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and
“NATURA 2000”.***

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**DEPARTMENT OF BOTANY
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- ABSTRACTS -

SESSION: agricultural landscape 1

The Mediterranean weedy vegetation and its origin

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The Mediterranean agriculture started about 12000 years ago in the Middle East and begun its westward expansion not before 9000 yrs b.p. (Diamond 1996). It is likely that the setting of the first cultures was triggered by the observation of the after-fire biological successions, in areas where the annual vegetation is characterized by high frequency of edible legumes and cereals. The transition from a simple tribal social structure of gatherers and hunters towards more complex and technologically developed cultures was probably related to the setting of the first agricultural techniques: increased fire frequency + ploughing + (eventually) hoeing.

The ever increasing cultivated areas selected an opportunistic, poorly competitive, specialized flora, dominated by species with prolific seed sets and efficient dispersal strategies. The Mediterranean weedy communities progressively increased their species richness during the westward spreading of the cultivation techniques, and reinforced as soon as commercial routes become established. From the Mediterranean agriculture, several polyploid populations of weedy species are deriving, that often crossed the limits of the distribution ranges of their ancestors and in some cases (such as *Poa annua* and *Veronica persica*) achieved a worldwide success.

Each agricultural practice operates a selective pressure on the weedy communities, and this is also influencing the phytosociological classification of the Mediterranean weedy vegetation. The development of the Mediterranean agriculture probably begun with cereal growing, where the agricultural practices were limited to after-yield fires and superficial ploughing. On its turn, the segetal vegetation (*Papaveretea rhoeadis*) is likely to be the first appeared in the Mediterranean region, originating from plants having an Irano-turanian distribution (archeophytes).

To the hoeing-practice, a seasonal alternation of plant communities is associated, depending on the life-cycle and harvest-time of the crop. In the Mediterranean region, three main groups of weedy communities, linked to non-watered hoed crops, can be recognized: one group includes the weeds growing in winter-spring (*Fumario wirtgenio-agrariae*) and two include those growing in summer-fall, either on carbonatic (*Diplotaxion erucoidis*) or siliceous (*Chenopodion boryos*) soils. The chemical reaction of the soils has got a strong influence on the weed distribution during the dry season, because soils richer in carbonates and clay are on average more compact and their surface dries up faster. This combined influence of the soil chemistry and texture is negligible during the rainy season, due to the hydratation of the soil surface, that buffers the physical stress in the rhizosphere. Hoeing is also practiced in the agrume-groves, where the shadowing of the canopy facilitates the development of a sciaphilous-nitrophilous weedy vegetation (*Veronico-Urticion urentis*), that protracts the growing season well into the summer.

Most of the weeds linked to non-watered hoed crops originated from plants belonging to Mediterranean or sub-Mediterranean chorotypes.

In the Mediterranean region, watered summer crops are chiefly related to the cultivation of corn and *Solanaceae*. Warm temperatures and abundant water availability favour a weedy vegetation dominated by fast-growing tropical species (*Digitario ischaemi-Setarion viridis*), among which the neotropical chorotype is often prevalent (neophytes), due to the American origin of the cultivated species.

Rice has a minor importance in the Mediterranean region, even if paddy fields are commonly occurring in SE-Spain and W-Sardinia. In this context, the weedy vegetation includes several species with an E-Asiatic origin (*Oryzetea sativae*).

Diversity of segetal weeds and vegetation of cereal fields in Crete, Greece

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Due to socioeconomic and macroeconomic processes cereal fields have become rare in Crete (S Aegean, Greece), and even more those subjected to traditional agriculture, i.e., in the absence of herbicides and non-organic fertilizers. I sampled 73 relevés in traditionally cultivated fields of *Avena sativa*, *Hordeum vulgare*, *Triticum durum*, *Secale cereale*, and in recent fallows, and classified the data set. Relevé groups defined by different species combinations were distinguished and assigned to three associations (plus subassociations). The ecology and syntaxonomic status of the vegetation types are discussed. A list of obligate segetal weeds is provided, and seven 'hot spots' of areas that are rich in indicator species of traditional agriculture are identified.

Alien species in weed vegetation on arable land in the Czech Republic

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This presentation will summarize the analysis of a large phytosociological data sets, concerning representation of archaeophytes and neophytes in weed communities on arable land in the Czech Republic, with respect to habitat preferences of particular groups of aliens and temporal changes in their occurrence.

Potentials for ecosystem functioning and species diversity restoration in areas predominated by agricultural use

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In most European countries, agriculture remains one of the most important activities interacting with nature through land-use, pollution, species introduction and loss of species richness. The observed polarisation towards intensification or adjusting of agricultural activities in areas of a different former land use intensity leads to various and different vegetation types, and their composition and succession depends on the scale and intensity, at which the previous management has taken place.

Species composition, predominant plant strategy types and species richness of weed communities in corn fields and early succession stages after abandonment were compared from different areas from Northern Germany to NE-Poland and S-Lithuania in order to characterize the potential value of these sites for a further land use including the restoration of species rich secondary sites.

New data on the vegetation of uncultivated lands of the Mediterranean region and relationship with related communities of both cultivated lands and grasslands

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The results of a phytosociological study on both typical and atypical communities occurring in more or less uncultivated lands of both southern Italy and Iberian peninsula,

generally referable to the *Echio plantaginei-Galactition tomentosae* as well as to similar alliances, are presented. In particular, on the basis of both personal and bibliographic data the updating of the alliance (*Echio plantaginei-Galactition tomentosae*) was made. Moreover, the sociological role of the most important species and the relationships with the vegetation of both cultivated lands and grasslands, are pointed out.

A survey of the weedy communities of Sicily

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Basing on literature and unpublished data, a syntaxonomical survey of the weedy plant communities of Sicily, including the small islands around Sicily, has been carried out. In this region, both wooden and herbaceous species are cultivated. The most common wooden groves include: oliveyards, vineyards, fruit-orchards (citrus, almond, peaches, apples, pears, and so on). In the second group, a further distinction can be made between non-hoed (cereals) and hoed crops (mainly legumes, corn, artichokes and other vegetables). The weedy communities described for Sicily reflect this noteworthy crop variety, since the colonization of weeds is strictly related to the cultivation techniques, often differing from one crop to the other.

Cereals are the most common element of the Sicilian agricultural landscape, as they are grown almost everywhere, from the sea level up to flattened or gentle-sloping mountain sites. The hilly landscape of inner Sicily was already transformed by the Romans into the "granary of Rome". The segetal weedy vegetation of Sicily is therefore rich and well differentiated. All the surveyed association can be ascribed to the class *Papaveretea rhoeadis*, which comprises the order *Papaveralia rhoeadis*, grouping the most thermophilous vegetation types, and *Aperetalia spicae-venti*, more mesophilous, in Sicily restricted to mountain sites at more than 700 m a.s.l.

Most of the surveyed associations are linked to hoed crops. Major differences are determined by the tillage and watering regimes, on their turn related to the life-cycle of the cultivated plant. Depending on the growing season, two orders can be recognized in the whole Mediterranean region: one (*Polygono-Chenopodietalia polispermi*) grouping the weedy vegetation that grows during the rainy season (winter-spring) and the other (*Solano-Polygonetalia convolvuli*) grouping the vegetation that grows in the summer-fall period. The latter is further on split in three alliances: *Digitario ischaemi-Setarion viridis*, to which the weedy communities of watered cultivations are ascribed, *Diphotaxion erucoidis* and *Chenopodion botryos*, comprising the remarkably thermoxerophilous vegetation of non-watered crops, on basic-neutral or acidic soils, respectively.

Vineyards of western Sicily, settled on carbonatic, poorly fertilized soils, host a peculiar subnitrophilous vegetation belonging to the endemic alliance *Fedio gracilis-Convolvulion cupaniani*, characterized by several species that commonly grow, as well, in abandoned fields.

Citruses have been introduced in Sicily by the Arabian settlers in the early medieval age. Therefore, there have been enough time for the floristic differentiation of a weedy vegetation, chiefly composed by sciophilous-subnitrophilous species originating from a ruderal suburban flora (*Urtico-Scrophularietalia peregrinae*), that have found an ideal ecological niche under the evergreen dense canopies of the citrus-groves. This weedy vegetation is ascribed to the special alliance *Veronico-Urticion urentis*. Since citrus-groves are watered, once or twice, in the summer, their weedy vegetation may progressively shift towards aspects more related with the above-mentioned alliance *Digitario ischaemi-Setarion viridis*.

