

Program of the Kiel Meeting 2008 with abstracts of lectures and presented posters

Lectures

Thursday, August 28th

14:20 – 15:10 Keynote Lecture 1 - **Large-scale classification of dry grasslands and related communities: approaches, problems, solutions and first results**

Jürgen Dengler¹

¹ Plant Systematics, Biocentre Klein Flottbek, University of Hamburg

Friday, August 29th

9:00 – 10:00 Keynote lecture 2 - **Ecological restoration of dry grasslands – a review**

Kathrin Kiehl¹

¹ Vegetation Ecology and Botany, Faculty of Agricultural Sciences and Landscape Architecture, University of Applied Sciences Osnabrück, Germany

The protection of species-rich dry grasslands is of high importance because they have become rare in many parts of Europe due to land use intensification and abandonment of traditional land-use techniques. Many examples show, however, that existing remnants of dry grasslands, e.g. in nature reserves, are often too small and fragmented to ensure the long-term maintenance of rare plant and animal populations. Therefore, it is also necessary to restore species-rich dry grasslands by improving the conditions for target species in degraded species-poor grasslands, and by establishing new grasslands e.g. on ex-arable land or in secondary habitats like mining areas. This is also in accordance with the Habitats Directive of the European Union, which states not only the protection and maintenance of existing habitats, but also the implementation of measures for the restoration of Natura 2000 sites to reach a favourable conservation status.

Degraded dry grasslands, which still contain target species, can often be restored by the implementation of a suitable management regime, such as mowing or grazing in order to reduce plant standing crop and litter and to optimize light and temperature conditions for low-growing, xerophilic species.

The restoration of completely destroyed dry grasslands is most successful on nutrient-poor, rawsoils, which occur e.g. in quarries, sand or gravel mines, or on sites where the nutrient-rich topsoil has been removed. On nutrient-rich soils with low water-holding capacity, the restoration of low-productive grasslands can also be successful because drought often limits nutrient availability. Nevertheless, nutrient impoverishment by mowing without fertilization is necessary on such sites to limit the growth of tall species of productive grasslands, which may be favoured in wet years.

Both in existing and newly established grasslands, diaspore availability of target species is often very low due to depleted seedbanks and limited dispersal in fragmented landscapes. Therefore, restoration success can be strongly improved by measures for the re-introduction of habitat-specific, target species. Results

from calcareous grasslands and from dry sandy grasslands indicate that the application of seed-containing fresh hay or raking material ensures the local provenance of the introduced plant material and allows the transfer of whole plant communities, which often contain a high proportion of rare and endangered species.

Newly established dry grasslands on restoration sites can improve the connectivity of dry grassland remnants and enlarge the habitats for populations of characteristic plant and animal species. Careful restoration planning, however, demands not only suggestions for short-term restoration activities, but also management strategies for the long-term maintenance of ancient grasslands and restoration sites.

10:00 – 10:20 **Naturalization and impact of a horticultural species, *Cotoneaster horizontalis* Decaisne (Rosaceae), in biodiversity hotspots in Belgium**

Julien Piqueray¹, Grégory Mahy and Sonia Vanderhoeven

¹ Laboratory of Ecology. Gembloux Agricultural University, Belgium

Cultivation of ornamental plant species has been recognized to foster plant naturalization of exotics by counteracting environmental stochasticity and continuously providing propagules. As a preliminary attempt to describe the invasion status of *Cotoneaster horizontalis*, we gathered information on the occurrence of the species at the Belgian level by computing various databases. We assessed the naturalisation status of *C. horizontalis* in Belgian calcareous grasslands, high value habitats recognised as biodiversity hotspots, by characterizing its occurrence, population status, preferred habitats, invaded communities, growth rate and fruiting capacity. We also assessed the impact of the species on calcareous grassland communities and on individual species. *Cotoneaster* occurred in seven of the nine investigated sites, with densities varying from 0.34 to 10 individuals/ha. In the most invaded sites, the high proportion of small individuals suggested an important ongoing colonization process, emphasized by the fact that fruiting capacities were demonstrated for 3-year-old individuals. Invaded habitats were typically Mosan Xerobromion habitats, which are Natura 2000 priority habitats. The presence of *C. horizontalis* was associated with changes in both the structure and composition of the community by decreasing species richness and diversity, and affecting grassland specialist species. These impacts are expected to intensify over time with changing age population and increasing propagule pressure due to close urbanisation.

Keywords: Biodiversity hotspots; calcareous grasslands; *Cotoneaster horizontalis*; impact; naturalization.

10:20 – 10:40 **From a hotspot to a dry spot – Australian temperate grasslands in a changing climate**

Anett Richter¹

¹ Institute for Applied Ecology, University of Canberra, Australia

Natural temperate grassland is one of Australia's most threatened ecosystems due to the dramatic reduction of more than 99.7% of its former distributional range. Apart from direct habitat loss and the consequences of grassland fragmentation, more recently these grasslands have experienced a period dominated by a pattern of severe drought. Natural temperate grasslands are known to be sensitive to climatic changes and under the current projected climatic scenarios it is expected that this type of ecosystem may collapse under the ongoing pressures of fragmentation and climate change leading to the extinction of this endangered community. Under the prevailing climatic conditions that were dominated by significant deficiencies in annual and monthly rainfall and above average annual temperatures I studied the responses of ground dwelling invertebrates to drought events at twenty four grassland remnants in the surrounds of Canberra. The results show a decline in invertebrate species richness and little sign yet of recovery, despite the end of the drought. It is concluded that under the influence of regional changes in climate, fragile ecosystems can change from previous diverse hotspots to a ... temporary... dry spot. Implications for European Dry grasslands are discussed.

11:00 – 11:20 **Long-term effects of the abandonment of grazing on steppe-like grasslands in Romania**

Eszter Ruprecht¹, Enyedi, M., Deák, M.

