). In general, the literature has repeatedly discussed the fact that the high content of carbonates in the soil contributes to the formation of high species diversity of plant communities (Wilson et al. 2012; Roleček et al. 2014; Chytrý et al. 2015).

Taking into account that studied communities have high conservation value, as habitats for many rare and endemic species, they need protection. At present, obligatory species of extreme basiphilous communities are most vulnerable, as the area of their habitats is reduced due to the natural processes of soil formation and the formation of swards by competitive steppe species. The protection strategy of typical species of extreme basiphilous communities should be based on the preservation of their microbiotope parameters. As noted above, the obligatory species of extreme basiphilous communities (e.g. *Artemisia hololeuca, Asperula tephrocarpa, Scrophularia cretacea, Thymus calcareus,* etc.) grow on almost pure chalk with very low content of humus, organic carbon and nitrogen compounds. This could include measures like a) removal of nearby fields from the arable use to prevent the ingression of chernozem (by flushing, or by blowing wind) on the surface of the chalk; b) not to prevent the influence of factors that increase the natural erosion of the chalk outcrops, to maintain a balance between the constant supply of pure chalk to the biotopes and the processes of soil formation.

Author contributions

Field studies were planned and conducted by A.K. and O.B. with the participation of G.S. and V.R. in the Oskol River valley. Soil analyses were made and interpreted by V.V. and V.T. The manuscript was prepared by A.K. with additions and comments by all authors.

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Scientific Report

News from GrassVeg.DE, the German grassland vegetation database

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Palaearctic Grasslands 37 (2018): 26-29

Abstract: GrassVeg.DE is a collaborative vegetation-plot database associated with the Eurasian Dry Grassland Group (EDGG). It aims at collecting relevés of grasslands and other open habitats from Germany to safeguard these valuable data and provide them for scientific research, specifically for broad-scale analyses via the European Vegetation Archive (EVA). GrassVeg.DE has Bylaws that ensure a fair balance between the interests of data providers and data users. It is self-governed by an elected Governing Board, Custodian and Deputy Custodian. Founded in autumn 2016, it has now grown to 10,371 plots from all federal states of Germany except two. Currently, the majority of plots are from the four vegetation classes *Juncetea maritimi*, *Festuco-Brometea*, *Koelerio-Corynephoretea* and *Molinio-Arrhenatheretea*. Interested researchers are invited to join in order to continue the expansion of this database.

Keywords: Bylaws; Eurasian Dry Grassland Group (EDGG); European Vegetation Archive (EVA); *Festuco-Brometea*; Germany; grassland; GrassVeg.DE; *Juncetea maritimi*; *Koelerio-Corynephoretea*; *Molinio-Arrhenatheretea*; relevé; vegetation-plot database.

Nomenclature: Berg et al. (2004) for syntaxa.

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Co-ordinating Editor: Idoia Biurrun

Linguistic Editor: Laura M.E. Sutcliffe

Background

The idea of creating a collaborative vegetation database for dry grasslands in Germany dates back to the foundation of the *Arbeitsgruppe Trockenrasen* in 2004 (Dengler & Jandt 2005; Jandt et al. 2013), which in 2008 became the EDGG. However, this database never was implemented, while the provision of grassland plots from Germany to the European Vegetation Archive (EVA; Chytrý et al. 2016) via other German databases was stagnating and thus many regions in Germany remained underrepresented in European studies. Therefore, Jürgen Dengler and Thomas Becker founded **GrassVeg.DE** in autumn 2016 as a **collaborative, self-governed initiative within the EDGG** (Dengler et al. 2017; Janišová et al. 2017). It is registered in the Global Index of Vegetation-Plot Databases (GIVD) as EU-DE-020 (http://www.givd.info/ID/EU-DE-020).

Principles and development of GrassVeg.DE

GrassVeg.DE collects vegetation plots of grasslands and further open habitats from Germany, i.e. all habitats except forests, shrublands, aquatic and segetal communities. GrassVeg.DE aims to contribute data that are not yet digitalized and/or not yet available for the broad scientific public via other EVA member databases. GrassVeg.DE has regulated a fair balance of the interests of data contributors and data users in its Bylaws (*Satzung*; https://bit.ly/2qBKSfg), supervised by the Governing Board (*Kuratorium*). The Governing Board is elected by the GrassVeg.DE Consortium, where all data contributors are members. After an initial period led by the two founders, a first election to the Governing Board for the period 2018–2019 took place in spring 2018 and resulted in a team consisting of Jürgen Dengler (Custodian), Ricarda Pätsch (Deputy Cus-

Fig. 1. ***The Governing Board (Kuratorium) of GrassVeg.DE for the period 2018–2019. From left to right: Jürgen Dengler, Ricarda Pätsch, Thomas Becker and Thilo Heinken. Photos: private.***

todian), Thomas Becker and Thilo Heinken (further Board members; Fig. 1).

In spring 2017, GrassVeg.DE became member of the EVA database (Chytrý et al. 2016) and since then has regularly provided updated content to EVA. Being a member database of EVA led already to various data requests for European projects. If GrassVeg.DE data contribute significantly to a European project, our Consortium members are informed and have the possibility to opt-in as active co-authors, an opportunity already used by some of our members. Data preparation and entry for GrassVeg.DE up to now was done by student assistants of Jürgen Dengler at the University of Bayreuth, mainly by Claudia Maria Kurzböck, which allowed a rapid initial growth (Fig. 2). Since these funds are used up, from now on we are relying on the work force of the Governing Board and other members. We are very optimistic to be able to continue with a constant growth, based on volunteers and on our well-established and documented procedures how to prepare high quality data for our Turboveg v.2 database.