The weedy associations occurring in Sicily are reported in the following syntaxonomical scheme:

- PAPAVERETEA RHOEADIS Brullo, Scelsi & Spampinato 2001
 APERETALIA SPICAE-VENTI R. & J. Tx. in Malato Beliz et al. 1960
Scleranthion annui Kruseman & Vlieger 1939
Legousio-Brizetum minoris Brullo & Furnari 1982
 PAPAVERETALIA RHOEADIS Hüppe & Hofmeister ex Theurillat et al. 1995 em. Brullo et al. 2001
Ridolfion segeti Nègre ex Rivas-Martínez et al. 1999
Capnophyllo peregrini-Medicaginetum ciliaris Di Martino & Raimondo 1976
Calendulo-Hypecoetum procumbentis Bartolo, Brullo, Minissale & Spampinato 1988
Roemerion hybridae Br.-Bl. ex Rivas-Martínez et al. 1999
Legousio hybridae-Biforetum testiculatae Di Martino & Raimondo 1976
Adonido cupaniana-Anthemidetum incrassatae Bartolo et al. 1983
Vicio bithynicae-Ranunculetum arvensis Bartolo et al. 1983
Rapistro rugosi-Melilotetum infestae Bartolo et al. 1983
Valerianello dentatae-Medicaginetum scutellatae Ferro 1988
Lolio rigidi-Raphanetum raphanistri Ferro 2005
- STELLARIETEA MEDIAE R. Tx., Lohmeyer & Preising ex v. Rochow 1951
 POLYGONO-CHENOPODIETALIA POLISPERMI R. Tx. & Lohmeyer in R. Tx. 1950 em. J. Tx. in Lohmeyer et al. 1962
Fumarion wirtgenio-agrariae Brullo in Brullo & Marcenò 1985
Raphano-Erucetum sativae Brullo & Marcenò 1985
Loto-Anthemidetum incrassatae Brullo & Marcenò 1985
Diplotaxietum vimineo-erucoidis Brullo & Marcenò 1985
Fumario densiflorae-Veronicetum hederifoliae Brullo & Marcenò 1985
Fumario parviflorae-Geranietum tuberosi Brullo & Marcenò 1985
Sileno coloratae-Lobularietum libycae Brullo & Marcenò 1985
Ammio-Torilidetum nodosae Brullo & Marcenò 1985
Herniario-Spergularietum arvensis Brullo & Marcenò 1985
Fumarietum parviflorae-bastardii Bartolo, Brullo, Minissale & Spampinato 1988
Fumario parviflorae-Resedetum luteae Bartolo, Brullo, Minissale & Spampinato 1988
- SOLANO-POLYGONETALIA CONVULVULI (Sissingh in Westhoff et al. 1946) O. Bolòs 1962
Digitario ischaemi-Setarion viridis (Sissingh in Westhoff et al. 1946) Oberd. 1957
Setario ambiguae-Cyperetum rotundi Brullo, Scelsi & Spampinato 2001
Setario glaucae-Echinochloetum colonum A. & O. Bolòs ex O. Bolòs 1956
Diplotaxion erucoidis Br.-Bl. in Br.-Bl. et al. 1936 em. Brullo & Marcenò 1980
Chrozophoro tinctoriae-Kickxietum integrifoliae Brullo & Marcenò 1980
Amarantho lividi-Eragrostietum barrelieri Brullo & Marcenò 1985
Chrozophoro tinctoriae-Heliotropietum dolosi Bartolo, Brullo, Minissale & Spampinato 1988
Chenopodion botryos Brullo & Marcenò 1980
Heliotropietum bocconeii Brullo & Marcenò 1980
Heliotropietum dolosi Brullo & Marcenò 1980
- THERO-BROMETALIA (Rivas-Goday & Rivas-Martínez ex Esteve 1973) O. Bolòs 1975
Fedio gracilis-Convolvulion cupaniani Brullo & Spampinato 1986
Chamaemelo-Silenetum fuscatae Brullo & Spampinato 1986
- GALIO-URTICETEA Passarge ex Kopecky 1969
 URTICO-SCROPHULARIETALIA PEREGRINAE Brullo in Brullo & Marcenò 1985
Veronico-Urticion urentis Brullo in Brullo & Marcenò 1985
Fumario-Stellarietum neglectae Maugeri ex Brullo & Marcenò 1985
Bromo-Brassicetum sylvestris Brullo & Marcenò 1985

Common and tartary buckwheat as semi-wild plants in agricultural vegetation in Europe

Kreft I

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Two types of buckwheat are grown in Europe: common buckwheat (*Fagopyrum esculentum*) and tartary buckwheat (*Fagopyrum tataricum*). In Europe are only small resemblances on growing tartary buckwheat, mainly in Luxemburg, but as well in Italy (area around Teglio in Valtellina), in some places in Germany and in Slovenia (Krma and areas close to Sevnica, Trebnje and Radohova vas). In Slovenia, buckwheat fields are typical element of traditional agricultural landscapes. In Europe buckwheat has been grown for centuries and is now one of the important alternative crops, suitable for ecological growing, without the use of artificial fertilizers or pesticides. For many years, cultivation of buckwheat declined, but recent interest in old, traditional foods and a re-evaluation of typical regional products has led to a resurgence in its cultivation. Buckwheat is known as an important source of antioxidative substances. Rutin (quercetin-3-rutinosid) is a flavonol glycoside synthesized in plants as a protectant against UV-B radiation and disease. The amount of ultraviolet (UV-B) absorbing compounds in buckwheat is related to UV-B radiation. Eastern Tibet and adjacent areas of Sichuan and Yunnan in China are probable sites of origin of cultivated common and tartary buckwheat. The altitude of villages and towns in Eastern Tibet is in the range of 2500 to 3500 m above sea level. Buckwheat plant originates in locations exposed to high UV-B radiation because of high altitude and relatively low latitude. Ability to synthesize rutin and related compounds is thus evolutionary plant response to the extreme growing conditions.

Both buckwheat species are low input plants and they appear as weed plants in each other's crop or on the margins of fields of other crops. Sometimes, they are an element in mixed crops. Buckwheat, especially common, but as well tartary buckwheat, are semi-wild plants with many morphologic and physiologic characteristics of wild plants.

Diversity of weed vegetation in the Czech Republic and Slovakia

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Major broad-scale gradients in species composition and their underlying factors were studied for weed vegetation of arable land in the Czech Republic and Slovakia. A selection of 2653 geographically stratified relevés sampled between 1954–2003 was used for gradient analysis and numerical classification. Canonical correspondence analysis revealed that species composition of weed vegetation mainly varied with altitude, which was associated with decreasing temperature, increasing precipitation and lower base status of the soils. Proportion of hemicryptophytes to therophytes increased at higher altitudes. Species richness increased and beta diversity decreased with increasing altitude. The second most important gradient of weed species composition was associated with seasonal changes, resulting in striking differences between weed communities developed in spring and summer. The third gradient reflected long term changes in weed vegetation over past decades. Proportion of hemicryptophytes to therophytes, and species richness decreased with time. Crop plants and associated agricultural management had a less pronounced but still significant effect on weed species composition than the broad-scale environmental gradients and temporal changes.

Relevés were classified into seven main groups using cluster analysis. For each group diagnostic species were determined using statistical calculation of fidelity. The classification reflected the major gradients as detected by canonical correspondence analysis, with a clear distinction between lowland and highland communities and with additional emphasis on the dichotomy between cereal and root-crop cultures. A separate group for vernal communities was also distinguished. The groups resulting from numerical analysis were compared with traditional phytosociological units.

Distribution of Turkish warty-cabbage *Bunias orientalis* L. in Latvia

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Bunias orientalis is one of the widely spread introduced species in Latvia. The region of origin of *B. orientalis* is the European part of Russia, Caucasus, West Siberia. Currently this is one of the species that is common and established in central Europe and in parts of northern and western Europe.

The study of distribution and phytosociology of *B. orientalis* in Latvia shows some significant relevances in spread of non-native species in new regions that can be partly generalized and adopted for further research in spread of other invasive non-native species. This study shows the history of species, its current distribution and migration routes and tendencies in Latvia.

B. orientalis were first recorded in 1829 in Latvia. Since then, there had been registered 335 localities of *B. orientalis*. 15 localities had been registered in a period from 1829 to 1890, 33 from 1891 to 1920, 25 from 1921 to 1950, 11 from 1951 to 1970, 251 from 1971 to 2005. The last decades were the most intensive in research of species distribution and offers the most representable data. A stadardized grid (10×10 km) for mapping were used.

Species was found mostly along roads, railways, in heavily disturbed habitats; more rarely on grasslands, fallow lands, agricultural fields, gardens, embankments of rivers, forest edges, and others habitats.

Most of localities were found in the east of Latvia, central part of east Latvia, some biggest cities, mostly in East Latvia and the capital; less at the coastal region and even less in western part of Latvia. The least concentration of localities was found in the central part of Latvia and central part of West Latvia. Migration routes from the east to the west can be drawn if mapping the registered localities in a historical perspective. The directions of migration are related mainly to the roads, railroads and rivers as migration routes.

We conclude that the introduction and spread of species are strongly related to transportation and river routes as determining factors. The influence of agriculture and gardening is inconspicuous.

SESSION: NATURA 2000

The Monitoring Guide for habitat types and species as a tool for planning conservation management strategies in the NATURA 2000 sites of Greece

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The monitoring and management obligations for Greece are not restricted only to the 359 sites of the NATURA 2000 ecological network (ca. 20% of the Greek territory), but data need to be collected both in and outside the NATURA 2000 network to achieve a full appreciation of the conservation status of the habitat types. Monitoring is needed to track trends in conservation status of both habitats and species. It is now necessary for Greece to proceed with the establishment of a monitoring system, which should take into account the reference parameters reached for each habitat type. This requires the setting up of a monitoring scheme in the frame of the Directive 92/43/EEC.