¹ Babeş-Bolyai University, Department of Taxonomy and Ecology, Romania

European semi-natural grassland carries an exceptionally high diversity of plants. Diversity and composition of these ecosystems evolved under the prevailing site conditions, but also in response to continuous human activities over millennia. Consequently, their species composition and species diversity are strongly related to past and current management practices. Our model vegetation type is species rich continental steppe-like grassland. In Romania, these dry grasslands occur on steep south facing slopes with eroded carbonated chernozemic soils on clayish or marly substrate, and are dominated by feather-grass (*Stipa*) species. Traditional management of the steppe-like grasslands was grazing by sheep or cattle from spring to autumn. In the last 15 years livestock have decreased in this region due to the low profitability, and because these dry grasslands have the lowest productivity compared to other more mesic grassland types; they were the first to be abandoned.

In a regional survey on steppe-like grasslands from the Transylvanian Lowland, Romania, we addressed the questions that: (1) what are the consequences of grazing abandonment on the *Stipa lessingiana* dominated steppe-like grasslands, and (2) what is the relative importance of management and environmental factors in causing variation in species composition and abundance in the continuously grazed and abandoned grassland stands.

We used and re-localized old vegetation data (phytosociological relevés) in order to re-sample those grassland stands which were surveyed 29-57 years ago. For revealing long-term changes in species composition and rank abundance PCoA

ordination was applied. The relative importance of management and environmental factors in structuring vegetation were explored by CCA ordination. Diversity, evenness and the relative number and abundance of red-listed species were compared between managed and abandoned stands.

Our results pointed out that grasslands formerly grazed, dominated by *S. lessingiana*, in the long-term absence of grazing have been transformed into *S. pulcherrima* dominated type. Management, probably by creating bare surfaces and preventing litter accumulation, had the strongest effect on the species composition and abundance in the grasslands. Abandoned grassland stands had lower diversity and evenness compared to continuously grazed stands, while at the same time, the relative number of threatened, rare species did not differ between managed and abandoned sites. As our study confirms, old vegetation data are useful for analysing long-term dynamical processes in grassland communities caused by land-use changes and for elaborating management plans.

11:20 – 11:40

Succession and Management of Calcareous Dry Grasslands in the Franconian Jura

Doris Jansen¹, Oliver Nell¹, Joachim Schrautzer¹

¹ Geobotany, Ecology Centre Kiel, Germany

Until the beginning of the 20th century, 20 % of the area of the Franconian Jura was covered with species-rich calcareous grasslands. Due to progressive land-use changes (intensification, abandonment caused by the retreat of sheep farming, reforestation) this area contracted to 0.75 % till this day. Thus, calcareous grasslands belong currently to the most threatened ecosystems of this region. To assure the remaining species-rich stands, and to enlarge the area of these ecosystems, restoration measures (state-aided re-establishment of sheep flocks, deforestation) were carried out since the beginning of the 1980's. One project within the scope of these activities is the Bavarian nature conservation project „Trockenbiotopverbund Staffelberg“. This project comprises 7 areas of the northern part of the Franconian Jura in which dry calcareous grasslands will be restored. Our study is engaged in investigating the effects of the implemented management measures on the vegetation structure and dynamics of these sites. Because the land use history is of high importance for the interpretation of successional processes as, e.g. following abandonment or restoration measures, we first analysed the fallow age and the date of deforestation using aerial views and the growth ring breadth of stems of *Juniperus communis*. To characterize the successional pathways, an indirect successional analysis was conducted, which was based on relevés of different scales (1 m², 25 m², 100 m²). The results show that the combination of aerial views and growth ring analysis turned out to be an appropriate method to determine fallow age and date of deforestation. While species richness is highest in intermediate successional stages (young fallows), species richness as well as the coverage of characteristic species of typical dry grassland species of the Festuco-Brometea decreased in abandoned calcareous grasslands. Deforestation and subsequent grazing with sheep flocks seem to be promising management measures for preserving and/or restoring the characteristic species composition of calcareous grasslands. However, because of the differing individual development of the sites after implementation of restoration measures (e.g. resettlement of wood) it is not possible to give general

recommendations concerning the intensity of management (e.g. frequency of grazing periods or displacement of woods).

Key words: secondary succession, restoration management, aerial views, growth ring analysis

11:40 – 12:00 **The botanical survey of a suggested Nature Reserve Týnčanský kras (Central Bohemia)**

Jiří Malíček¹, Petr Karlík^{1, 2}

¹ Přírodovědecká fakulta Univerzity Karlovy, katedra botaniky, Czech Republic

² Lehrstuhl für Botanik, Fakultät für Biologie und Vorklinische Medizin, University of Regensburg

The survey of the flora and vegetation of a suggested Nature Reserve, Týnčanský kras, is given. This small limestone area is situated in the south part of Central Bohemia, in the Middle Vltava region. Týnčanský kras is one of the best examples of the karst phenomenon between Bohemian Karst and limestone areas in the south of Bohemia. The karst area is characterised by xerothermic grasslands accompanied by a number of endangered plants (*Anemone sylvestris*, *Caucalis platycarpus*, *Gentiana cruciata*, *Orchis morio*, etc.). The list comprises almost 420 taxa of vascular plants. 50 species are on the red list (Procházka 2001). Vegetation of grasslands belongs to association *Carlino acaulis*-*Brometum erecti* (alliance *Bromion erecti*). In respect of former land use, it is possible to differentiate between vegetation on ancient pastures (with species *Helianthemum grandiflorum*, *Verbascum lychnitis*, *Festuca ovina*) and vegetation on old fields (with *Campanula rapunculoides*, *Agrimonia eupatoria*). On very thin soils occurs rupicolous vegetation of association *Alyso alyssoidis*-*Sedetum albi* (alliance *Alyso alyssoidis*—*Sedion albi*). Xerothermic plant communities are strongly endangered. The expansion of shrubbery is the main problem. The degradation of grasslands is caused by absence of a pasture/management.