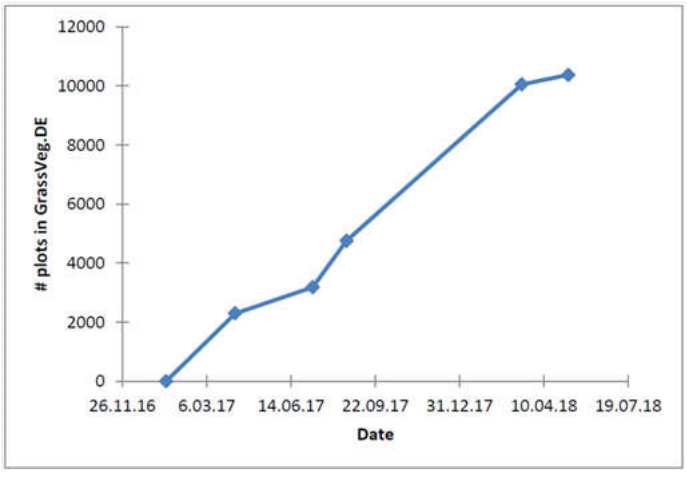

Fig. 2. ***Temporal development of the content of GrassVeg.DE.***

Current content of GrassVeg.DE

As of 9 May 2018, GrassVeg.DE contained **10,371 plots** contributed by **40 Consortium members**, while additional 10 datasets with 1,011 plots were "in the pipeline" for preparation. The best-covered vegetation classes are *Juncetea maritimi* (26.3% of plots), *Festuco-Brometea* (17.6%), *Koelerio-Corynephoretea* (16.6%), *Molinio-Arrhenatheretea* (11.5%), *Trifolio-Geranietea* (5.9%), *Mulgedio-Aconitetea* (5.6%), *Artemisietea vulgaris* (5.5%) and *Calluno-Ulicetea* (4.1%) (Fig. 3). All federal states except Saarland and Bremen were represented, with biggest fractions coming from Schleswig-Holstein (31.1%), Lower Saxony (16.6%), Brandenburg (14.8%), Bavaria (10.7%), Hesse (7.4%), Saxony-Anhalt (5.0%) and Mecklenburg-Vorpommern (4.8%). We would like to fill still existing data-gaps in the westernmost part of Germany (Saarland, Rhineland-Palatinate, North Rhine-Westphalia, W Lower Saxony and Bremen) and in parts of Baden-Württemberg, Bavaria, Thuringia and Saxony (Fig. 4). Up-to-date information on GrassVeg.DE can be found on our website at the Ecoinformatics Portal Bayreuth: https://bit.ly/2qgX208.

Invitation to contribute

If you have **vegetation-plots of any grassland or other open habitat in Germany**, we kindly **invite you to contribute** them to GrassVeg.DE and thus become a member of our Consortium. We accept both your own original plots and plot data that you digitised from the literature. Plots can be unpublished or published, from university theses (BSc., MSc., PhD., Diplom, Staatsexamen), research, projects, monitoring or environmental consultancies. We accept data in essentially any electronic format, but prefer-

Fig. 3. ***Examples of the four most-represented grassland classes in GrassVeg.DE. Upper left: Juncetea maritimi (Photo: R. Pätsch), upper right: Festuco-Brometea (Photo: J. Dengler), lower left: Koelerio-Corynephoretea (Photo: T. Heinken), lower right: Molinio-Arrhenatheretea (Photo: J. Dengler).***

entially as Excel or Turboveg files. Benefits of contributing include:

- Your valuable data are safeguarded and made available for science in perpetuity.
- Data usage is transparent and controlled by the Governing Board elected by you.
- You are informed when your data are used and have the opportunity to opt-in as active co-author (detailed regulations in the Bylaws of GrassVeg.DE and EVA).
- As member of the GrassVeg.DE Consortium, you can request the full EVA dataset or parts of it for own research projects.
- If you contribute your data in the near future, you can become co-author of a Long Database Report in the Web of Science journal *Phytocoenologia*, similar to that on the Romanian Grassland Database (RGD; Vassilev et al. 2018).

You are most welcome to also forward this call to your colleagues, friends and students. If you have questions, please contact the members of the current Governing Board, Jürgen Dengler, Ricarda Pätsch, Thomas Becker and Thilo Heinken.

Author contributions

J.D. drafted the manuscript while all other authors checked, improved and approved it.

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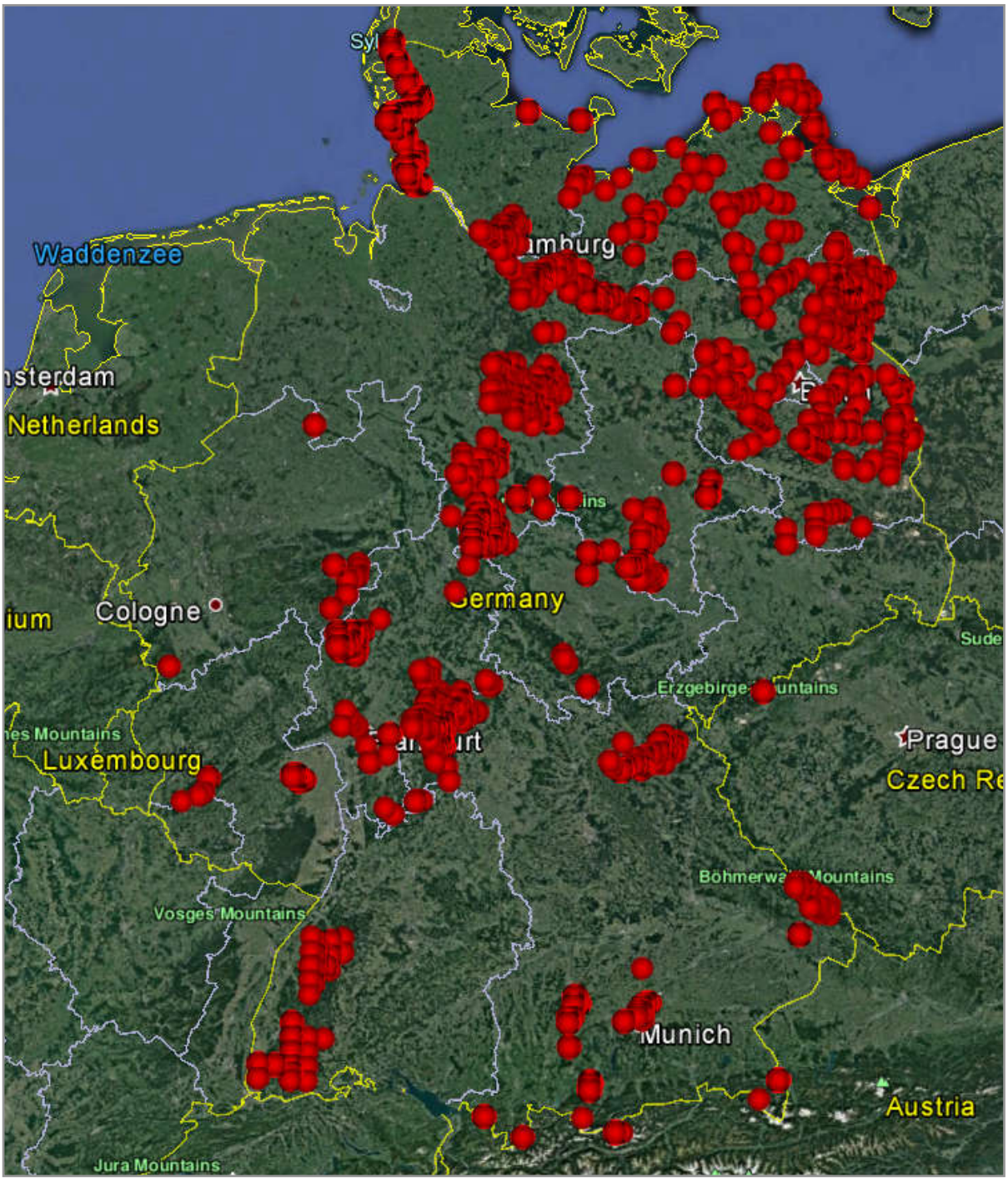