The recently published Monitoring guide for habitat types and species comes to fill the existing gap at the level of specification of the methodical principles for planning and implementing long-term monitoring to plant species and habitat types in Greece. It is structured in three chapters:

Chapter I refers to the stages of establishment of the NATURA 2000 network, from the initial selection of the sites of ecological importance in 1994-1995, up to the establishment of 27 Management Institutions in 2003.

Chapter II refers to the present and potential threats corresponding to each NATURA 2000 and Hellenic habitat type, which are attributed to 6 categories and 42 subcategories; a reference list of threats is presented.

Chapter III refers to the monitoring guidelines for habitat types and plant species in the 78 NATURA 2000 sites included in the area of responsibility of the 27 Management Institutions. The general part concerns a) the description of the widely used methods for planning and implementing a long-term monitoring of the habitat types of the Dir. 92/43/EEC, as well as of the Hellenic habitat types, b) the guidelines for the Conservation Status Assessment scheme to be implemented in Greece on the basis of three parameters and three value categories or status degrees based on the EU Directive 97/266/EG. In the specific part, guidelines for monitoring and assessment of each of the nine (9) habitat type groups in the sense of Dir. 92/43/EEC are given.

For the plant species of Annex II of the Dir. 92/43/EEC, the widely used monitoring methods, as well as a Conservation Status Assessment scheme are presented in the general part. The last subchapter provides specific monitoring guidelines for 17 plant species of priority relevance including 1 moss species, 2 pteridophytes and 14 angiosperms, applying the methodical principles given in the general part.

What can a phytosociologist learn from NATURA 2000 habitat mapping?

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NATURA 2000 habitat mapping in the Czech Republic, which took place between 2000 and 2004, gave opportunity for practical use of phytosociological knowledge, but also revealed some limitations of the traditional phytosociological approach to define “natural units” (habitats) useful for nature conservation purposes. The most important learning from the mapping is that it is often advisable to abandon the aspiration for “objectivity” in habitat mapping and to follow very specific and “subjective” criteria given by the needs of nature conservation.

Restoration of NATURA 2000 habitats in agricultural landscapes: the case of “Open grassland with *Corynephorus*” Code 2330 and “*Koelerion glaucae*” Code 6120

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To restore endangered sand-specific plant communities, indicating low-nutrient conditions, the following problems have to be solved:

- The sand material used must be of low-nutrient status and low ruderal seed content.
- Diaspores of sand-specific species should be transferred by inoculation methods.

Both approaches were used in projects in northwestern Germany (Ems region: acidic sand) and the northern upper Rhine valley near Darmstadt (calcareous sand).

In the Ems region it was possible to restore an alluvial sandy landscape on former intensively managed maize field stands by creating, e.g., “neodunes” with low-nutrient sand from former dike cores. After inoculation with raked material taken from target areas, stands of *Spergulo-Corynephorum* and *Diantho-Armerietum* developed. Grazing impact by cattle and river dynamics maintain a long-term dynamic system with patchily distributed open sand habitats.

In the northern upper Rhine valley fragmented *Koelerion glaucae* and *Allio-Stipetum* stands were “defragmented” by using layers of nutrient-poor deep sand with nearly no seed content. Afterwards inoculation with raked material from target areas was carried out. By implementing these inoculated sand areas, *Koelerion glaucae* stands were restored. Even very rare plant species, such as *Bassia laniflora* and *Jurinea cyanoides*, are now growing there. An extensive sheep-grazing management insures the maintenance of dynamic processes.

Sand-specific animal communities (wild bees, thermobiontic grasshoppers) were able to disperse or were transferred by the raked material (the eggs of the endangered grasshopper *Calliptamus italicus*). The approach is only successful, if there are sufficient numbers of remnant areas with target communities still present.

NATURA 2000 in Germany and its implications for the protection of plant syntaxa

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The site selection for building the European network of protected sites “NATURA 2000” is finalized at least for the Habitats Directive after several phases of site proposals and site evaluations both at national and at community level in the biogeographic seminars. Germany now has 5.073 sites, covering 13,5 % (9,3% for SCI's) of the terrestrial land surface (4,812,932 ha), and an additional 2,317,909 ha of marine areas. With 87 (91) protected habitat types of Annex I a substantial part of the endangered vegetation types is covered, however some gaps remain. An analysis will be given which alliances are protected under the Habitats Directive in Germany and a preliminary assessment will be given on the level of protection they will receive under the EU regulations.

Phytosociological basis of the Bulgarian NATURA 2000 habitats

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Bulgaria is in the process of establishing the NATURA 2000 network. 89 habitat types from the Annex I of the Directive 92/43 (Habitat Directive) were described on the country's territory (Kavrakova et al. /eds./ 2005). More than 100 associations, subassociations,

communities and provisional associations, which have been identified according to the Braun-Blanquet's methodology, correspond to 41 habitat types listed in the Directive. Despite of the phytosociological research increase during the last decade, the Bulgarian vegetation is still poorly investigated according to the Braun-Blanquet's school. Some widespread vegetation types as the oak and coniferous forests, the halophytic, stone, steppe grasslands and the humid meadows are not well studied. Only the sand dunes, the mires and the petrifying springs and the beech forests are investigated more completely. The alpine and subalpine grasslands and the heaths are investigated only in Rila Mts. (Roussakova 2000), the aquatic vegetation - in Danube plain (Tzonev 2002), the snow-beds, the rock fissures and the screes – in Pirin Mts. (Mucina et al. 1990). A large part of the Bulgarian territory and many not only rare, but also common vegetation types need more complete explorations as well. Such researches will help the process of the making and the management of NATURA 2000 special protected areas.

Comparative analysis of different natural habitat classification systems applied at local scale for NATURA 2000 sites management. The case of Calabria (S Italy)

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The study summarises the experience in the application of different systems (CORINE, EUNIS, Dir. 92/43 and Land Cover) for habitat individuation, mapping and spatial analysis at local scale used in elaboration of management plans for proposed NATURA 2000 sites in Calabria. The presentation compares the effectiveness of different systems for data collecting and managing and their applicability for territorial analysis in supporting decision making and long term monitoring. Short comments about relations between habitat, vegetation (syntaxa) and landscape approaches applied for Nature conservation at local scale in respect to environmental policy are also discussed.

SESSION: semi-natural vegetation

Classification of seminatural grasslands in north-eastern Bulgaria

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Some 387 releves collected in north-eastern Bulgaria during 2001-2004 were analyzed. The region has been under intense anthropogenic influence for millennia. Heavily fragmented, the remains of semi-natural grasslands are found in one of the most pronounced agricultural landscapes in Bulgaria. Descriptions are stored in the TURBOVEG data base; they have also been exported to JUICE, and TWINSpan has been used for the classification. Evidence has been found for the presence of *Cynosurion*, *Stipion lessingianae*, *Festucion vallesicae*, *Convolvulo-Agropyron*, *Dauco-Melilotion*, *Sisymbrium* and *Scolimion* alliances. The syntaxonomic diversity has been analyzed at lower hierarchical levels as well. The presence of *Festucion rupicolae* proved debatable. No firm evidence of that was found in the course of the analysis. Intensive agriculture led to the large-scale invasion of ruderal plants and weeds into all community types, resulting in a higher degree of floral similarity between them and making classification difficult. Nearly half of the grasslands belong to alliances comprising ruderal communities. The vegetation belonging to *Dauco-Melilotion* is characteristic of the early phases of digressive succession in abandoned arable land. *Convolvulo-Agropyron* develops in mesophytic locations, and represents a phase of digressive succession of long time abandoned arable fields. The *Sisymbrium* and *Scolimion* are represented in the *Festucion vallesicae* zone as a highly ruderalized phase of overgrazed pastures.

Ephemeral wetlands in the Western Palaearctic region – the role of climatic variability, soil disturbance and land use in a north-south gradient

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The ecological conditions creating a niche for temporary wetland communities (*Isoeto-Nanojuncetea*) on a gradient from subarctic via temperate to mediterranean climates is outlined. Short-living dwarfish plants can exist when perennial competitors are excluded. This can be guaranteed by a different combination of environmental factors:

1. In subarctic regions vertical soil movement by cryoturbation (needle ice, frost heaving) and lateral solifluidal processes eradicate the perennials ("ambulatorian plants") and create habitats for the *Koenigio-Microjuncion*.
2. In perhumid climates local destruction of the plant cover is necessary from time to time to exclude the perennials. Disturbance can result from geomorphodynamic processes or from anthropo-zoogenous impacts. Wave erosion, flood pulse, ice scour, fluvial erosion and sedimentation favour pioneer communities and initiate a shifting pattern at the local scale and year-to-year-fluctuations of the vegetation mosaic. Bioturbation (rooting by wild boar and pigs) opens germination niches for short-living ephemerals in permanent alluvial grassland. Some communities (*Centunculo-Anthocerotetum*) have expanded by arable land as secondary habitats.
3. As a result of seasonal variability of precipitation and evapotranspiration, water level is strongly fluctuating in subhumid to semi-arid climates. No soil water is available for perennials in the dry season and temporary pools can be spatially very stable structures there. Pure rainwater systems fill very slowly with sediments. Biogenic sediments are reduced by rapid oxydation in the dry season..