14:00 – 14:20 **Impact of different management practices on heathland communities in the nature reserve 'Lütjenholmer Heidedünen' (Nordfriesland, Schleswig-Holstein)**

Martin Lindner¹

¹ Arbeitsgemeinschaft Geobotanik, Olshausenstr. 75, 24118 Kiel, Germany

Since 1989 different management methods (sod-cutting, prescribed burning) have been applied as conservation management strategies in the Lütjenholmer Heidedünen nature reserve (16 ha, district of Nordfriesland, Schleswig-Holstein, NW Germany). Effects on vegetation composition have been documented by use of permanent plots. Overall, a positive trend toward desired results was observed. Nearly all applied methods lead to higher germination rates of *Calluna vulgaris*. *Erica tetralix* recovered less well. Other typical species of heathland, e.g. lichens and bryophytes, probably require more time to recolonize. In the last years, new competition dynamics have emerged through the spread of nonnative species such as *Campylopus introflexus*, and woody species, such as *Rubus fruticosus* agg., *Prunus serotina*, and *Populus tremula*.

14:20 – 14:40

Regeneration and improvement of dry grasslands in Germany, project subsite Schleswig-Holstein – conservation concept, actions and results (LIFE00NAT/D/7058 Trockenrasen in Deutschland)

Hauke Drews¹

¹ Stiftung Naturschutz Schleswig-Holstein, Eschenbrook 4, D-24113 Molfsee, Germany, www.stiftung-naturschutz-sh.de

Semi-dry grasslands on calcareous soils are among the most endangered habitat types in central Europe. Today these habitats are mainly manmade substitute communities for forests on special sites in lime-rich, temperate and dry regions. The dry grassland species colonised these secondary habitats primarily from relict habitats on steep slopes at river embankments or coastal cliffs.

The ongoing technology progress and intensification of agriculture causes two main and contradictory developments, which are also relevant for calcareous semi-dry grasslands in central Europe; land use is being intensified on the fertile sites with the consequence that the semi-dry grassland is destroyed or severely impaired. By contrast, use is being completely abandoned on the sites with marginal yields e. g. as steep slopes or dry hill tops. This abandonment process causes the increase of dominant grass species and scrub. The flora and fauna species of the semi-dry grassland that depend on open, sunny sites are losing their necessary habitat requirements.

Calcareous semi-dry grassland (NATURA 2000 Code 6210) with especially large numbers of orchids is among the priority habitats according to the habitats directive (92/43/EEC). In Germany the calcareous semi-dry grasslands have special importance for European natural heritage thanks to its position at the interface of the biogeographical regions (Atlantic – Continental). Against the background of the great loss of land and the increasing degradation of semi-dry grassland due to scrubbing over, the Naturlandstiftung Saar [Saar Natural Land Foundation] and the Stiftung Naturschutz Schleswig-Holstein [Schleswig-Holstein Nature Conservation Foundation] have decided to take steps to protect this priority habitat with the LIFE-project “Regeneration und Erhaltung von Kalkhalbtrockenrasen in Deutschland” (Regeneration and Improvement of dry grasslands in Germany, LIFE00/Nat/D/7058). The overall project covers 8 partial areas: 1 in Schleswig-Holstein and 7 in the Saarland. The Project was implemented between 2001 and 2006. Further information is available on: www.life-trockenrasen.com

The presentation will focus on the project part of Schleswig-Holstein where primary dry grasslands in coastal cliffs were the project’s focus. Intensive land use up to the top of the cliff caused nutrient input and degradation of the dry grassland habitats on the cliff. To decrease these effects by the neighbouring land use, the conservation strategy was to buy parts of the arable fields to establish a zone of 100 m depth from the top of the cliff as a buffer and dry grassland development zone.

For preparing the management plan of the site monitoring was carried out focusing on vegetation, snails, solitaire bees and wasps (aculeate Hymenoptera). One prominent output was the reporting of the snail species *Truncatellina costulata*, which has its core distribution in southeastern European steppe habitats.

The land buying and exchange phase was complicated because it was in an area with growing farms and rising demands of other land buying projects for e.g. a

motorway development project. Finally, 18 ha of arable fields and one ha spruce plantation in the coastal cliff were purchased. Within this zone permanent grassland was established by succession and this area has been grazed since then by robust cattle, e. g. Galloway cattle.

Initial results from 3 year robust cattle grazing at a glance:

- the productivity of the grassland is much lower today than in 2005
- the first Baltic dry grassland species such as: *Leontodon hispidus*, *Anthyllis vulneraria*, *Primula veris*, *Centaurea scabiosa* and *Carlina vulgaris* are occurring in the conversion sites on former arable fields.
- one important After-LIFE activity was the felling of a spruce plantation in the coastal cliff.

LIFE Project Trockenrasen in Germany: www.life-trockenrasen.com

14:40 – 15:00 **Management of dry grasslands – examples of all year round moderately used semi-open pastures (Halboffene Weidelandschaften) on areas of the Nature Conservation Foundation (Stiftung Naturschutz) in Schleswig Holstein**

Heiko Grell¹

¹ Stiftung Naturschutz Schleswig-Holstein, Eschenbrook 4, D-24113 Molfsee, Germany, www.stiftung-naturschutz-sh.de

An area of about 27,000 hectares is owned by the “Stiftung Naturschutz” and spreads over the whole area of Schleswig-Holstein. These areas are mostly unproductive river valleys, fens, bogs, and coastal biotopes, or plots on nutrient-poor sandy soils. The Stiftung Naturschutz also holds some former military training areas.

The “Stiftung Naturschutz” has the task to manage these sites according to the aims of nature conservation in order to conserve and to support the diversity of natural habitats including their specific fauna and flora. Hereby, nature conservation efforts focus upon natural biodiversity, red-listed species, and FFH habitats. A major part of the area belongs to Natura 2000 sites. The “Stiftung Naturschutz” supports three different LIFE-projects so far.

The management of dry grasslands is a main theme the “Stiftung Naturschutz” faces by establishing semi-open pastures on areas of more than 100 hectares.