Fig. 4. ***Spatial distribution of the 10,371 plots contained in GrassVeg.DE on 9 May 2018 (Base map © GoogleEarth).***

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Photo Story

Impressions from the nature reserve "Hochwiesen-Pfullinger Berg" (SW Germany)

Photos and text by Jürgen Dengler

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The nature reserve "Hochwiesen-Pfullinger Berg" is located in the district of Reutlingen in the federal state of Baden-Württemberg in SW Germany (48.43° N, 9.18° E) at 720 m a.s.l. Geologically it belongs to the Swabian Alb, a part of the Jura Mts., which stretch from SE France through Switzerland and Baden-Württemberg to N Bavaria. It is protected since 1992, comprises 68.8 ha and is now also included in the larger Biosphere Reserve "Swabian Alb".

The reserve comprises well-managed and species-rich semi-dry grasslands (*Bromion erecti*) as well as mesic meadows (*Arrhenatherion elatioris*). It is particularly famous for its rich orchid flora. While in May 2018 due to a very dry spring relatively few orchids were flowering, the grasslands were still fantastic due to their rich flora.

Mesic meadows (Arrhenatherion elatioris, Molinio-Arrhenatheretea) with Geranium sylvaticum, Silene dioica and Campanula patula (from top left to bottom right).







Semi-dry basiphilous grasslands (Bromion erecti, Festuco-Brometea) with Anacamptis morio, Polygala comosa, Scorzonera humilis, Plathanthera bifolia, Pulsatilla vulgaris and Trifolium montanum (from top left to bottom right).

Short contributions

About the growth of protected steppe areas in the Donetsk region's nature reserve fund

The steppe zone occupies about 40% of Ukraine's territory, but due to excessive anthropogenic pressure, almost all the steppes have been destroyed and they currently account for no more than 3% of the country's territory. The problem of steppe ecosystem conservation in Ukraine is therefore quite acute.

The work, initiated by the Department of Ecology and Natural Resources of the Donetsk Regional State Administration, was carried out in 2017. And as result, between the November of that year and the beginning of March 2018, 13 new nature reserves were created for the purpose of protecting steppe areas; a total of almost 1348 ha.

The vegetation in the reserves is predominantly steppe communities, formed mainly by *Festuca valesiaca* Gaudin, *Elytrigia intermedia* (Host) Nevski, *Calamagrostis epigejos* (L.) Roth, *Agropyron pectinatum* (M. Bieb.) P. Beauv., *Eryngium campestre* L., *Linaria genistifolia* (L.) Mill., *Artemisia absinthium* L., *Medicago sativa* L., *Senecio jacobaea* L., *Marrubium praecox* Janka, *Euphorbia stepposa* Zoz, *Lavatera thuringiaca* L., *Potentilla arenaria* Borkh., *Echium vulgare* L., *Salvia nemorosa* L., *Limonium donetzicum* Klokov, *Goniolimon tataricum* (L.) Boiss.

Stipa capillata L., *S. ucrainica* P.A. Smirn., *S. lessingiana* Trin. & Rupr., *Koeleria talievii* Lavrenko, *Onosma tanaitica* Klokov, *Tulipa quercetorum* Klokov & Zoz, *Adonis volgensis* DC and *Ornithogalum boucheanum* (Kunth) Asch. are significant features – all are listed in the Ukrainian Red Data Book (RDB). The population of *Paeonia tenuifolia* L. is of particular value.

Regionally rare species (listed in the RDB of the Donetsk region) which are present include: *Hyacinthella leucophaea* (K. Koch) Schur, *Centaurea ruthenica* Lam., *Arum elongatum* Steven, *Corydalis marschalliana* (Willd) Pers., *C. solida* (L.) Clairv., *Asarum europaeum* L., *Convallaria majalis* L., *Equisetum hyemale* L., *Ephedra distachya* L., *Bellevalia sarmatica* (Pall. ex Miscz.) Woronow.

There are also RDB insects, such as *Saturnia pyri* (Denis & Schiffermuller, 1775), *Iphiclides podalirius* (Linnaeus, 1758), *Papilio machaon* (Linnaeus, 1758), *Xylocopa violacea* (Linnaeus, 1758), *Bombus argillaceus* (Scopoli, 1763), *Melitturga clavicornis* (Latreille, 1808), *Lucanus cervus cervus* (Linnaeus, 1758), *Saga pedo* (Pallas, 1771), *Dorcadion equestre* (Laxmann, 1770), *Zygaena laeta* (Hübner, 1790).

Amphibians are represented by *Pelobates fuscus* (Laurenti, 1768) and *Bufotes viridis* (Laurenti, 1768), both listed in Bern Convention. Amongst the common reptiles are *Lacerta agilis* (Linnaeus, 1758) and *Dolichophis caspius* (Gmelin, 1789).

The bird fauna includes such species of open landscapes as: *Alauda arvensis* (Linnaeus, 1758), *Emberiza hortulana* (Linnaeus, 1758), *Emberiza calandra* (Linnaeus, 1758), *Lanius collurio* (Linnaeus, 1758), *Acanthis cannabina* (Linnaeus, 1758). *Galerida cristata* (Linnaeus, 1758), *Cuculus canorus* (Linnaeus, 1758), *Luscinia megarhynchos* (Brehm, 1831), *Lanius excubitor* (Linnaeus, 1758), *Falco vespertinus* (Linnaeus, 1766), *Circus aeruginosus* (Linnaeus, 1758) and *Upupa epops* (Linnaeus, 1758) are also present. Some patches are used for foraging by *Merops apiaster* (Linnaeus, 1758). Other bird species protected by the Bern Convention are *Caprimulgus europaeus* (Linnaeus, 1758), *Accipiter gentilis* (Linnaeus, 1758), *Buteo buteo* (Linnaeus, 1758), *Falco tinnunculus* (Linnaeus, 1758), *Strix aluco* (Linnaeus, 1758) and *Buteo lagopus* (Pontoppidan, 1763).

Mammalian species that are present in newly-protected areas include *Vulpes vulpes* (Linnaeus, 1758), *Lepus europaeus* (Pallas, 1778), *Mustela nivalis* (Linnaeus, 1766), *Martes foina* (Erxleben, 1777), *Erinaceus europaeus* (Linnaeus, 1758). Some of the bats present are listed in the RDB of Ukraine.