Finally, conservation management of ephemeral wetland ecosystems is discussed: There is a contrast between Central Europe, where more dynamics in geomorphological and hydrological processes are necessary to maintain dwarf rush communities, Southern Europe, where pasturing should be reintroduced, and Northern Africa, where overgrazing respectively transformation to arable land are the main risks.

Dry grassland communities of shallow, skeletal soils (*Sedo-Scleranthenea*) in northern Europe

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We studied the dry grasslands of shallow, skeletal soils (*Sedo-Scleranthenea*, *Koelerio-Corynepherea*) in northern Europe, based on a combination of new relevés from southern Öland (Sweden, $n = 182$) and Saaremaa (Estonia, $n = 73$) as well as a comprehensive evaluation of literature data, of which 65 suitable relevés were directly included in our analyses. Apart from a few vague indications of acidophytic *Sedo-Scleranthenea* communities (order *Sedo-Scleranthetalia*), all data refer to basiphytic communities (*Alysso-Sedetalia*); our analyses are thus focussed on the latter. These vegetation types for the most part have been included in Annex I of the Habitats Directive of the European Union as priority habitat 6280 ('Nordic alvar and precambrian calcareous flatrocks'). The Nordic *Alysso-Sedetalia* communities proved to be quite different from their temperate counterparts and thus are included in a separate alliance, *Tortello tortuosae-Sedion albi*, which forms the northern counterpart to the central European *Alysso-Sedion*. Within the northern alliance, we distinguish two suballiances. The more widespread central suballiance *Tortello tortuosae-Sedion albi* inhabits different types of base-rich substrata in both natural and anthropogenic sites, and is comprised of the *Cladonio symphicarphae-Sedetum albi* and the *Ditricho flexicaulis-Sedetum acris*. The second suballiance *Tortello rigentis-Helianthemion oelandici*, is restricted to the alvar sites (= treeless limestone plateaus) in Öland, Gotland, Västergötland and Estonia. It is characterised by several endemic taxa and a large number of cryptogams typical of alvar. It is comprised of four associations, *Crepido pumilae-Allietum alvarensis*, *Fulgensio bracteatae-Poetum alpinae*, *Helianthemion oelandici-Galietum oelandici* and *Gypsophilo fastigiatae-Globularietum vulgaris*. All six Nordic associations are described with respect to their floristic composition, ecology and distribution. The floristic differences within the Nordic communities are worked out in a synoptic table. Whereas several vegetation scientists have pointed out that vegetation types occurring at the limits of their distribution ranges in northern Europe are generally difficult to classify, our application of the Braun-Blanquet approach, which is based on *a priori* separated structural types and the general application of the central syntaxon concept, has enabled us to characterise and adequately define all Nordic communities. The *Tortello-Sedion* associations are two to three times as species-rich as those of the *Alysso-Sedion* and are among the most diverse small-scale plant communities ever described. We discuss the reasons for this exceptionally high plant diversity and the peculiar species mixture in the *Tortello-Sedion*. Our results further underline the uniqueness of Baltic alvars and their paramount importance for conservation at the European level.

The analysis of long term changes in plant communities: the effect of stratified resampling in a large database

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Over the last five years, several authors reported that abstract vegetation types such as associations or alliances are not static entities with a fixed floristic composition, but that the latter varies significantly over time. Large phytosociological databases seem to be a valuable instrument to analyze long term changes in plant communities (for instance as a reference for the NATURA2000-network), since they include recent as well as historical relevés in most cases. However, the relevés in such databases are biased towards easy accessible sites and vegetation types of interest, which influences the outcomes of classification studies. We questioned how this bias influences the results of trend analyses of species composition and whether stratified resampling improves the results of the analysis. Hence, for three plant

communities, viz. the *Cirsio dissecti-Molinietum* (subatlantic fen meadow, class *Molinio-Arrhenatheretea*), the *Genisto anglicae-Callunetum* (dry lowland heath, class *Calluno-Ulicetea*) and the *Stellario-Carpinetum betuli* (subatlantic oak-hornbeam woodland, class *Quercus-Fagetea*), we stratified the Dutch national vegetation database, using 1) grids at different scales (1x1 and 5x5 km) and 2) phytogeographical districts, reflecting plant distribution caused by environmental and historical factors. For all three vegetation types, we filtered the database (on quality of relevé data), we resampled the database and we analyzed the differences in floristic composition between two periods (before and after 1970) using χ^2 -statistics. The results diverged between the applied stratification, but also between the different plant communities, most likely as a result of the structure of the data. We conclude that for trend analysis in large vegetation databases, with data from various sources, stratification is needed, because it results in a more representative (less biased) data set. The most suitable type of stratification is dependent on the data structure.

Do alkali steppes belong to the natural or the agricultural landscapes of East-Central Europe?

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Pannonian alkali steppes are often regarded as secondary, originated after the agricultural amelioration of the Pannonian floodplains. Based on 18-19th century botanical, historical, ethnographical and map sources we show that the present-day alkali steppes are much older, than 150 years. Most of them seem to be continuous with the natural steppes, only a part originates from drained floodplains. We describe the "sigmetum" of primary and secondary steppes, compare the basic alkali plant associations of the two steppe types. Based on the META-database (actual vegetation database of Hungary), we delineated these steppe types in a wider landscape.

Local flora lists from 1790-1810 were analysed with COCKTAIL (Juice 6.3.70). The found species groups are nearly identical with the present-day species groups of alkali steppes, hence we concluded, that vegetation composition did not change considerably between 1800 and present, as was suggested by many Central-European/Hungarian botanists.

Influence of sample plot size on the data analysis

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Vegetation samples from plots that are stored in phytosociological databases often differ by one or two orders of magnitude in size, even within a single vegetation type. This fact may influence vegetation analysis, but the extent of this possible influence has not been investigated so far. The effect of sample plot size on ordination results was investigated in forest vegetation in Moravia (Czech Republic), using data from nested plots of 49, 100, 225, 400, 625 and 961 m². Sampling of different vegetation types over various climatic condition in a larger area of southern Moravia on the one hand and of floristically homogeneous vegetation within a small area on the other hand, provided heterogeneous and homogeneous data sets, which were used for analysis. In both data sets the smallest plot sizes showed the most deviating patterns in ordinations, while samples of larger sizes gave similar results. The transformation of percentage cover also affected the results, more so when samples were collected in homogeneous vegetation. These effects of various plot size on ordination are caused by low species richness and evenness in smaller plots, which are more pronounced in homogeneous data set, and result in a higher β -diversity of the set of smaller plots.

Samples differing in size by one order of magnitude (49 and 961 m²) seem to be inappropriate to combine together in ordination analysis, especially when they were sampled in homogeneous vegetation.

Productivity of *Polygono-Trisetion* meadows in the North Pennine landscape, England

Rodwell J., Edwards A. & Taylor J.
Lancaster, United Kingdom

Measurements of above-ground biomass from *Polygono-Trisetion* grasslands were made each week during the spring growing season on two farms at different altitudes in the North Pennine foothills, England. These data provide the first indication of the growth pattern and productivity in these traditionally- managed hay meadows much declined over the past century, still threatened by intensive agriculture and designated for NATURA 2000 as Habitats Directive (Annex I 6520).

***Festuco-Brometea* grasslands in Latvia: classification and phytogeography**

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Classification of calcareous grassland vegetation was carried out using sociological species group approach (algorithm of H. Bruehlheide using computer programme JUICE by L. Tichy). Three sociological species groups (SSG) were associated with the class *Festuco-Brometea* – *Helictotrichon pratense* group (*Helictotrichon pratense*, *Filipendula vulgaris*, *Phleum phleoides*, *Trifolium montanum*, *Fragaria viridis*, *Galium verum*) *Fragaria vesca* group (*Fragaria vesca*, *Centaurea scabiosa*, *Medicago lupulina*, *Agrimonia eupatoria*, *Polygala comosa*, *Pimpinella saxifraga*) and *Carex flacca* group (*Carex flacca*, *Cirsium acaule*, *Festuca arundinacea*, *Inula salicina*, *Carlina vulgaris*, *Sesleria caerulea*). In total, 374 relevés from the initial data base of 1373 relevés of mesophytic and xerophytic grassland vegetation were delimited as belonging to the class *Festuco-Brometea*.

Calcareous grasslands clearly differentiate in western and eastern type in Latvia. Occurrence of the *Helictotrichon pratense* SSG and *Carex flacca* SSG is associated with the western type, namely *Filipendula vulgaris*-*Helictotrichon pratense* community. Calcareous grasslands of the eastern Latvia with certainty represent separate association (*Centaurea scabiosa*-*Fragaria vesca* community) and it lacks *Helictotrichon pratense* SSG and *Carex flacca* SSG but possesses *Fragaria vesca* SSG.