These areas are grazed extensively all year round by robust cattle, partly combined with horses and sheep. The livestock density is about 1 cattle per 3 hectares (0.3 GVE/ha). All habitats are included in the pastures, even groves, water bodies, springs, dunes, heath lands, and dry grasslands.

Some parts of the “semi-open pastures” can be temporarily left idle if otherwise breeding periods of birds or main flowering periods of certain plant species were disturbed. Grazing areas for the cattle can also be rotated systematically over the course of the year. This management method is called “Staffelweide”.

The concept of the “Staffelweide” in large “semi-open pastures” has partially been in practice for 10 years. Positive effects on wildlife habitats as well as on specific rare animal and plant species have been recognized since then.

Species which benefit from the “semi-open grassland” management are:

- many species on the red lists
- poor competitors
- species of edge habitats and ecotones
- species of short-grass meadows
- pioneer species

- species of heathlands and mattgrass communities

The positive development tendencies of the following plant species should be emphasized:

Species of heathlands and matgrass communities: Moonwort (*Botrychium lunaria*), Mat-grass (*Nardus stricta*), Heath Grass (*Danthonia decumbens*), Downy Oat-grass (*Helictotrichon pubescens*), Stiff Eyebright (*Euphrasia stricta*), Maiden Pink (*Dianthus deltoides*), Large Thyme (*Thymus pulegioides*), Kidney Vetch (*Anthyllis vulneraria*), Dog Violet (*Viola canina*), Scottish Heather (*Calluna vulgaris*), Petty Whin (*Genista anglica*), Dyer's Greenwood (*Genista tinctoria*), Hairy Greenweed (*Genista pilosa*), and Devil's-bit Scabious (*Succisa pratensis*).
 Species of pioneer habitats: Sheep's-bit (*Jasione montana*), Small Cudweed (*Filago minima*), Early Hair-grass (*Aira praecox*), Silver Hair-grass (*Aira caryophyllea*), Squirreltail Fescue (*Vulpia bromoides*) and Shepherd's Cress (*Teesdalia nudicaulis*).

The above-mentioned plant species show positive developments in the presented areas "Höltigbaum", "Schäferhaus", "Geltinger Birk", and "Reesholm".

Dependent butterfly or other insect species often benefit as well. Concerning animal species, mainly inhabitants of complex biotopes profit by the "semi-open grassland" management since plants settle in rather heterogeneous species compositions that change on very small scales and are subject to a high level of habitat dynamics.

Instead of the typical plant sociological units, special and close-to-nature habitat types are established in "semi-open grasslands", which are heterogeneous and often of a great environmental value. Species of dry grasslands and matt grasslands are found. No classification for this kind of complex natural habitat is defined up to now. It is characterized by moderate grazing activities, species richness, structural diversity and richness in flowering plant species.

Because of the positive effects of the management for nature protection, the "Stiftung Naturschutz" intends to establish this kind of "semi-open pastures" in all natural regions of Schleswig-Holstein, where suitable and fairly large project areas can be found. Natura 2000 sites are especially of interest.

Posters

Thursday, August 28th

Psammophilous grasslands *Spergulo morisoni-Corynephorretum canescentis* in the Mazurian Lakeland

Barbara Juskiewicz-Swaczyna¹

¹ University of Warmia and Mazury, Poland

Pioneer grassland occurring on inland, oligotrophic, limeless, acidophilous sands are a relatively rare component of the landscape of the Mazurian Lakeland. Within this area more fertile, young glacial habitats usually predominate, and therefore psammophilous grasslands encounter less than ideal conditions in which to develop. This, in turn, leads to the impoverishment of their floral composition, which especially affects the Atlantic and Subatlantic species. In the Mazurian Lakeland, the phytocenoses of *Spergulo morisoni-Corynephorretum canescentis* reach their eastern limit of their geographical range. The complex studies of these communities were performed in the years 1994-1997, the set of 596 phytosociological relevés was taken and analyzed by means of hierarchic classification using indicator species and the TWINSPAN program. In the Mazurian Lakeland, a subcontinental race of association *Spergulo morisoni-Corynephorretum canescentis* with D. geogr. *Veronica dillenii* occurred. The association is divided into 4 subassociations (*S.-C. typicum*, *S.-C. cladinetosum mitis*, *S.-C. thymetosum serpylli* and *S.-C. festucetosum ovinae*) with 10 variants. Field studies showed that the communities were exposed to strong anthropogenic pressure, leading to their degradation and a declining of their area of inhabitation. In May and June 2008, the next studies were undertaken to estimate an accurate state of the grasslands in the Mazurian Lakeland. A significant reduction of phytocenoses distribution was found, and the majority of them were devastated due to land usage connected with residential or road building, wood storage and sand extraction. Numerous grassland patches were forested or covered by naturally self-seeding *Pinus sylvestris*. Grasslands located in the areas attractive for recreational purposes, e.g. along lake shorelines, are under a strong human influence because they are used as playing fields and unauthorized bathing sites. Currently, there are only a few sites where well-conserved, extensive grassland patches of *Spergulo-Corynephorretum* still exist. It is noteworthy, however, that during the last fourteen years a strong limitation of grassland distribution as well as disadvantageous changes in floral composition in the area of the Mazurian Lakeland has been observed. The sites occupied by psammophilous communities are often regarded as wastelands and are often devastated, and therefore are becoming a more and more rare component of the Mazurian plant cover.

Koelerio-Corynephoretea plant communities on the Baltic Sea coast in Latvia

Brigita Laime¹, Didzis Tjarve¹

¹ University of Latvia, Faculty of Biology, Latvia

The Sea Coast in Latvia extends in total 496 km lengthways, 182 km along the Baltic Sea and 308 km along the Gulf of Riga. It is variable in geomorphology and habitats. Data of the coastal habitat mapping in 2004-2005, indicated that grey dunes cover an area of 1385 ha. The largest dune territories are located on the Baltic Sea coast and nowadays are included in Natura 2000 sites.