The typical steppe rodent *Spalax microphthalmus* (Guldenstaedt, 1770) can still be found on some of the reserves. The presence of moderate grazing is favourable to most steppe rodents, including *Marmota bobak* (Müller, 1776), *Spermophilus* (F. Cuvier, 1825) and *Ochotona pusilla* (Pallas, 1769), all of which are now rare species.

The presence of plant and animal species from the Bern Convention Resolution No. 6 in the majority of newly created reserves allows them to be identified as sites suitable for inclusion in the Shadow List of the Emerald Network of Ukraine, currently being drawn up.

Donetsk region was the most successful in creating new protected areas in 2017-2018. In other regions of Ukraine, 10 times less area became protected than in Donetsk region.

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Documentary about steppes in Ukraine

Solving global environmental problems requires ecological enlightenment and the shaping of public opinion. Unfortunately, not many people read scientific or popular-scientific books on this topic, raising the importance of popular science documentaries.

Programmes devoted to climate change, the destruction of habitats, the disappearance of biodiversity and so on are familiar enough. However, the makers of such films usually illustrate them using forests and oceans, or sometimes African savanna; European grasslands, especially dry ones (i.e. steppes), rarely star in such documentaries.

Unfortunately, popular-science cinematography has been in miserable state in Ukraine during last quarter of century. There have only been a small number of short documentaries; it seems that the sole full-length work on an environmental topic is Valeriy Lovchinovskiy's film "*Where has the forest gone? It was still here yesterday*", made in an investigative journalism style, which describes corruption in Ukrainian forestry.

The steppe zone covers 40% of Ukraine, but the area of actual steppe area accounts for no more than 3% of the country. Unsurprisingly, 30% of the species in the Red Data Book of Ukraine are from grassland habitats. Ukraine would therefore seem to be crying out for a film about steppes. However, it is difficult to remember any such films, apart from a short documentary (13 minutes) about Askania-Nova as part of the project "7 Natural Miracles of Ukraine". This is more a tourism film than one about ecology. Any other documentaries about grasslands are semi-professional or amateur shorts.

Now at last, a full-length documentary about steppes has been made in Ukraine. It has been somewhat of a sensa-






Screens from the documentary "Tor steppes: life, death…resurrection?". Photos: TV-company "Orbita".

tion because it was made not by a nationwide film/TV company, not even a regional one. Rather it was made by a local TV company "Orbita" from the town Pokrovsk, in cooperation with an NGO, the All-Ukrainian Ecological League. Both scriptwriters Olexiy Burkovskiy (All-Ukrainian Ecological League) and Olexiy Vasyliuk (Ukrainian Nature Conservation Group) are also members of the public campaign, "Save Ukrainian steppes!", founded in 2008.

There is one more interesting fact: "Orbita" is based in the Donetsk region. So, it is paradoxical but for the first full-length documentary about steppes the "hottest" spot on the Ukrainian map has been chosen. Filming was carried out just 35-50 km from the front line between Ukrainian and Russian troops. Perhaps this was not entirely irrational – the fragility of life just a few kilometers from war sharpens perception of value, heightening the desire to save the most important, the vulnerable and the beautiful. This is probably one of the main reasons why the director of Orbita, Yury Barkulov, accepted the proposal to make the film without any hesitation.

The production process lasted about a year, from March 2017 till February 2018, producing a 76 minute video entitled *Tor steppes: life, death…resurrection?*. "Tor steppes" is not a geobotanical term but an artificial name suggested by Sergiy Lukovenko, a reputed local historian. The old name for the Kazennyi Torets river is Tor, and since the grasslands are situated in the upper reaches of its catchment, the name was suggested as an easy-to-understand shorthand.

It is clear that a local TV company has very limited financial and technical resources and its film is a real example of the art of the possible. The scriptwriter and filmmaker set themselves the task of showing that the fate of grasslands is not just a local issue, but one of national and even international significance. That is why the script of the documentary was written in a way which used the Tor grasslands as just one example of Ukrainian grasslands and of the challenges which typically confront them. Such an approach can be accused of generalization and simplification of the topic but it was the best approach for producing a documentary in conditions where resources were limited. Of course, flora and fauna are not uniform across the Ukrainian steppe zone, but environmental problems really are similar over the whole area. The details vary from place to place, but the essence is the same. For example, agricultural companies prefer to sow maize in some regions and sunflower in others, but the core of the problem is the same, i.e. loss to arable farming.

The documentary is notable for its realism. It documents the current state of the last grassland areas hidden amongst endless arable land, industrial plants, towns and villages. Most of steppe islands featured in the film do not have any conservation status. In law they are regarded as degraded and low-yielding agricultural lands - slopes unfit for tillage, narrow river margins, and balkas (small flat-bottom valleys). On the one hand, the authors of the documentary tried to show the beauty of Ukrainian grasslands but on the other hand they didn't wish to romanticise them. That's why the viewer will not see saiga or bustard in the film, because these species are absent from the Tor steppes like they are absent on most of Ukraine's surviving steppe fragments.

Tor steppes: life, death…resurrection? is a modern documentary where alarm about the state of grasslands features much more than steppe lyricism. Such an atmosphere required specific background music. Searching for it became a real casting process lasting more than two months and causing quite a bit of stress – the solution was found accidentally through a posting on Facebook and Olexiy Sokolov was taken on as composer, much to his surprise, since he had never imagined his music in an environmental context and found it difficult to imagine it being used for that purpose! But, serendipitous as the circumstance of the partnership's formation may have been, the result is very effective.

The documentary covers two main topics. First, it provides some general information about steppe: natural history, the soil formation process and plant and animal biodiversity. Then it describes current environmental threats: arable agriculture, mindless afforestation, the disappearance of steppe rivers, industrial pressure through the example of coal mining, and so on. However, the film emphasizes not only the problems but also offers some ways of addressing them. By today, the sheer lack of natural ecosystems is the first and main environmental problem; it is clear that the mere conservation of wildlife relics is too little, too late. Mankind has crossed the Rubicon of acceptable levels of biosphere destruction long ago. Thus, the general environmental task today is to enlarge the area of natural ecosystems and the main recipe proposed for steppe saving is rewilding. That's why the last word in the title of the documentary is *resurrection?* with question-mark after it, because today spontaneous process of rewilding directly depends on deliberate human decisions. Only acts of the human will can give sufficient peace to many anthropogenic areas that wildlife will restore itself there. However, when this resurrection will start at a large scale is another question.

On 14th March 2018, the documentary was premiered to scientists, ecologists and public activists of environmental NGOs in the Conference Hall of National Academy of Science in Kyiv. After the screening, all those who voiced an opinion noted its extremely high educational value and necessity of its broad dissemination, especially to pupils, students and, not least, to politicians.