Several circumstances are responsible for these differences. In most cases, the parent soil in western type is dolomites covered by shallow top soil, but calcareous moraine (rich in gravel and clay) forms parent soil in the eastern type. As dolomites come close to the soil surface almost exclusively in the river valleys calcareous grasslands of western type are located in the largest river valleys, but eastern grasslands occur outside valleys on moraine hills. But this is not the only reason for accounted differences, as already in the central part of Latvia there are almost no localities of *Filipendula vulgaris*-*Helictotrichon pratense* community although suitable habitats with dolomites close to the soil surface are still present.

Differences in floristic composition of both plant communities are associated also with the clear oceanic-continental gradient from the Baltic Sea to the inland. The border between the two communities generally coincide with the border of two phytogeographical provinces (namely, western European geobotanical province and eastern European geobotanical province) dividing Latvia into two parts.

Taking into consideration the above mentioned, syntaxonomical position of Latvian calcareous grasslands in Central and Northern European context will be discussed.

SESSION: agricultural landscape 2

Vegetation of vernal pools on the Hungarian segetal fields

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Most of the arable fields are managed intensively in the alluvial plains of the Carpathian Basin. Due to extremely high annual precipitation occurring only 2 or 3 times in a century, several thousand km² of segetal fields with inland water can be found in the floodplain of Duna, Tisza and Dráva rivers. Few year-old vernal pools on arable fields are usually rich in endangered species (e.g. *Marsilea quadrifolia*, *Lindernia procumbens*, *Elatine* spp.). However these species are ancient elements of the pioneer vegetation of Pannonian floodplains, their natural habitats had been reduced rather drastically since the great regulations of the Hungarian rivers in the 19th century. Some of these vegetation types and their species survived on the arable fields with inland water and on the outer side of the river embankments. 363 phytocoenological relevés (recorded mostly in the period of 1999-2005) taken in vernal pools of arable fields were compared in our study. According to our results the relevés can be classified into 3 main association groups:

1. *Isoeto-Nanojuncetea* Br.-Bl. et R. Tx. ex Westhoff et al. 1946 (3 groups, 258 relevés)
2. *Phragmiti-Magnocaricetea* Klika in Klika et Novak 1941 (2 groups, 60 relevés)
3. *Molinio-Arrhenatheretea* R. Tx. 1937 (1 group., 44 relevés)

Using Borhidi's indicator values (Borhidi 1993) we analysed our dataset and attempted to recognize the main gradient-like patterns.

Methods to define the ecological state of agricultural landscapes and to describe their principal pathologies following landscape ecology: examples from Lombardy region

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Actually, the agricultural landscapes of the Po Valley seem to move toward an impressive alteration of their ecological state being more and more degraded and modified versus an industrialised type of cultivation. Besides, from an ecological point of view, in many cases their structure and functionality don't pertain to an agricultural landscape any more: they act as suburban or urban landscape. By contrast very few people remember their fundamental importance for the maintenance of the right level of ecosphere metastability.

Therefore, a description of the most important agricultural landscape pathologies and of their consequence is presented. In add, two complementary methodologies will be suggested here. The first is able to characterise and distinguish the different types of agricultural landscapes and give us the values of their ecological thresholds. The second permit a correct evaluation of the ecological state of vegetation in agricultural landscapes.

Preliminary results from Lombardy region will be produced.

Assessment of favourable conservation status of habitat types in the Netherlands – past, present and future

Janssen J., Schaminée J. & Hennekens S.

Favourable conservation status (FCS) is defined in the European Union in terms of range, area, structure & function, typical species and future prospects. Assessment of the conservation status forms an important part of the 6-yearly reporting to the European Commission on the NATURA 2000-network. In the Netherlands, an expert assessment of conservation status has been carried out for all habitat types, partly based on – different types of – data.

At the moment a quantitative inventory is carried out of some of the aspects of the conservation status, all based on existing monitoring data. The quantitative data serves as a baseline measurement of the conservation status of habitat types for future reporting to the European Commission. Besides, the inventory shows in what NATURA 2000-sites no or not enough monitoring data is gathered at the moment. With the experience of the inventory a scheme will be developed for future monitoring of habitat types for the EU-reporting.

It is discussed in what way vegetation data may be used for the assessment of the past, present and future conservation status of habitat types. Range is assessed based on distribution of vegetation relevés. Area is quantified by translating vegetation maps into habitat type maps. About the quantification of structure & function, status of typical plant and animal species and future prospects still a lot of discussion is going on. Some ideas on the monitoring of these aspects will be proposed.

Long-term patterns of land use, evolution of the fieldscape, and hedge composition in Highley parish, central-west England

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Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough, United Kingdom

Documentary records and a field survey of surviving features in an area of Ancient Countryside in western England were combined, to help reconstruct the historical development of the fieldscape and hedges from pre-enclosure times to the present. Early and medieval woodland clearances resulted in a mixture of private (mainly pastoral) assarted estates with hedges and common open fields mostly lacking hedges. A substantial block of common wood pasture and some coppice woodland was retained. Enclosure of common land at around 1600 produced a landscape that was eventually filled with many woody hedges. Although estate boundaries remained relatively stable, there was nevertheless a good many minor changes to the fieldscape after initial enclosure through to about 1800. Thereafter, the fieldscape remained largely static, until a wave of post-1945 hedge clearance took affect. To a large extent these changes reflected how agrarian policies and practices changed over time. Superficially, surviving hedges appeared remarkably mixed in woody species, including those originating from the main enclosure period. In addition, the mix of woody species in the latter was remarkably similar to those found in medieval woodland, indicating that local woodland (and probably the common wood pasture in particular) was the main source of plants used to construct hedges created on the original open fields. This is in marked contrast to areas of Planned Countryside in England, which were enclosed later mainly using hawthorn *Crataegus* transplants bought from large commercial nurseries.

Soil loss erosion in natural and man-made woods on the Mt. Etna Natural Park

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The intensive man intervention since long time in Mediterranean region caused soil erosion in many areas. This is influenced by the Mediterranean climate, which, with its summer dry period and frequently torrential rainfall, increases the phenomenon. This is of a great importance in areas with steep slopes and where the soil is made up of loose material.

Since some years we are studying this problem on Mt Etna, within the natural park area. In our previous studies (Poli Marchese et al. 2000, 2002) we highlighted the role of plant cover and soil erosion. In this study we show the results of a research carried out on Mt. Etna in woody areas where there are steep slopes, the soil is made up of volcanic loose material and the human intervention is high.

The aim is to show soil loss and to highlight the main factors caused it.

The research was carried out on the south-eastern slopes of Mt. Etna, at 1100-1800 m a.s.l.. The plant cover is characterized by *Fagus sylvatica* forests and by *Castanea sativa* woods and coppices, both belonging to the *Querco-Fagetea* class.

In this area some sample areas were chose; on different sample areas many relevés were made on the vegetation and on the soil. On each selected area the soil data were collected at the tree foot and at the coppice foot to calculate the value of soil loss. All values were shown through a soil loss index (SLI).

This index was connected with structural data of the woody communities (plant cover, height and density of the coppices) and with some sites factors (as slope and exposition).

Different level of erosion were identified. The SLI reaches the highest value where the slope is steep and the man disturbance (cutting, overgrazing, trampling) is high as at the foot of a 20 m high *Fagus sylvatica* tree (SLI: 6,68), on a *Fagus sylvatica* forest with a canopy cover of 90% (SLI 4,01 and 3,46) or on a chestnut coppice community (SLI: 2,10–3,00). While on forests where the man disturbance is low or absent, even if they are located in steep slopes, the SLI is low (e.g. 0,02).

The results obtained provide useful knowledge for a sustainable forest management within the Etnean natural park.

Changes in traditional land-uses and secondary communities: which management?

Spada F.
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Not received

Vegetation succession in the terraced agricultural landscape of Sicily and its neighbouring islets

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Up to now only little knowledge is available on vegetation dynamics after abandonment of the agricultural terraces of Sicily; nonetheless, this is a noteworthy topic for landscape management, since 3% (ca. 800 km²) of the island surface is occupied by terraces, most of them abandoned or prone to be abandoned in the next decades. In order to study the factors which influence the course and the speed of secondary succession on abandoned terraces, we planned a series of vegetation relevés in five study areas which seem to be the most suitable to represent the Sicilian terraced landscapes: 1) Pantelleria Island (volcanic substrates, between

200 and 500 m a.s.l.), 2) Mt. Etna (volcanic, 500-1000 m a.s.l.), 3) Aeolian Islands (volcanic, 100-800 m a.s.l.), Hyblaean Mts. (mostly limestones, 300-900 m a.s.l.) and Palermo Mts. (limestones, 300-800 m a.s.l.). Since disturbance by fire and grazing is frequent in large part of Sicily, in order to evaluate the influence of these factors on vegetation succession we have chosen terraces in a) undisturbed, b) burned (fire ≥ 10 years ago) and c) burned and grazed areas. The relevés were made on N- and on S-facing terraces, separating the data concerning the terrace surface (always 50 m², Braun-Blanquet approach) from those of the base of terrace wall and those of the wall (species list, presence/absence). We have chosen only those terraces once cultivated with vine or annual crops; other permanent crops fallows have been excluded because they seem to be subject to different succession processes. The selected plots covered a wide range of abandonment (from 1 to 50 years), which has been determined through aerial photo interpretation.

