

Working group on dry grasslands in the Nordic and Baltic region – Outline of the project and first results for the class *Festuco-Brometea*

J. Dengler¹

with the collaboration of S. Boch¹, H. H. Bruun², M. Diekmann³, K. Dierßen⁴, C. Dolnik⁴, C. Dupré³, V. B. Golub⁵, A. Helm⁶, N. Ingerpuu⁶, S. Löbel⁷, M. Pärtel⁶, V. Rašomavičius⁸, S. Rūsiņa⁹ & S. R. Znamenskiy¹⁰

- Jürgen Dengler (dengler@uni-luebeck.de) & Steffen Boch (s_boch@web.de): Institute of Ecology and Environmental Chemistry, University of Lüneburg, Scharnhorststr. 1, D-21335 Lüneburg
- Hans Henrik Bruun (hans_henrik.bruun@ekol.lu.se): Växteknologi och Systematik, Ekologiska Institutionen, Lunds Universitet, Ekologihusek, S-22362 Lund
- Martin Diekmann (mdiekman@uni-bremen.de) & Cecilia Dupré (ceciliadupre@t-online.de): Institute of Ecology and Evolutionary Biology, University of Bremen, P. O. Box 330440, D-28334 Bremen
- Klaus Dierßen (kdierssen@ecology.uni-kiel.de) & Christian Dolnik (cdolnik@ecology.uni-kiel.de): Ecology Centre, Christian-Albrechts University Kiel, Olshausenstr. 40, D-24098 Kiel
- Valentin B. Golub (vbgolub2000@mail.ru): Institute of Ecology of the Volga River Basin, Russian Academy of Sciences, Komzina 10, RU-445003 Togliatti

- Aveliina Helm (aveliina@ut.ee), Neel Ingerpuu (neleing@ut.ee) & Meelis Pärtel (pmeelis@ut.ee): Institute of Botany and Plant Ecology, University of Tartu, Lai 40, EE-2400 Tartu
- Swante Löbel (swante.loebel@ebc.uu.se): Department of Plant Ecology, Evolutionary Biology Centre, Uppsala University, Villavägen 14, S-75236 Uppsala
- Valerijus Rašomavičius (floraval@botanika.lt): Laboratory of Flora and Geobotany, Institute of Botany, Zaliujų Ezeru Str. 49, LT-08406 Vilnius
- Solvita Rūsiņa (rusina@lu.lv): Faculty of Geography and Earth Sciences, University of Latvia, 19 Raiņa bulv., LV-1586 Riga
- Sergey R. Znamenskiy (seznam@krc.karelia.ru): Biology Institute, Karelian Research Centre, RU-186610 Petrozavodsk

1. Introduction

Dry grasslands for the most part are semi-natural plant communities that resulted from low-intensity agriculture in former times. They host a considerable proportion of Europe's biodiversity. At present, however, they are highly endangered throughout the continent. Conservation depends on good knowledge of the objects to preserve, their distribution and their ecological requirements. Therefore, a sound classification of dry grassland communities is not only 'pure' science but has also a high practical value for nature conservation. Whereas in central Europe there is a legacy of publications dealing with syntaxonomy of dry grasslands, scientists in Fennoscandia and in the Baltic countries have paid much less effort on the classification of these communities. This is partly due to different scientific traditions (cf. Uppsala and Russian schools of vegetation science), partly also to the fact that the dry grassland communities of these regions do not 'fit' properly into the classification schemes developed farther south. However, recently syntaxonomic distinctness and also increased small-scale species densities compared to the central European counterparts have been shown for some of the relevant syntaxa (Dengler & Löbel 2006, Dengler & al. 2006).

In this situation, we founded a working group on dry grassland vegetation in the Nordic and Baltic region, which at present comprises 15 persons from six countries (additional contributors are welcome!). Our basic aim is to develop a supranational classification of the dry grassland communities of that part of Europe based on a uniform and consistent methodology. Furthermore, we want to analyse the ecological gradients underlying the floristic differentiation of these dry grassland syntaxa as well as the biodiversity patterns and their causes. To achieve this goal, we are establishing a databank including as many as possible relevés of dry grasslands and dry forest edge communities from this region.

2. Databank – outline

2.1 Geographic coverage

The region sampled largely corresponds to the area that was covered by the Scandinavian ice-shield during the Pleistocene. It comprises 10 countries (or parts of them):

- Germany (Mecklenburg-Vorpommern, Brandenburg, Berlin, Schleswig-Holstein, Hamburg, NE Lower Saxony)
- Denmark
- Norway
- Sweden
- Finland
- Poland (northern parts)
- Lithuania
- Latvia
- Estonia
- Russia (regions of Kaliningrad, Pskov, Novgorod, Leningrad, and the Karel'skaya Resp.)



2.2 Syntaxonomic coverage

We collect relevés of the three phytosociological classes

- Festuco-Brometea** (excluding the alliance *Festucion valesiacae*, which occurs only locally in the southern parts)
- Koelerio-Corynephoretea** (with the two subclasses *Koelerio-Corynephoretea* and *Sedo-Scleranthenea*)
- Trifolio-Geranietea** (with the two subclasses *Trifolio-Geranietea* and *Melampyro-Holcetea*)



Helictotrichon pratense community (probably alliance Filipendulo vulgaris-Helictotrichon pratensis) of the order Brachypodietalia pinnati (Festuco-Brometea) on the island of Saaremaa (Estonia).