Today the authors of the documentary are investigating the possibility of translating if from Ukrainian to English. A preliminary English version of the trailer is available at https://youtu.be/8NC8zErx8Qo

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Tarutynsky Steppe reserve defended in court

In previous issues of the EDGG Bulletin, we have published information about the struggle of Ukrainian conservationists to preserve the Tarutynsky Steppe Reserve in the Odessa region. One of the important points in this struggle was the appeal made by the EDGG and the sending of many individual letters from the group members. In this article, we outline the first serious win in the struggle to protect the reserve.

The Tarutynsky Steppe reserve was created by way of decision № 445-VI of April 26, 2012 by Odessa Regional Council, on an area of 5200 hectares. The territory has been excluded from the former Tarutyno military training ground. Unfortunately, the rest of the training ground had been distributed between farmers, who then proceeded to plough up most of the steppe. All area that could be saved was included in the reserve. But even this small part of the once colossal training ground still is the second-largest protected steppe of Ukraine (after Askania-Nova). The main value of the reserve is the ecosystems preserved here: forb-fescue-feathergrass and fescue-feathergrass primary and secondary steppes with domination of *Stipa capillata* and *S. lessingiana*, less often other species of feather grass, fescue and blue grass. Among the widespread animals here, almost 40 species are listed in the Red Data Book of Ukraine. The Tarutyno steppe is particularly important for the conservation of rare species of steppe birds and of the rodent *Sicista subtilis* (Pallas, 1773), which is very rare in Ukraine. For more than a century, this territory was not ploughed and did not experience intensive human economic activity.

But in 2016, the local unit of the Ministry of Defence of Ukraine signed an agreement with a farming business (Chance-2016), which ostensibly gives the rights to the farmer to grow crops here, with the profits being split between the parties. Of course, such a contract is not legal, since the territory does not belong to the Ministry of Defense and moreover has the status of a wildlife reserve. In addition, in November 2016 the Standing Committee of the Bern Convention decided to recognise the Tarutynsky Steppe as an Emerald Network site. This means that the protection of the territory is a mandatory task for Ukraine as part of its duties under the Convention.

However, the Ministry of Defence, which is one of the most influential state agencies in Ukraine, has continued to insist on the legality of the contract. By the time the efforts of environmentalists of the Odessa region put a stop to the ploughing of the land, 1300 hectares of the reserve had been turned into arable land.

Success eventually came in the courts. The international charity Environment People Law (EPL) appealed to the court to remove obstacles to the area's conservation and to enforce an end to the ploughing and the return of the land affected to its former state. In particular, EPL has asked the court to declare the contract invalid and oblige the farmer to work to restore the steppe.

On December 12, 2016, an interim order of the Odessa Economic Court stopped all work on the Tarutyno Steppe pending its final decision. In another finding on April 11, 2017, the court went beyond the boundaries of the lawsuit and, at its own initiative, declared the contract entered between the PE "Chance" and the Ministry of Defense unit invalid. Subsequently, the Economic Court of Appeal of the Odessa region and the Supreme Court of Ukraine supported this position. Since the contract has been declared void, each party is obliged to return to the other party all that it received for its execution, and where this is impossible, to reimburse the payments received at the rates current at the time of the refund.

In this case, the damage has been caused to the environment of Ukraine, namely the Tarutyno steppe landscape reserve of local significance. The amount of damages was assessed by specialists of the state ecological inspection of the Odessa region and calculated to be 1 billion Euros. These losses should be reimbursed to the environmental fund and can be used for recovery measures on the steppe.

The sum of the damages is large, and it is difficult to imagine its payment, although the court decision is not subject to appeal. This means that the story will continue. However, the primary task is fulfilled – the Tarutyno steppe has been saved from destruction.

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Kreydova Flora Nature Reserve celebrates its 90th anniversary

The Kreydova Flora Nature Reserve is located on the slopes of the right bank of the Siverskiy Donets river of Slovyansk and Lymansk districts of Donetsk oblast. The very large reserve takes the form of open Cretaceous slopes stretching from the village of Pyskunivka to the village Kryva Luka and then, with a short interruption, from the latter to the village of Zakitne. The total length of the protected area is around 10 km and its perimeter is around 25 km; its width varies with the width of the vegetation being protected, ranging from 0.5 to 3 km. As of today, the reserve is the largest protected territory of Cretaceous outcrops in Ukraine, with a total area of 1,134 ha.

Ukrainian flax blossoms in the Kreydova Flora Nature Reserve. Photo: S. Limanskij.

The reserve was founded as a part of the wider Ukrainian Steppe Nature Reserve of the National Academy of Science of Ukraine by Order of the Ministerial Council of the former USSR № 310-p, 14.07.1988. The reserve is a subdivision of the National Academy of Science of Ukraine. The M. G. Holodnyi Botanical Institute is the scientific curator of the reserve. 2018 marks the formal 30th anniversary of the reserve, but we have recently discovered the reserve is in some senses much older than we thought.

The history of its preservation in fact goes back to 1928. Mr. Ye. Lavrenko, a well-known botanist once mentioned to the then PhD student V.I. Akopov: "*I was lucky to find three-four small natural plots of pine tree habitat near village Lavrentiyivka, which is upwards from village Kryva Luka on the Cretaceous outcrops of the right bank of the Donets river. According to locals, these are natural territories with well-established renewal of pines*". The Kharkiv subdivision of the Ukrainian Committee on Nature Monument Preservation (UCNMP) headed by Mr. Ye. Lavrenko had included this territory to the List of Nature Monuments of Republican value. The legislation of the time did not require the adoption of any Decrees on the creation of nature monuments. The territories were recognized and supervised by the UCNMP. From 1929 the Committee had obliged Artemivsk regional administration to introduce preservation activities that included: "*prohibition of clear-cutting and grazing*". The abolition of the UCNMP in 1939 resulted in the loss of special status for areas under its supervision, including that of "Kreydovyi bir near the village of Lavrentiyivka". This protection was renewed in 1988 when the current reserve was founded.

Chalk deposits define the landscape of reserve. The natural escarpment is quite high (50-70 m) and steep (up to 70°) here, dissected by a dense network of ravines that vary in depth and length.

The vegetation of the Cretaceous outcrops is characterized by a number of relict and endemic species, the origin of which is now lost in the depths of time. One of the peculiar species is *Pinus sylvestris* L. var. *cretacea* Kalen.

The reserve provides a good example of vegetation change following the ending of destructive anthropogenic activity. We can observe the renewal of the primary vegetation - the Cretaceous pine - and the final stages of cenogenesis.

The reserve flora was compiled by V. Tkachenko and N. Parakhonska. The list includes 490 species from 274 genera and 65 families, amongst them 27 species from the Ukraine Red Data Book and 21 species of endemics. There are 6 European Red List species – *Hyssopus cretaceus*, *Genista tinctoria*, *Stipa zalesskii*, *Elytrigia stipifolia* and *Scrophularia cretacea*.