The preliminary results suggest that human pressure is so high that undisturbed conditions are absent in all the study areas, except for Pantelleria and few areas of Aeolian Archipelago and Mt. Etna; the dynamic patterns of these undisturbed areas are quite different. The first occurrence of disturbance after abandonment seems to determine the evolution of the fallow: if it burns few years after abandonment we observe different succession patterns, probably depending on the edaphic characteristics of the examined area, while if fire affects the fallow after the successful colonisation of the first woody plants, we record a higher woody cover. Similarly, where terraces are grazed soon after abandonment, typical nitrophilous herbs linked to grazing do prevail. If grazing starts several years after crop abandonment, woody species play a major role. On Palermo and Hyblaean Mts. grazing and fire are so frequent that the recorded plant communities can be regarded as "permanent": present disturbance regime stops succession. On the contrary, at Pantelleria and on Aeolian Islands, secondary succession can be appreciated since fires are not such frequent and grazing impact is, except for Lipari and Vulcano, quite low. On Mt. Etna we registered "intermediate" conditions.

The main factors which influence the course and the speed of vegetation dynamics after abandonment on Sicilian terraces seem to be: 1) substrate (physical + chemical); 2) bioclimate (altitude + exposition); 3) presence/absence of safe sites (e.g.: former crop and base of the wall, strongly affecting the germination, the establishment and the growth of woody plants); 4) presence/absence of dispersal centres (direct and indirect neighbourhood effect) and dispersal vectors; 5) disturbance regime (first occurrence + intensity + frequency).

The highest values of species richness have been recorded in the younger stages after abandonment, where environmental factors are very heterogeneous, while the lowest ones are typical of the oldest fallows. These data suggest to improve landscape management policies aiming to preserve also the young and the intermediate stages of succession.

POSTER SESSION 1

1) Statistical determination of diagnostic species for site groups of unequal size

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Aim: Concentration of species occurrence or abundance in groups of classified sites (clusters, community types, vegetation units) can be quantified with statistical measures of fidelity, which can be used for determination of diagnostic species. However, for most of such measures fidelity depends on the size of site groups. As the classified data sets typically contain site groups of unequal size, it is impossible to compare numerical values of fidelity of the same species for different site groups. To remove the effect of group size, this paper proposes a new method of measuring fidelity with presence/absence data after standardization of the size of the site groups.

Methods: Site groups in the data set are standardized to equal size, while relative frequencies of species occurrence within and outside these groups are kept constant. Then fidelity is calculated using the phi coefficient of association.

Results: Fidelity values computed after standardization are independent of the size of site groups, but do not contain any information related to statistical significance. By changing the size of the target site group relatively to the size of the entire data set, it is possible to make the fidelity measure more sensitive to either common or rare species.

Conclusion: The phi coefficient applied to site groups standardized to equal size has several advantages over other presence/absence-based measures of statistical fidelity. It yields results that are very close to intuitive understanding of fidelity and diagnostic species in community ecology and vegetation science. The missing information on statistical significance can be easily obtained by a simultaneous calculation of some other fidelity measure that enables establishing significance, or by direct calculation of the probability of observed concentration of species occurrences, e.g. by Fisher's exact test. A big advantage of the new method is that by changing the standardized size of the target site group one can weight the relative importance of common and rare species in fidelity calculation. This makes it superior to the categorical form of Dufrêne-Legendre Indicator Value, which is also independent of the size of site groups, but gives a fixed and rather high weight to common species.

2) Vegetation patterns in a natural forest and abandoned plantations of alien species in a riparian ecosystem of northeast Greece

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Riparian forests have been much disturbed, degraded and reduced in area in the last decades. Land use change is one of the most usual causes of the abovementioned impact on them. The reversibility of such kind of human impact is a controversial issue.

The present study investigates the effects of the conversion of a riparian forest in northeast Greece (the Nestos River) to plantations of fast-growing, exotic species (*Populus x canadensis*, *Robinia pseudoacacia*), on the floristic composition as well as on the soil physical and chemical properties. Additionally, it aims at the formation of hypotheses concerning the restoration of natural riparian forests.

The study is based on vegetation (relevés) and soil data (pH, organic matter and nitrogen content, and texture), which are used in explanatory analyses (DCA and CCA) in order to explore the effects of land use change on species composition and soil properties. Furthermore, vegetation data (relevés) were classified by means of TWINSpan in order to distinguish vegetation groups and investigate floristic affinities between them.

Results show: a) a clear floristic differentiation between the natural forest and the abandoned plantations, which however varies between the different vegetation groups distinguished in the plantations, b) the abovementioned differentiation may be attributed to the much lower content in organic matter and nitrogen of the topsoil of the abandoned plantations in comparison with the natural forest, as well as to the different tree layer composition, c) parallel ecological gradients between the natural forest and the abandoned plantations, concerning mainly soil texture.

The main conclusions drawn in the present study are:

a) there exists a different response of the vegetation layers to environmental gradients as far as the occurrence of natural riparian vegetation species in the plantations is concerned;

b) the loss of habitats of typical riparian plant species could not be overcome by the rich flora of poplar plantations, as the latter is composed mainly of ruderal species;

c) the present floristic composition of the abandoned plantations reflects well site conditions and it could comprise a basis for a management plan for the restoration of natural riparian forests.

3) The protected area of Kotychi Wetlands and Strofylias' Forest (WNW Peloponnesus, Greece): A new Greek National Park?

Tzanoudakis D.

Management Agency, Botanical Institute, The University of Patras, Greece

The protected area of Kotychi wetlands and Strofylias' Forest is located in WNW Peloponnesus, between the cities of Patras and Pyrgos and almost in an equal distance from them. Actually it consists of the two corresponding sites of the NATURA 2000 net work and is considered as a natural ecosystem of high complexity and biological and aesthetic value. The area is characterized by the bigger, in Peloponnesus, system of wetlands (lakes and marshes), the bigger, also in Greece and one of the biggest in the Mediterranean area, *Pinus pinea* forest, by extensive costal sand dunes and, as well as, by several habitats and priority species according to the 92/43 directive.

The natural ecosystem of area is, more or less, well preserved and so the area was included, by the Greek government, to be among the 27 ones of the country, for which special agencies for their management were established since 2003. The area is planned to be a national park but, until now, the special legislation needed for the creation of the national park has not appeared. This delay causes several problems related not only to the protection of the nature but also to the economic development of the area. In the present communication the above problems are discussed in relation to the special natural characteristics of the area.

4) Formalized classification of perennial ruderal vegetation of the Czech Republic

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Institute of Botany and Zoology, Masaryk University, Brno, Czech Republic

High number of vegetation units of perennial ruderal vegetation has been distinguished in the traditional phytosociological system of the Czech Republic. The delimitation of these units is non-uniform, often differentiating according to the various authors. The procedure of formalized reproduction of an expert-based vegetation classification was used for the revision of the recent classification system. By means of the Coctail method, the formal definitions of associations were created for ruderal vegetation types commonly ranked into the classes *Artemisietea* (alliances *Onopordion acanthii* and *Dauco-Melilotion*), *Agropyreteea repentis* (alliance *Convolvulo-Agropyron*) and *Plantaginetea majoris* (alliance *Polygonion avicularis*).

5) Distribution of lowland grasslands throughout Europe

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In a research contract for English Nature, a survey is being undertaken of the wider European distribution of lowland grasslands of the alliances *Corynephorion*, *Thero-Airion*, *Plantagini-Festucion*, *Violion*, *Bromion*, *Cynosurion*, *Alopecurion*, *Calthion*, *Polygono-Trisetion*, *Molinion* and *Thlaspion calaminariae*. You are asked to complete a simple questionnaire for your country indicating the extent (4 categories) and degree of threat (5 IUCN categories) for each of these alliances, together with brief details of any particular conservation initiatives to protect them.

6) The vegetation of the arable land in the Borská nížina Lowland (Western Slovakia)

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Borská nížina Lowland is situated in the western part of Slovakia following by its boundary the borderline with Austria and partly with the Czech Republic. It spreads between the slopes of Malé Karpaty Mts. and the Morava River. Covering the area of ca 1000 km², it pertains to not very extended lowlands in the country; however, it is especially interesting due to its unique nature.

The lowland lies in the warm climatic region, in the altitude ranged from 138 to 290 m a.s.l. Phytogeographically, the territory belongs to the province of Eupannonian xerotherm flora (Eupannonicum) of the Pannonian flora region (Pannonicum). The geological undersoil is made of alluvial sediments remained from the shifted riverbed of the Morava River during the Quaternary. Eolian sands make up a characteristic and dominant soil type, creating sand dunes. The inland eolian sands are also common in the eastern and south part of Slovakia, but only in the Borská nížina Lowland they are non-carbonate, acidic and poor in minerals.

The vegetation is quite specific. Except sand dunes with psamphyte communities and pine forests, alluvial grasslands and bogs occur. Most part of the lowland has substantially been transformed by humans to agricultural land with the network of settlements connected by roads.