Grey dune plant communities were investigated after a renewal of independence of Latvia in 1991, when restrictions to visit the seashore were removed. Grey dune plant communities were

described and classified based upon 2795 phytosociological relevés (plot size 1 m²-4 m²) and the use of the Braun-Blanquet method.. Five associations within the class Koelerio-Corynephoretea were identified: *Violo-Corynephoretum*, *Caricetum arenariae*, *Phleo-Tortuletum ruraliformis*, *Festuco-Thymetum serpylli* and *Festucetum polesicae*.

The results show high plant species richness within the association *Festuco-Thymetum serpylli*. Some plant species like *Anthyllis maritima*, *Epipactis atrorubens*, *Dianthus arenarius* subsp. *arenarius* and *Tragopogon heterospermus*, indicate peculiarities of the grey dune vegetation of the Baltic Sea Region. The specific habitat condition and structure of the plant cover, as well as plant species composition determine the phytosociological diversity of the *Festucetum polesicae*. It was found that three variants could be identified in this association: var. *Arctostaphylos uva-ursi*, var. *Tortula ruralis-Pulsatilla pratensis* and var. *Dianthus arenarius-Thymus serpyllum* (rich in *Diploschistes muscorum* and *Astragalus arenarius*).

Dry grassland on sandy soils in the Forest and Steppe-Forest zones of the plain part of Ukraine: present state of syntaxonomy

Anna Kuzemko¹

¹ National Dendrological Park "Sofievka" NAS, Ukraine

Dry grassland on sandy soils in the Forest and Steppe-Forest zones of the Ukrainian plain, is represented by communities of the three classes: *Koelerio-Corynephoretea*, *Festucetea vaginatae* and *Molinio-Arrhenatheretea* (*Agrostion vinealis* alliance).

Communities of the *Koelerio-Corynephoretea* class are formed on the fluvio-glacial sediments, including river-valley terraces, and also on the highest parts of flood-plains in Polyssia of Ukraine. The class is composed of *Corynephoretalia Klika 1934 em. R. Tx 1955* order with *Corynephorion Klika 1931* alliance. In Ukrainian phytosociological literature has hitherto happened only to document the association *Helichryso arenarii-Jasionetum Libbert 1940* (Ворбйов, Балашов, СОЛОМАХА, 1997), and in addition the rank of communities that were not assigned to the association. Also, the association *Euphorbio cyparissias-Festucetum ovinae Shelyag et al. 1987* was described in the territory of Ukraine but has a doubtful status. Thus, syntaxonomy of this class in Ukraine is not adequately explored. It is probable that communities of orders *Festuco-Sedetalia acris R. Tx 1951* and *Alyso-Sedetalia Moravec 1967* are also present on Forest Zone territory of Ukraine.

In similar conditions in the Steppe-Forest Zone, the communities of the *Festucetea vaginatae* class are formed. On this territory the class includes communities of *Festucetalia vaginatae Soó 1957* order, *Festucion beckeri Vicherek 1972* alliance with four associations *Veronico dillenii-Secalietum sylvestri Shevchyk et V. Sl. 1996* (ШЕВЧИК, СОЛОМАХА, 1996, ДІДУХ, КОРОТЧЕНКО, 1996), *Thymo angustifolii-Festucetum beckeri Vicherek 1972* (ДІДУХ, КОРОТЧЕНКО, 1996), *Centaureo borysthonicae-Festucetum beckeri Vicherek 1972* (ШЕВЧИК, СОЛОМАХА, 1996, ДІДУХ, КОРОТЧЕНКО, 1996, ГОНЧАРЕНКО, 2003, КУЗЕМКО, 2003), *Thymo pallasiani-Centauretum sumensis Shevchyk et V. Sl. 1996* (ШЕВЧИК, СОЛОМАХА, 1996; ГОНЧАРЕНКО, 2003).

Order *Galietaalia vari Mirk. et Naum. 1986* (syn. *Proo-Agrostietalia vinealis Shelyag, V. Sl. et Sipaylova 1985*) and alliance *Agrostion vinealis Sipaylova, Mirk., Shelyag et V. Sl. 1985* are not accepted by the majority of European phytosociologists, but these syntaxa are recognized in surveys of vegetation in some countries of the former USSR. Communities of *Agrostion vinealis* alliance are in transition from *Molinio-Arrhenatheretea* class to *Koelerio-Corynephoretea* or *Festucetea vaginatae*. The characteristic properties of these communities are: low cover layer of mosses and lichens, and high consistency of *Molinio-Arrhenatheretea* species. On the territory of Forest and Steppe-Forest zones of the Ukrainian plain, the alliances are represented by tree

associations: Koelerio-Agrostietum vinealis (Sipaylova et al. 1985) Shelyag et al. 1987, Festuco valesiaca-Agrostietum vinealis Shelyag, Sipaylova, V.Sl.et Mirk. in Shelyag et al.1985, Agrostio vinealis-Calamagrostietum epigeioris (Shelyag et al. 1981) Shelyag, V.Sl.et Sipaylova 1985 (Сипайлова, Шеляг-Сосонко, 1996; Шевчик, Соломаха, Войтюк, 1996; Байрак, 1998; Куземко, 1999, 2003, 2004, 2008; Куземко, 2006; Куземко, Дзюба, 2002; Гомля 2005 and others).

Probleme der Klassifikation der Salzvegetation und des Schutzes von seltenen Halophytenpflanzen und –gesellschaften im Wolgagebiet (Russland)

Tatiana Lysenko¹

¹ Institut für Ökologie des Wolgaeinzugsgebietes der Russischen Akademie der Wissenschaften, 445003 Togliatti, Russia

Die Halophytengesellschaften sind charakteristisch für die Vegetation der Steppen- und Wüstenzonen im Wolgagebiet. Sie nehmen aber keine beherrschende Lage ein. In den Jahren 1994-2007 wurden im mittleren und unteren Wolgagebiet 1392 geobotanische Aufnahmen der Salzgesellschaften eingestuft und 57 Syntaxa bestimmt. Sie gehören zu den Klassen Thero-Salicornietea und Festuco-Puccinellietea. Was die Zugehörigkeit zu den Ordnungen und Verbänden angeht, bleiben noch viele offene Fragen, da das russische Syntaxa-System fehlerhaft ist. Es wurden 18 seltene Halophytenarten und 15 Salzpflanzengesellschaften benannt und Empfehlungen zu ihrem Schutz vorgeschlagen.