2.3 Criteria for the inclusion of data

- Contiguous plots** (i.e., no frequency data of randomly distributed subplots as often used in Scandinavia)
- Plot size between 1 m² and 32 m²** (i.e. five octaves; this limitation is important since plot size strongly influences classification results and biodiversity parameters, cf. Dengler & al. subm.)
- Cover-abundances values** (i.e., no pure presence/absence data)

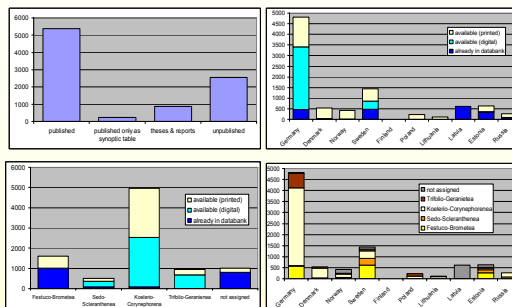
2.4 Standardisation within the databank

- Plant nomenclature following European checklists**
 - Vascular plants: Tutin & al. (1968-1993)
 - Mosses: Corley & al. (1981), Corley & Crundwell (1991)
 - Liverworts: Grolle & Long (2000)
 - Lichens: Santesson & al. (2004)
- Cover-abundance values transformed to the (extended) Braun-Blanquet scale**
- Essential header data:**
 - Country; state/province
 - Geographic coordinates (that allow stratified resampling)
 - Plot size
 - Cryptogam treatment: yes/no?
- Optional header data, e.g.**
 - Coverage of the vegetation layers, bare soil, and open rock
 - Inclination; aspect
 - Soil properties
- Automatically generated header data**
 - species richness (total and per taxonomic group)
 - mean Ellenberg indicator values

3. Databank – current state

3.1 Overview of the available data

Up to now, we have located **110 sources**, which comprise more than **9,000 relevés** that correspond to the given criteria. Nearly 2,000 relevés have already been entered in the databank; another large proportion is available in a digital manner.



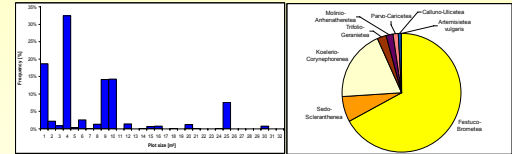
The geographic and syntaxonomic coverage of the available data is good for Germany and Latvia, and suitable for Sweden and Estonia. For all other countries, additional relevés are desirable, especially in the case of Finland and Poland.

3.2 Data in the databank

For 1,531 (77%) of the 1,983 relevés currently in the databank, bryophytes and lichens have been recorded; for 366 of these also non-epigeic taxa (18%). The most frequently used plot sizes are 1 m², 4 m², 9-10 m², and 25 m².



With an average of 53.6 species on 4 m², the Gypsophila fastigiate-Globularium vulgare (Tortelloa tortuosae-Setion albi) of the subclass Sedo-Scleranthenea on the island of Öland (Sweden) is one of the most species-rich communities on small scales.



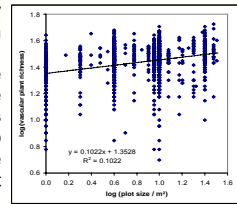
The relevés in the databank have been tentatively assigned to (sub-)classes based on diagnostic taxa determined in comprehensive regional studies (Berg & al. 2004, Boch & Dengler 2006, Löbel & Dengler subm.). 2/3 of relevés belong to the *Festuco-Brometea*, smaller proportions to the two other studied classes, and also some relevés to 'non-xerothermic' classes.

4. Festuco-Brometea

Of the four major syntaxa, the *Festuco-Brometea* (with the only order *Brachypodietalia pinnati*, semi-dry basiphilous grasslands) are already included in the databank to the largest extent. Thus, we will start the analyses with these communities. The very first results are presented here.

4.1 Species-area relation (SAR)

The power regression function of the SAR of vascular plants for the 1,328 relevés has a z value of 0.10. This is considerably lower than the values typically yielded by nested-plot studies in dry grasslands (ca. 0.20; cf. Dengler 2005), pointing on the probable incompleteness of the species lists for the larger plots (cf. Chytrý 2001). According to the regression function, there are on average 22.5 vascular plant taxa on 1 m² and 28.5 on 10 m².



4.2 Species combination

The most frequent taxa are:

74% Achillea millefolium agg.	48% Humulothecum tuberosum	38% Knautia anserina
62% Plantago lanceolata	46% Dactylis glomerata ssp. glomerata	36% Linum catharticum
58% Festuca ovina agg.	45% Hieracium pilosella agg.	36% Lotus corniculatus
53% Galium verum ssp. verum	44% Hypnum cupressiforme	35% Centaurea jacea agg.
52% Briza media ssp. media	41% Galium album ssp. album	34% Anthyllus vulneraria
52% Pteris aquilina ssp. aquilina	41% Medicago lupulina	34% Carex caryophyllus
50% Poa pratensis agg.	40% Festuca rubra agg.	34% Fragaria viridis ssp. viridis
49% Avenula pratensis ssp. pratensis	38% Filipendula vulgaris	33% Centaurea scabiosa

5. Outlook

- Continuous completion of the databank
- Close cooperation with the German Dry Grassland Databank (cf. Dengler & Jandt 2005) and SynBioSys Europe
- Definite analyses will start soon, beginning with the *Festuco-Brometea* and including syntaxonomy, methodology (e.g., effects of plot size and cryptogam treatment on results; different classification approaches), and biodiversity patterns

All persons with dry grassland data from the Nordic and Baltic region are cordially invited to join our working group!

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The *Festuco psammophilae-Koelerium glaucum* (*Koelerio glaucum*) of the subclass *Koelerio-Corynephoretea* grows on basic, nutrient-poor sands in the southern part of temperate Europe (Uckermark, Germany).