The phytocoenological material was collected from the arable land in the Borská nížina Lowland. It makes 573 relevés from our research (carried out in 2002-2004), literature sources, and unpublished works of other authors. All relevés were processed and classified over the numerical methods. Vast majority of collected material belongs to the period from 1949 to 1955 and to our studies from the last years. There are apparent differences in the communities' floristic composition due to the integration of the fields' boundaries and significantly intensified agriculture. Many species common in the past became very rare at present.

On the cultivated land, the communities from the class *Stellarietea mediae* R. Tx., Lohmeyer et Preising in R. Tx. ex von Rochow 1951 were frequent. On the abandoned fields, the communities from the classes *Artemisietea vulgaris* Lohmeyer et al. in R. Tx. ex von Rochow 1951 and *Galio-Urticetea* Passarge ex Kopecký 1969 were widespread and on sandy abandoned fields the species from the class *Koelerio-Corynephoretea* Klika in Klika et Novák 1941 were rather common. In field depressions, hygrophilous communities from the classes *Isoëto-Nanojuncetea* Br.-Bl. et R. Tx. ex Westhoff et al. 1946 and *Phragmito-Magnocaricetea* Klika in Klika et Novák 1941 often occurred.

7) Variability of the Molinion meadows in the Czech and Slovak Republic

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Molinion meadows include species-rich vegetation in intermittently wet habitats where the groundwater table fluctuates considerably during the growing season. They are characterized

by the species which are adapted to these conditions, such as *Betonica officinalis*, *Dianthus superbus*, *Galium boreale*, *Iris sibirica*, *Molinia caerulea* s.lat., *Selinum carvifolia*, *Serratula tinctoria* and *Succisa pratensis*.

In the past these meadows commonly occurred in the lowlands of both countries, and in the Czech Republic also at higher altitudes. They were not manured and were mown usually once a year in late summer. Due to extensive alterations to the water regime and intensification of agriculture in the past decades many of these meadows have been replaced by species-poor meadows or agricultural fields. As only fragments of this vegetation exist now, it is very important to protect them. They also contain some rare species, such as *Carex hostiana*, *Dianthus superbus*, *Gentiana pneumonanthe* and *Iris sibirica*.

Two associations were distinguished in both countries within the *Molinion* alliance – *Molinietum caeruleae* Koch 1926 and *Junco effusi-Molinietum caeruleae* Tüxen 1954. The former occurs on more base-rich soils and contains species which are typical of these sites, such as *Betonica officinalis*, *Galium boreale* and *Serratula tinctoria*, while the latter is confined to more acidic habitats and is typical by the occurrence of species of *Nardus* grasslands or of the *Caricion fuscae* alliance.

8) Working group on dry grassland vegetation in the Nordic and Baltic region - Outline of the project and first results for the class *Festuco-Brometea*

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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 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 requirements. Therefore, a sound classification of dry grassland communities is not only 'pure' science but also has 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.

In this situation, we founded a working group on dry grassland vegetation in the Nordic and Baltic region, which at present comprises 14 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 *Festuco-Brometea* and *Koelerio-Corynephoretea* communities from the research area, which comprises the following countries or parts of them: Denmark, Norway, Sweden, Finland, Russia (Karelia, Leningrad oblast, Kaliningrad oblast), Estonia, Latvia, Lithuania, Poland (lowlands), Germany (Mecklenburg-Vorpommern, Brandenburg, Lower Saxony, Schleswig-Holstein). At present, approximately 3,000 relevés have already entered into the databank. With that, the databank is nearly 'complete' as regards the class *Festuco-Brometea*, whereas there are several thousand additional relevés available of the class *Koelerio-Corynephoretea*. At the EVS workshop, we will present first evaluations of the *Festuco-Brometea* data and a preliminary classification of these semi-dry basiphilous grasslands.

9) Spontaneous renaturalization processes of the vegetation in the abandoned fields (central Italy)

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The phenomenon of the “economic marginalization” that has progressively affected larger areas of Italian agricultural territory since the war has become evident through the abandonment of the agro-pastoral practices that for centuries have been the form of management for these areas. The statistical data show how in just the central and southern regions of Italy the agricultural area in use has suffered a reduction of around 2.1 million hectares, of which at least 1.8 million is in the hills and mountains. The reasons for this abandonment are to be found essentially in the changed socio-economic conditions of the Italian population, having many causes and evident also at the community and extra-community level, that have resulted in the depopulation and the consequent loss of rurality of the Apennine population. This transformation process has led to the need to verify the “sustainability” of the affected areas, that has to be thought of both in environmental terms as much as in economic and demographic ones.

To assess the first aspect, that of the environment, it is of fundamental importance to understand what level of influence man has had on the natural ecosystems, and thus to understand the difference between the original state and the present. Such a valuation is certainly not easy to perform because of the lack of certain knowledge of the model of the potential landscape, the identification of which can be attempted through the integrated analyses of the historic series regarding the variations in space and time of environmental situations and the impact of man. It is anyway possible to put forward hypotheses that are in the majority absolutely generic, as they are mainly limited to the structure of the landscape. The scholars of the vegetation have for a long time argued over the concept of climax vegetation and therefore the potential plant landscape. It is thought anyway that the potentiality to which it is possible to refer to in concrete terms is only the actual one, that is the one that is realized or which is predictable to be realized in the near future in the territory under consideration, that having been profoundly transformed by human activities will not ever return to the original conditions.

The variations occurring in the agricultural, timbering and shepherding landscape, immediately perceptible with a simple observation, allows us to discover a regenerative capacity in the natural processes that occurs on an unforeseen time-scale, significantly shorter than that hypothesised. What will be the scenaria that will be reached in the hill and mountain landscapes, outside of the large centres of agricultural production, in the next few years? Will the new environmental equilibria produce better stability or, on the contrary, result in hydrogeological ruin?

In what way must one intervene to guide the natural processes that are developing? To adequately answer these questions, that are only a part of those legitimately proposable, it is first of all necessary to have a solid basis of the knowledge of the processes, indispensable for carrying out the planning of the renaturalization of the landscape. Indeed, it is inconceivable not to have plans regarding such an important part of the national territory, that is so deeply involved in transformation processes. For a country with such a high population density as Italy, it is necessary to define the significance of the conservation of nature in terms of planning strategy. It is also necessary to define the role of man in the planning and reconstruction of the biological equilibria, taking into account that human activity has not always resulted in a reduction of biodiversity, but in very many circumstances has notably increased it, as with the traditional agricultural, timbering and shepherding activities. It must therefore be considered that the abandonment of such practices induces transformations that we must guide and evaluate for their true significance.

10) Fruit morphology of Illyrian-Apennine populations of the species *Seseli tommasinii* Rchb. f. (Apiaceae)

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Morphometric analysis of the fruits of Italian and Croatian populations of the species *Seseli tommasinii* has been carried out with the purpose to define possible determination value of fruit morphology, as well as its implication on taxonomical treatment of the Italian populations as an Illyrian or Illyrian-Apennine endemic taxa. Results of the analysis of nine morphometric traits of the semimature (the most commonly accessible) and mature fruits showed that two characters (the juga secundaria and the vitta below the juga primaria) are not present at all in the populations investigated, while four traits (number of juga primaria, number of vallecule, number of vitta in the vallecule and number of vitta on the commissural side of the fruit) are constant and equal values for all the samples analysed. For no more than five characters of the semimature and mature fruits, different values among the analysed groups were established: length of the fruit, width of the fruit, height of the juga primaria, width of the juga primaria and width of vallecule. According to an analysis of them it was determined that the semimature fruits cannot with any certainty be employed for diagnostic purposes. The same characters of the mature fruits do cause a certain grouping of the observed population groups, but this is most likely caused by their phenotype plasticity. We can conclude that the groups of the Croatian and Italian populations do not show, in the characters of their fruits, sufficient differences for being ascribed the status of different taxa, and we take the species *S. tommasinii* to be an Illyrian-Apennine endemic.

11) Changes in floristic composition of weed vegetation in central Slovenia in the last 60 years

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The weed vegetation was sampled in the central part of Slovenia. As the data exist from the first part of the 20th century, we could estimate the changes in vegetation composition of weed communities in this area. The data were acquired according to the standard Braun-Blaquet method. The data were elaborated using a coefficient measuring the diagnostic significance of the species and principal canonical analysis for measuring the correlation of species composition, relevés and ecological factors. The analysis showed that number of species increased. The number of spring ephemerophytes (e.g. *Veronica triphyllos*), specialized cereal weeds and basophilic species decreased while the number of neophytes and herbicide resistant grasses increased.

12) Floristic and vegetation studies in Jaba Valley regarding nature conservation ranking and estimated hay-value of autochthonous pasture (Hungary, Somogy county)

Szabo I. & Kerckmar V.

not received

POSTER SESSION 2

13) Interpretation of the habitat types for NATURA 2000: phytogeographical and political aspects

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EU Habitats Directive is a political document; in its I and II Annex habitat types and species of EU importance are listed. Implementation of the Directive – NATURA 2000 – the process that proceeds on a scale of biogeographical division of Europe. On the example of Lithuania, the territory of which is intermediate between Boreal and Continental (temperate) region, difficulties in habitat interpretation on local level and possible ways of the solution will be presented.