Friday, August 29th

Long-term population changes of *Libanotis pyrenaica* under different management

Wojciech J. Bąba¹

¹ Jagiellonian University, Institute of Botany, Lubicz str. 46, PL-31-512 Kraków, Poland

Cessation of traditional management or abandonment of calcareous grasslands caused a strong declining, fragmentation and isolation in the landscape by affecting the many calcareous grasslands throughout Europe. *Libanotis pyrenaica* is a monocarpic perennial, whose populations rely on seed production, and thus it is a good indicator of these changes. In southern Poland it occurs on different sites ranging from rocky vegetation (ass. *Festucetum pallentis*, *Seslerio-Festucion duriusculae* alliance), calcareous grasslands (*Cirsio-Brachypodium* order thermophilous fringes (*Trifolio-Geranietaea* class) to anthropogenic sites (road verges, railway escarpments). Is it possible for vulnerable plant species to withstand increasing competition from surrounding vegetation? Are the applied management strategies sufficient to maintain or recover viable populations?

Methods: I investigated the effect of the reinstatement of this species and demography between 1997 and 2006 under different management schemes: mowing with sod disturbance (M), clearing the shrubs (SC) and without management (C). In 1997, 3 10 x 10 m permanent plots consisted of 100 1m² quadrats, each in calcareous grasslands (*Origano-Brachypodium*) in Ojców National Park, Poland were established. In quadrats the very detailed (with resolution up to 1cm² cover) percentage cover data on each *Libanotis* specimen were collected. All the censuses were performed during the *Libanotis* flowering period. This enabled me to distinguish the individuals from cover data and divide it into four stages: seedlings (S), juveniles (J), vegetative adults (V) and

generative adults (G). Then I constructed stage-based transition matrices (Caswell, 2001). The LTRE experiments were used to disentangle the contributions and deviations in different life stage transitions to variation in overall population growth rate.

Results: Both management and year had an impact on demographic traits of *Libanotis*. Mowing and clearing the shrubs increased population growth rate by raising recruitment and increasing the efficiency of seedling establishment. In unmanaged plots, the gradual decline in population growth rate was observed. On all the plots studied, the high year-to-year fluctuation in flowering rate, caused by changes in weather conditions, was observed.

Conclusions: Only managed population of *Libanotis* show the ability of maintaining and even slightly recovering from abandonment. It was proven that owing to high year-to-year fluctuations in seed production, only the long-term experiments are able to fully explain the true trends in population dynamics.

Is *Campanula glomerata* threatened by competition of expanding grasses? Results of a long-term experiment

Monika Partzsch¹, Urte Bachmann and Isabell Hensen

¹Institut für Biologie/Geobotanik, Martin-Luther-Universität Halle-Wittenberg, Germany

In East Germany, a high percentage of species-rich, semi-natural dry grasslands have been converted into species-poor communities dominated by various grass species. Reasons include the disappearance of low-intensity types of agricultural land-use such as mowing and grazing, as well as an increased level of nitrogen deposition. The expansion of *Festuca rupicola* and *Poa angustifolia* in the porphyry landscape near Halle (PARTZSCH 2000) indicates that competitive relationships between plant communities are changing and that the biodiversity of species-rich dry grasslands is diminishing. In particular, low-growing forbs are becoming endangered due to the increasing dominance of the two aforementioned grass species. We selected *Campanula glomerata* as an example of a rare forb and evaluated its performance in competition with *F. rupicola* and *P. angustifolia*.

Method: In order to investigate the interaction of *C. glomerata* in contact with the two grass species *F. rupicola* and *P. angustifolia*, we used a replacement design (De Wit 1960) wherein the proportion of species within mixtures was varied, maintaining a constant density throughout. The following treatments were used: F9, C9, P9, F6C3, F3C6, P6C3, and P3C6. In March 2002, seeds of *C. glomerata*, *F. rupicola* and *P. angustifolia* were sown into plastic pots with a compost/sand mixture (2:3, pH value 7.0); and in September 2002, the pots were placed outdoors at the Botanical Garden of our institute. We measured the length of stems and the number of flowers per individual of *C. glomerata* as fitness parameters and determined the above-ground biomass of the pots. The whole experiment lasted 5 years. For the statistical analysis we calculated a linear model with the repeated measure procedure followed by a Tukey's post hoc test ($p \leq 0.05$).

Results: There was a highly significant change of biomass per unit area (unit pot) from year to year, between the treatments, and in the interactions between years and treatments in the mixtures and monocultures. Biomass decreased in the monocultures C9 and P9 as well as in the mixtures with *C. glomerata* und *P. angustifolia* from year to year. In contrast, biomass showed no similar trend in the *F. rupicola* monoculture or in the mixtures F6C3, F3C6.

The length of flowering stems of *C. glomerata* from year to year, between the treatments, and through interactions between years and treatments showed no significant results.

The number of flowers per individual of *C. glomerata* fell dramatically after the first year. The differences between years, treatments and interactions between years and treatments were significant.

By calculating the RNE- value of *C. glomerata*, we found that the interactions between *F. rupicola* and *C. glomerata* switched from facilitation to competition from year to year. When grown with *P.*

angustifolia, *C. glomerata* suffered from competition, which was highest in the 2nd year. The year on year variation was marginally significant ($p=0.06$); between treatments it was significant ($p=0,011$); but there was no significance in the interactions of years and treatments ($p=0.085$).

Conclusion: The results of our experiment show that an increasing dominance of *F. rupicola* and *P. angustifolia* leads to diminishing fitness in *C. glomerata*-individuals, with *P. angustifolia* being a much stronger competitor than *F. rupicola*.