The preliminary list of fauna has 167 species of birds, 33 species of mammals, 8 species of amphibians and 8 species of reptiles. About 10 species of animals are listed in the European Red Lists.

It's unfortunate that the territory of the reserve was affected during the early stage of the military conflict that escalated in 2014 in the east of Ukraine. Subsequently, the entire part of the Donetsk region, in which the reserve was located, was freed by the troops of the Ukrainian Armed Forces. However, during this period the reserve was damaged by numerous explosion craters, trenches and the like.

In 2016, the uniqueness of the reserve was recognized on international level. Most of it is covered by Article E1.13 of Resolution 4 (1996) of the Bern Convention. The Emerald network has been created to protect such areas, and in November 2016, the Standing Committee of the Convention decided to include the reserve in the Emerald Network.

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How to assess the conservation status of semi-natural habitats?

The conservation status assessment is one of the most controversial processes related to the Habitats Directive and this strongly hampers monitoring and conservation actions.

For an habitat, favourable conservation status should mean that:

- natural range and areas within that range are stable or increasing;

- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist,
- the conservation status of its typical species is favourable.

However, many of the concepts included in these criteria are vague and can be applied over a wide range of approaches that are often not consistent. For instance, unequivocal definitions of "natural range", "specific structure and functions" should be given in order for these criteria to be read consistently throughout the EU member states and across the broad range of stakeholders that may read and interpret these words.

The interpretation of these concepts is particularly complex when looking at semi-natural habitats, since these, by definition, do not have a natural range, but rather a range that depends on human activities interacting with vegetation dynamics. In fact, a semi-natural grassland maintained by grazing livestock has a range depending on the quantity and quality of farming activities and its specific structure and functions also depend on management intensity and objectives.

In a recent study, my colleagues and I contributed to the debate on this topic by proposing to use historical vegetation data to assess the conservation status of semi-natural habitats. Firstly, we quantified the degree of compositional change occurred between the historical sampling and a recent sampling. Since the historical sampling could be assumed as in favourable condition, we used the measure of compositional change as an inverse proxy of conservation status.

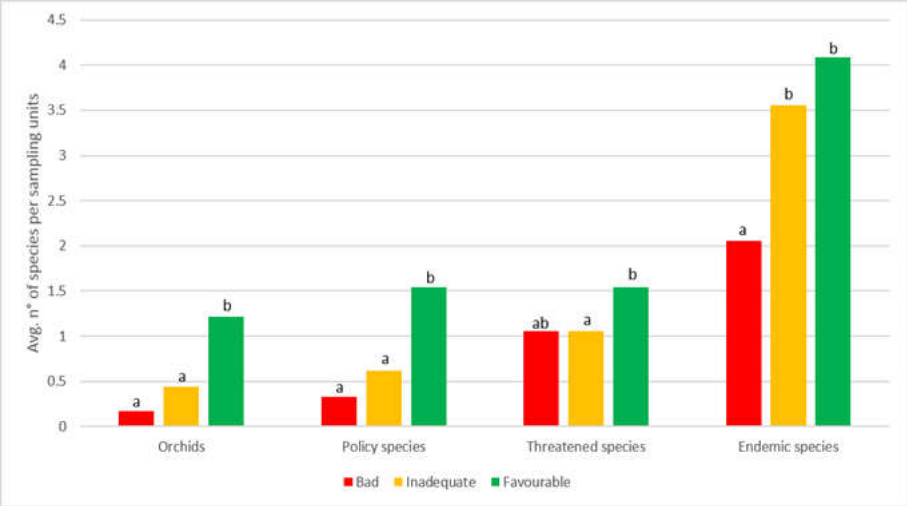
Then we quantified ten potential indicators, encompassing proxies of species composition (e.g. number of habitat diagnostic species, relative cover of steppic species), habitat structure/function (e.g. relative cover of woody and graminoid species, ratio between toxic and non-toxic species), and landscape patterns (edge complexity of the polygon, perimeter shared with woody communities).

One of the study sites, Mt. Pennino (central Apennines). Photo: S. Burrascano.

Finally, we tested these potential indicators against the degree of compositional change.

The two most relevant indicators were the number of diagnostic species and the relative cover of woody species. By combining these two parameters we assessed the conservation status of 132 locations and found out that this assessment was in good agreement with the number of species of conservation concern.

We know we are still far from an agreement on standardised methodologies. However, we hope our attempt of looking in the past to drive future actions can be of use in the path towards this goal.



Average number of orchids, Policy species (Habitats Directive, Bern Convention, CITES), Threatened species (from global, national and regional Red lists), and endemic species per sampling units in each status category. Letters on bars indicate significant differences among groups as resulted from the post-hoc test (same letter indicates no significant differences between the two categories considered).

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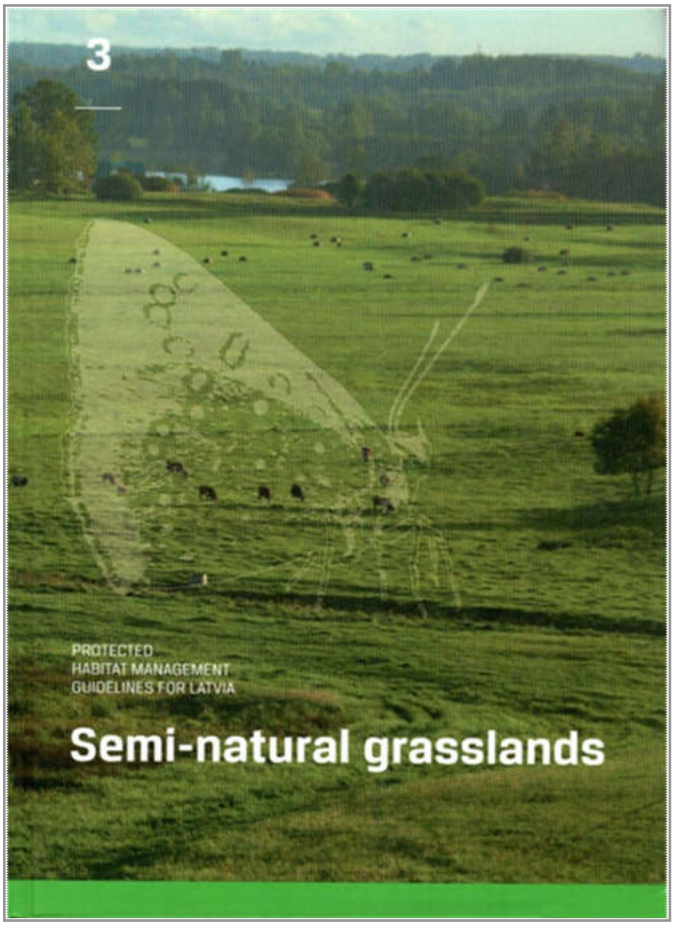
Book review

Rūsiņa S. (Ed.) (2017): Protected habitat management guidelines for Latvia, Volume 3, Semi-natural grasslands. Nature Conservation Agency, Sigulda, 456 pp. Will be available for free download at www.daba.gov.lv

Grassland restoration and application of suitable management in semi-natural grasslands is in the focus of scientific and practical interest since decades (Dengler et al. 2014). On the one hand, there were high scientific efforts made to understand the internal community dynamics and the effect and mechanisms of external drivers (i.e. management practices) on grassland biodiversity. On the other hand, there is an urgent need to support nature conservation authorities, farmers and other stakeholders with appropriate reference works and guidelines for appropriate management and restoration (Blakesley & Buckley 2016). There is, however, a visible gap between the restoration theory and conservation and restoration practice which should be bridged by supporting effective knowledge transfer and communication (Török & Helm 2017).