The expansion of these two grass species is a result of the abandonment of traditional land use practices, which may compromise the chance of survival of low-growing forbs in dry grassland communities, and may also be one reason for the observed decline in biodiversity.

Population management for *Pulsatilla pratensis* in Schleswig-Holstein (Germany) – A first step

Björn-Henning Rickert¹, Hauke Drews²

¹ Hans-Olde-Weg 4, D-24229 Dänischenhagen, Germany

² Stiftung Naturschutz Schleswig-Holstein, Eschenbrook 4, D-24113 Molfsee, Germany

Pulsatilla pratensis ssp. *nigricans* is a highly endangered species in Schleswig-Holstein with just a few, still declining populations. Therefore, the idea of establishing a „backup population“ as a first step towards a population management arose. Seeds were collected from two populations and 45 seedlings were cultivated in a greenhouse. As a locality for the „backup population“, an area with moderate grazing owned by the „Stiftung Naturschutz Schleswig-Holstein“ was chosen. The plants were planted on sites with topsoil removal. All plants survived the first winter and in spring 2008, 22 of them flowered.

Invasion von *Calamagrostis epigejos* in Sandtrockenrasen des Wendlandes – Einfluss auf Vielfalt und Struktur von Vegetation und Heuschreckenzönosen

Oliver Schuhmacher¹ and Jürgen Dengler²

¹ NABU Hamburg, Germany

² Systematik der Pflanzen, Biozentrum Klein Flottbek, Universität Hamburg, Germany

Das Land-Reitgras (*Calamagrostis epigejos*) breitet sich derzeit in vielen Trockenrasengebieten Deutschlands aus und führt dazu, dass artenreiche Xerothermrasengesellschaften durch artenarme Landreitgras-Dominanzbestände ersetzt werden. Dies geschieht auch in extensiv beweideten Sandtrockenrasen (Ordnungen *Corynephorretalia canescentis* und *Trifolio arvensis-Festucetalia*) auf Flächen des NABU Hamburg im Wendland (Unteres Mittelbetal, Landkreis Lüchow-Dannenberg, Niedersachsen).

Im Rahmen eines Pflegeversuches zur Reduktion des Land-Reitgrases über sechs Jahre (2007–2012) untersuchen wir die Zusammenhänge zwischen Deckungsgrad und Sprossdichte von *Calamagrostis* und der Artenvielfalt und -zusammensetzung der Vegetation sowie der Heuschreckenzönosen. Dazu wurden jeweils benachbarte Flächen mit und ohne *Calamagrostis* vergleichend analysiert (Vegetation/Flora auf 1 m² und auf 100 m²; Heuschrecken auf 100 m²). Weiterhin untersuchen wir die zeitliche Entwicklung von *Calamagrostis*-Beständen bei unterschiedlicher Behandlung (keine Behandlung; Mahd mit Abtransport des Mähgutes 1mal, 2mal und 4mal jährlich, Pferchbeweidung durch Schafe sowie einmaliges Umgraben zur Beginn der Projektlaufzeit). *Calamagrostis* breitet sich in der Regel von einem Punkt ausgehend mit seinen

Rhizomen vegetativ in alle Richtungen aus, so dass oft fast kreisrunde Polykormone entstehen. Wir untersuchen deshalb zusätzlich Transekte vom Zentrum zum noch unbesiedelten Rand solcher Polykormone unterschiedlicher Größe vegetationskundlich, um daraus auf die Invasionsdynamik rückschließen zu können.

Es zeigte sich, dass die Ausbreitungsgeschwindigkeit von *Calamagrostis* bei über 1 m pro Jahr liegt und die Art auch innerhalb kurzer Zeit einen dichten Dominanzbestand aufbauen kann, in dem die Anzahl anderer Arten erheblich reduziert ist. Erste Ergebnisse zum Einfluss von *Calamagrostis* und der verschiedenen Behandlungsvarianten auf Flora und Heuschreckenfauna werden wir in Kiel präsentieren.

Expansion of *Rosa rugosa* in coastal dunes

Maike Isermann¹

¹ Vegetation Ecology and Conservation Biology, Bremen University, Germany

Coastal dunes are one of the most valuable habitat types in Europe, which are often species-rich and contain a lot of regionally rare plants and animals. Therefore, the preservation of semi-natural grass- and heathlands has a high conservation priority. Due to changes of species richness and diversity, the expansion of species poor shrublands e.g., with *Rosa rugosa* poses a serious conservation problem.

The influence of topographic and edaphic factors on the rate of the dry calcareous grassland vegetation dynamics

Solvita Rusina¹

¹ Faculty of Geography and Earth sciences, University of Latvia, Latvia

The aim of the present research is to assess how rapid is the vegetation change and decrease of species diversity in two calcareous grasslands abandoned for nearly 20 years. Investigations were carried out in calcareous grasslands located in the Abava River valley – the most spectacular calcareous grassland territory in Latvia. One sample area was located on a southwestern terrace slope and another sample area was located on a northeastern terrace slope of the river.

Vascular plant species and their abundance were recorded in permanent plots (size of a plot was 1m²; 35 plots in total with 15 plots in the first and 20 plots in the second area) each year in July and August from 2001 to 2007. The first area was covered by a *Filipendula vulgaris*-*Helictotrichon pratense* var. *typicum* community (five plots represented calcareous grassland overgrown by *Calamagrostis epigeios* and 10 plots were established in the most diverse part of the grassland). The second area was covered by *Filipendula vulgaris*-*Helictotrichon pratense* var. *Carex flacca* community (10 plots were established in a grassland part overgrowing with *Aegopodium podagraria* and *Chaerophyllum aromaticum*, and 10 plots were established in the most diverse part of the grassland). Surprisingly, vascular plant species richness did not change significantly over the research period in the most diverse part of the first area and slightly increased (statistically significant increase) in the part overgrown with *Calamagrostis epigeios*. There were no substantial vegetation changes over the seven-year period. The second area was more dynamic. Species richness decreased significantly, and vegetation changes were substantial. Ellenberg indicator values, soil chemical properties and topographic factors were used to explain the observed dynamics of vegetation and species richness.