The reviewed book by Rūsiņa (Ed.) (2017) is a very comprehensive and practice driven approach summarising the existing scientific and evidence-based knowledge of management and restoration of Latvian grassland habitats. The 24 chapters of the book are arranged in four thematic parts. The first part of the book, containing four chapters, deals with historical origin of grasslands and their traditional use, ecosystem goods and services, current protection status and biodiversity. The second part with three chapters introduce the principles of habitat restoration and management planning. The most voluminous third part with 12 chapters introduces the 13 EU protected grassland types (one introductory chapter followed by the introduction of 10 types in 10 chapters plus one chapter with three types of wooded grassland types). The fourth part with five chapters focus on the evaluation and comparison of methods frequently used in maintaining and recovery of grasslands.

It is also important to mention that the book also contains five annexes, out of the first introduces a key for the identification of habitat quality (i.e. habitat naturalness and degradation). The second annex summarizes in smart spreadsheets the optimal, suboptimal and inappropriate management schemes for all EU protected grassland habitat types of Latvia. Annex 3 introduces the most important problematic species (both natives and adventives) and Annex 4 the most important indicator plant species of various grassland types, while Annex 5 provides a compilation of bird species for which grasslands serve as important breeding and feeding habitat. The latter three annexes are supplemented with a photo-documentation of the mentioned species based on which most of them can be easily identified also by farmers.



The book is richly illustrated with photographs and other types of paintings and artworks. To sum up, the reviewed book is an important milestone on the road to the wise and sustainable management and conservation of Latvian grasslands, but it is also an important reference work for overall grassland conservation and restoration in Europe as most of the reviewed grassland types, related problems and suggested solutions and conservation schemes are also valid for other countries.

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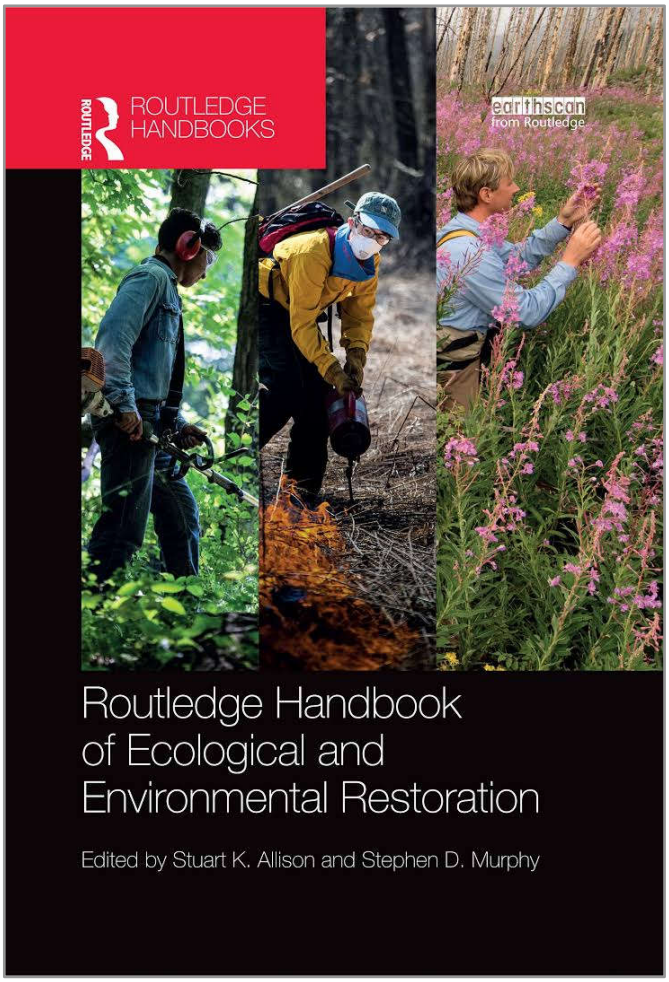
Book review

Allison, S. K. and Murphy, S. D. 2017. Routledge Handbook of Ecological and Environmental Restoration. – 604 pp., Routledge, Oxon, U.K. ISBN: 978-1-138-92212-9. £165.00 (hardback)



Grassland ecosystems around the world are threatened by severe area loss and degradation, mainly due to the changing intensity of management, either in the form of management intensification or underuse and abandonment (Dengler et al. 2014; Wesche et al. 2016). As their vascular plant species richness at small scales can even exceed that of rainforests (Wilson et al. 2012), the biodiversity of Palaearctic grasslands is outstanding; thus, their conservation and restoration is a crucial task (Török & Dengler 2018).

In recent years there has been an increase in the global attention paid to ecological restoration. Although there were former edited books providing a general synthesis of ecological restoration (Perrow & Davy 2002; van Andel & Aronson 2006), the rapidly evolving nature of the field made it necessary to put together a new volume that discusses both current practice and future opportunities and difficulties generated by our constantly changing world. This book was compiled by a team of 80 respected contributors from 16 different countries from all around the world, and provides a broad synthesis of the current knowledge on ecological restoration, from both a scientific and a practical point of view.

Besides the introduction, the book consists of four parts. The first part provides the basis for restoration in the 21st century. This part discusses the need and reasons for restoring ecosystems, such as conserving biodiversity, recovering natural capital and ecosystem services, testing ecological theories and reconnecting humanity with nature. It also provides an historical perspective, deals with the principles of restoration at different levels (population and landscape-scale levels), and assesses the role of social processes and social engagement in ecological restorations.

The second part is the longest (approximately half of the book) and can be considered as the main section. This part covers the acquired knowledge about the restoration of key ecosystems in 18 chapters, dealing with ecosystems from boreal forests to coral reefs, including also restoration in urban areas. The chapter about temperate grasslands first describes the types, origin and present distribution of temperate grasslands, then discusses why temperate grasslands have been lost or degraded and reasons to restore them, identifying also the limitations and obstacles that stand in the way of their successful restoration. The chapter then discusses the different methods that can be used in grassland restoration, either in the restoration of degraded grasslands or in the establishment of new ones. Examples of restoration of main grassland types are also provided.