Importance of past land use for species occurrence and vegetation composition: An example of dry calcareous grasslands

Petr Karlík¹ and Peter Poschlod¹

¹ Lehrstuhl für Botanik, Fakultät für Biologie und Vorklinische Medizin, Universität Regensburg, D-93040 Regensburg, Germany

Dry calcareous grasslands are one of the most species-rich but also most endangered ecosystems of Middle Europe, therefore they rank among habitats listed in the Habitats Directive. Besides dramatic loss of area in the second half of the 20th century, new (= recent) grasslands have formed on abandoned arable fields. The actual vegetation and habitat properties of both ancient and recent grasslands were compared in two typical territories of south German calcareous grasslands near Kallmünz (Bavaria, Franconian Alb) and on the Kaltes Feld (Baden-Württemberg, Swabian Alb).

It was found that history (former land use) of localities is a fundamental attribute of them. There is a strong significant difference between ancient and recent grasslands in both vegetation and soil. Arable cultivation in the past has changed the physical and chemical soil properties of recent grasslands. Differences in vegetation are mostly in composition, while difference in number of species is only weak. Ancient and recent grasslands may be characterized by plants which indicate the status of being ancient or recent. Good indicators for ancient grasslands are e.g. *Hipocrepis comosa*, *Carex caryophyllea*, *Asperula cynanchica*, *Helianthemum ovatum*, and *Pulsatilla vulgaris*. Typical for recent, newly arisen grasslands are e.g. *Agrimonia eupatoria*, *Mellilotus officinalis*, *Arrhenatherum elatius*, and *Vicia hirta*. Not only ancient grasslands, but also recent grasslands contain rare and/or endangered species (e.g. *Gentiana cruciata*) and may therefore have high conservation value too. These results could be applied in species- and habitat conservation.

Dry heathlands and sandy open grasslands in a suburban environment in the south of Brussels (Belgium)

Julien Taymans¹

¹ Laboratory of Ecology · Gembloux Agricultural University, Belgium

The Brabant sablo-limoneux region is located in the south and near Brussels, in the phytogeographic district of Brabant (Atlantic domain). This region is characterized by a high diversity of local ecological conditions due to the alternance of important tertiary sand outcrops and quaternary silty layers. The agro-sylvo-pastoral activities, which were practiced on these sandy and sand-silty soils for centuries, caused the evolution of the climatic forest into semi-natural habitats such as dry heathland, sandy grassland and grassheath. The evolution of the heathland distribution from 1770 to the present has been studied on the scale of the Dyle hydrographic subbasin (43.000 ha). It is characterized by an important regression of this habitat in the study area (from 1460 ha in 1770 to 72 ha in 2006), mainly due to *Pinus sylvestris* orchards, and more recently, to urbanisation caused by the proximity of Brussels. A generalized ageing and an environmental closing characterize the evolution of heathland physiognomy since the middle of the 20th century. The phytosociology of heathlands, sandy grasslands and grassheaths has been characterized and 19 groups of vegetation have been differentiated. Among the 393 listed higher plant species, more than 30 are of great conservation interest in the regional context. A hierarchisation of restoration priorities has been established on the scale of the studied hydrographic subbasin and management measures have been proposed.

Species traits as predictors of plant rarity on different spatial scales in 28 dry grassland species of North Eastern Germany.

Daniel Lauterbach ^{1,2}, Michael Ristow ², Christine Römermann ³

¹ Botanischer Garten & Botanisches Museum Berlin-Dahlem Königin-Luise-Str.6-8 14195 Berlin

² AG Vegetationsökologie und Naturschutz Universität Potsdam Maulbeerallee 2 14469 Potsdam

³ Institut für Physische Geographie J.W. Goethe-Universität Altenhöferallee 1 60438 Frankfurt am Main

In an actual landscape, plant species are opposed to a variety of land-use changes affecting plant species performance. We expect that, depending on their traits, plant species may be more or less threatened due to these changes. We tested for a correlation between traits and (1) frequency and (2) status of plant species endangerment on different spatial scales. We collected data for 28 non-clonal perennial plant species, from common to rare, on 59 species rich dry grassland sites in North Eastern Germany (Brandenburg/ Oder region). The following five traits were determined for each species: plant height, SLA, plant coverage, peak of flowering, and diaspore mass. In six different models we tested whether there is a correlation between these traits and: (1a) grid cell frequency of occurrence for Germany, (1b) grid cell frequency of occurrence for Brandenburg, (1c) site frequency for the Oder region, (1d) Shannon Index of coverage, (2a) status of endangerment for Germany, (2b) for Brandenburg. Stepwise multiple regression models were used. The results suggest that less frequent and more endangered plant species have a lower plant height, lower plant coverage and a lower SLA on all spatial scales. On a local scale, less frequent species additionally have a higher diaspore mass. More frequent and less endangered species show a later peak of flowering on a national and regional scale. Our results show that traits enhancing competition ability, like plant height, are more important on larger spatial scales and traits correlating with dispersal ability, like diaspore mass, are more important on small spatial scale for frequency of perennial non clonal dry grassland species. For an assessment of the performance of dry grassland species the knowledge about traits of common and rare species could be a useful tool to predict which species are vulnerable under certain ecological conditions, and which plant species may face a greater threat in the future.

Rehabilitation of the Baltic Coastal Lagoon Habitat Complex

Antje Walter¹

¹ Stiftung Naturschutz Schleswig-Holstein, Eschenbrook 4, D-24113 Molfsee, Germany

The LIFE Project BaltCoast assembles over 20 partners from 5 countries at 33 project sites around the Baltic Sea for this Coastal Habitat Project running from 2005 to 2011. It is aiming on restoration and improvement of several characteristic habitat types, animals and plants listed in the EU-Habitat Directive and EU-Bird Directive.

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