The third part covers the socio-economic context of environmental restoration. From the social point of view it assesses international restoration-related law and policy issues, the importance of volunteer programmes and the human community in general, and the integration and participation of different key stakeholders, emphasising the need for a social-ecological system approach. From the economic point of view this section discusses the role of businesses that are engaged in restoration projects, market-based instruments (e.g. grants, subsidies, penalties and taxes) and the potential of profit motivation as a positive influence on ecological restoration.

The fourth part looks into the future. The first chapters assess the challenges set up by different aspects of global environmental change, like climate change and invasive species. This section also deals with the applicability of resilience concepts in the management and restoration of ecosystems, and with the potential of ecological restoration to reverse the losses in ecosystem services. A separate chapter focuses on the new field of economics of restoration, which is the application of economic principles to

restoration ecology, including also the restoration of natural capital. The last chapters emphasize the importance of an interdisciplinary approach and the collaboration among restoration researchers, practitioners and stakeholders; and summarize how restorationists use social media to promote environmental and restoration issues.

To sum up, the authors compiled an impressive amount of useful information covering most of the issues related to ecological restoration. As it is usual with edited books, there is some variation in the style of the chapters, but it does not influence the readability and comprehension of the book, as they are generally well-written and complemented with well-structured tables and figures that assist the understanding of the text. Several case studies are also presented, and numerous boxes accompany the main body of the text. One shortcoming of the book is that the majority of authors are from institutions from the USA, which means that although Europe is quite well-covered and Australia may even be a bit overrepresented, the rest of the world, especially Asia, remained underrepresented. Despite this, due to its integrative approach and the diversity of topics covered, this handbook can be recommended for both restoration scientists and practitioners, and the editors are quite right stating that this is an 'unrivalled volume'.

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Lychnis flos-cuculi, near the village of Zaježová, Javorie Mts. (Slovakia), May 2018. Photo: M. Janišová.

Recent publications of our members

*In 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 the Palaearctic and to improve their accessibility. You are invited to send lists of such papers from the last three years following the format below to Iwona Dembicz, iwodem@op.pl. 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.*

Methodology, classification, databases

De Cáceres, M., Franklin, S.B., Hunter, J.T., Landucci, F., Dengler, J. & Roberts, D.W. 2018. Global overview of plot-based vegetation classification approaches. *Phytocoenologia* 48: 101–112.

Willner, W., Bergmeier, E., Biurrun, I., Dengler, J. & Jansen, F. 2018. A survey of vegetation survey papers. *Phytocoenologia* 48: 1–6.

Vassilev, K., Ruprecht, E., Alexiu, V., Becker, T., Beldean, M., Biță-Nicolae, C., Csergő, A.M., Dzhovanova, I., Filipova, E., (…) & Dengler, J. 2018. The Romanian Grassland Database (RGD): historical background, current status and future perspectives. *Phytocoenologia* 48: 91–100.

Venn, S., Ambarlı, D., Biurrun, I., Dengler, J., Kuzemko, A., Török, P. & Vrahnakis, M. 2018. The Eurasian Dry Grassland Group (EDGG) in 2016–2017. *Hacquetia* 17: 17–23.

Biodiversity

Zarzycki, J. & Bedla, D. 2017. The influence of past land-use and environmental factors on grassland species diversity. *Applied Ecology and Environmental Research* 15(4): 267–278.

Conservation and restoration

Herzon, I., Birge, T., Allen, B., Povellato, A., Vanni, F., Hart, K., Radley, G., Tucker, G., Keenleyside, C., (…) & Pražan, J. 2018. Time to look for evidence: results-based approach to biodiversity conservation on farmland in Europe. *Land Use Policy* 71: 347–354.

Population biology of dry grassland species

Dembicz, I., Szczeparska, L., Moysiyenko, I.I. & Wódkiewicz, M. 2018. High genetic diversity in fragmented *Iris pumila* L. populations in Ukrainian steppe enclaves. *Basic and Applied Ecology* 28: 37–47.

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Cypripedium calceolus, Borowa Gora Natura 2000 site (SE Poland). Photo: P. Chmielewski.

Forthcoming events

61th Symposium of the International Association for Vegetation Science (IAVS)
Natural Ecosystems as Benchmarks for Vegetation Science
22-27 July 2018 in Bozeman, Montana, USA
Pre-symposium excursions: 17–21 July; post-symposium excursion: 28 July – 1 August
The Symposium Website: http://iavs.org/2018-Annual-Symposium/Home.aspx

48th Annual Meeting of the Ecological Society of Germany, Austria and Switzerland
Ecology – meeting the scientific challenges of a complex world
10–14 September 2018 in Vienna, Austria
Website: https://www.gfoe-conference.de/

7th Balkan Botanical Congress
10–14 September 2018 in Novi Sad, Serbia
The congress website: http://www.7bbc2018.com

SER Europe Summer School on Ecological Restoration 2018
Best practice in management and restoration of European dry grasslands
20-24 August 2018 in Vácrátót, Hungary
The meeting website: http://restorationcourse.okologia.mta.hu/

3rd Congress of the Spanish Society for Geobotany
21-29 November 2018, Mexico DF, Mexico.
Conference website: http://132.247.197.101/fito/

British Ecological Society Annual Meeting
16-19 December 2018, ICC, Birmingham, UK.
Registration and abstract submission Deadline: 19th October 2018.
Conference website: https://www.britishecologicalsociety.org/events/bes2018/

2nd International Young Scientists Conference on Biodiversity and Wildlife.
5 - 7 October 2018 in Tsaghkadzor, Armenia
Abstract Submission Deadline: 20th June 2018.
Conference website: http://www.bioconf.am

16th Eurasian Grassland Conference (EGC)
Summer 2019 Graz, Austria

11th EDGG Field Workshop
Summer 2019 Caucasus, Armenia

Campanula stevenii, Sabalan Mt. near Alvars (Iran), May 2016. Photo: J. Noroozi.

EDGG on the web:
http://www.edgg.org
EDGG in Facebook:
https://www.facebook.com/groups/938367279561202
EDGG on the ResearchGate
https://www.researchgate.net/project/EDGG-Eurasian-DryGrassland-Group

The Eurasian Dry Grassland Group (EDGG), founded in 2008, is a working group of the International Association for Vegetation Science (IAVS) and member of the European Forum on Nature Conservation and Pastoralism (EFNCP). On 30 June, it had 1315 members from 67 countries.

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

The EDGG covers all aspects related to 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.

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Tragopogon orientalis, near the village of Zaježová, Javorie Mts. (Slovakia), May 2018. Photo: M. Janišová.