14) Coenological shift following fertilization in a Mediterranean grassland

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In Rome both meadows of Central-European affinity and Mediterranean dry grasslands are present.

We studied a site (Parco Regionale Urbano del Pineto in Rome) with very diverse vegetation, where species belonging to both coenological groups occur.

We fertilized three plots with a combination of phosphorus (P) and Nitrogen (N). After fertilization diagnostic species of *Helianthemetea guttati* (therophytes) decrease while species of *Molinio-Arrhenatheretea* (hemicriptophytes) increase.

In a climate as that of Rome, transition between Mediterranean (with summer drought) and Central European (with summer drought), nutrients availability modulates the distribution of vegetation classes with respectively Mediterranean or Central-Europe affinities.

15) Seminatural grassland habitats in the Slitere National Park (NATURA 2000 site) – past and present

Samite D.

Latvia

Slītere National Park (recently – a reserve, founded in 1921) is situated in the north-west of Latvia, Coastal lowland. The main value of the region lies in sandy beaches, dunes, landscape of former coastal lagoons which were left behind by the Littorine Sea, and impressive natural formations such as the shores of what were Ice Age lakes.

When Latvia was part of the USSR (between 1940 and 1991), public access to the coast (which was also the Soviet border) was highly restricted. Commercial activity within this area was prohibited, leaving the area more or less unchanged since the 18th century. This historical context created a rather unique situation where – contrary to other places in the coastal Europe – nature in the National Park remained intact for decades.

At the beginning of the 19th century local population, the Livs or Livonians, lived in the ancient fishermen's villages. Beside fishing they bred also a small number of domestic animals and the hardest problem to maintain them was a hay supply. True meadows were located more than 10 km far from villages. Therefore any treeless area around the farm was mowed including even in-between dune hollows with tall sedge plant communities.

At present, the aim of the National park as the NATURA 2000 site is to decide whether to reintroduce the mowing of these wet habitats after 70 years abandonment or not. Management activities will be complicated. Mowing can be carried out only by hands because of standing

water all the vegetation period. Mowed material should be removed and placed somewhere outside the wet habitats for drying.

Although there are no rare and endangered species and habitats in these areas they are biologically and historically interesting objects not present anywhere else.

16) Coastal vegetation of NATURA 2000 sites at the Baltic Sea in Latvia

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The 500 km long sea coast of Latvia shows a great diversity of coastal habitats. Studies reveal that some accumulative forms of the coast occur towards the mainland behind the present-day non-accumulative coastal types. In some places embryonal dunes form next to the wash – off coast. This testifies about the large - scale coastal dynamics. Since 2005, 15 NATURA 2000 sites along the coast of the Baltic Sea were accepted (158 104 ha).

The data shows two ways of plant community succession on the accumulative and dynamic equilibrium coasts:

- 1) beach→primary dunes → secondary dunes→dry pine forest;
- 2) beach→primary dunes→secondary dunes →mire or wet dune slacks.

After the storms of November – December, 2001 that washed off all the embryonal dunes and most of fore-dunes, somewhere even parts of grey dunes were lost, the re-establishment of accumulative and dynamic equilibrium coastal types was studied. Vegetation data was analysed using program TURBO(veg) and PC-Ord.

17) Management and reporting for NATURA 2000 in Germany – the example grassland vegetation

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Although NATURA 2000 sites are selected, the work of protection and management of these sites is at its starting point. Practical assessment methods and procedures have to be set up and site management plans will be necessary in many cases. At national and EU level a system of reporting is currently worked out for the 6 year standard reporting on the Conservation status of Habitats and Species. Examples of these tasks will be given showing how this will influence the conservation of grassland vegetation in nature conservation in Germany. 13 Grassland habitats are covered by the Habitats Directive in Germany adding up to nearly 200.000 ha within the NATURA 2000 sites.

18) Horizontal and vertical distribution of *Caricetum ferrugineae* Lüdi 1921 in the Eastern Alps

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Numerous regional monographs in the Eastern Alps include descriptions of the *Caricetum ferrugineae* – a plant community occurring above calcareous bedrock. Syntaxonomical studies as OBERDORFER 1993, GRABHERR, GREIMLER & MUCINA 1993, GRABNER 1997, BUFFA & SBURLINO 2001, are confined to certain regions of the Eastern Alps. An overview, covering the whole area is missing up to now.

Therefore we started to put relevés of the *Caricetum ferrugineae* into a database called “SynDat”. The site factors and the geographical location of about 570 relevés can already be analysed. A distribution map similar to HUTTEGGER, KURTZ & HEISELMAYER 2004 shows the geographical range of the community. The analysis of the site factors expresses its regional

different site preferences and will clarify the correlation between hygric continentality (GAMS 1931, 1932) and preferred sites.

19) The response of potato cultivars to combined effects of selenium and drought

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Global warming, which causes fluctuations of precipitation distribution might increase the risk that plants are repeatedly exposed to drought. Changes in the water balance can be crucial for crop yield. More harsh conditions may affect competition between plants and eliminate less tolerant crops and promote others. Recently it has been evidenced, that selenium (Se) has ability to regulate the water status of plants under conditions of drought. A possible ameliorative effect of the Se foliar fertilisation on the detrimental effects of drought was studied in three cultivars of potato; Bard, Adora and Desiree during 3 months of experiment in Ljubljana, Slovenia. Four combinations of treatments were conducted: well-watered plants with and without Se foliar fertilisation, and drought exposed plants with and without Se foliar fertilisation. Net photosynthesis, transpiration rate, quantum yield of photosystem 2 (PS2), and respiration potential measured by electron transport system (ETS) activity were monitored through the season. After three months of the exposure to treatments leaf water potential, the number and size of leaf stomata were determined as well as the tuber yield. Several effects of drought and Se foliar fertilisation as well as their interactions were found although not the same in all cultivars, indicating cultivar-specific responses. Net photosynthesis, transpiration rate, actual quantum yield of PS2, and respiratory potential were lower in drought exposed plants. Se induced higher respiratory potential in the leaves of cv. Desiree and lowered it in cv. Bard. Higher efficiency of energy conversion in PS2 expressed by a higher potential and actual quantum yield of PS2 was shown in Se treated plants in cv. Desiree. However, Se lowered the mass of the tubers in cv. Adora, as well as photosynthesis in cvs. Bard and Adora. Ameliorative effect of Se was found regarding mass of the tubers in droughted specimens of cvs. Bard and Desiree. Se treatment did not significantly affect the number and size of leaf stomata in studied cultivars. Drought lowered the number of stomata and enhanced their length in cv. Desiree. These findings can be taken into account when choosing cultivars for growing in conditions, possibly exposed to water limitation.

20) Phytosociological study of the vegetation infesting crops of Salina Island (Aeolian Islands)

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The main characters (genetic, structural, ecological and dynamic) of the vegetation infesting crops of Salina Island (Aeolian Islands, Sicily), on the basis of phytosociological samples carried out in the years 2002-2005, are illustrated. In particular, it resulted that infesting vegetation is rather complex because it is constituted of both vegetal entities related to specific cultivations (cereals, legumes, vine, caper, olive, etc.) and phytosociological groups preferential of recent uncultivated lands and/or grasslands.

It is noteworthy that, despite the type of the substratum, scarce rainfalls and the lack of hill springs and pools, cultivated lands are characterized by significant floristic and vegetational diversities due to limited size of fields, discontinuous interventions in cultivated lands as well as migrations of several plants from a vegetational type to another one.

The following associations of both cultivated and uncultivated lands were found: a) *Lolio rigidum-Raphanetum raphanistri* Ferro 2005 (*Roemeria hybrida* Br.-Bl. ex Rivas-Mart., Fernández-González & Loidi 1999); b) *Herniaria glabrae-Sperguletum arvensis* Brullo & Marcenò 1985 (*Fumaria wirtgenii-agrarariae* Brullo in Brullo & Marcenò 1985); c) *Amarantho graecizantis-Setarietum verticillatae* Ferro 2005 (*Chenopodium botrys* Brullo & Marcenò 1980); d) *Achilleo ligusticae-Galactitum tomentosae* Ferro 2005 (*Echio plantaginei-Galactium tomentosae* O. Bolòs & Molinier 1969); e) *Lavatero creticae-Chrysanthemetum coronarii* Ferro

& Zizza 2005 (*Hordeion leporini* Br.-Bl. in Br.-Bl., Gajewski, Wraber & Walas 1936 corr. O. Bolòs 1962); f) *Geranio robertiani-Smyrnietum olusatri* Ferro 2005 (*Allion triquetri* O. Bolòs 1967).

Moreover, some atypical communities, like that with *Ornithopus pinnatus* and *Avena barbata*, also referable to the class *Stellarietea mediae* R. Tüxen, Lohmeyer & Preising ex von Rochow 1951, were found.

Finally, some taxonomic, syntaxonomic, nomenclatural and epistemological observations are given too.

21) On weed flora of Dhophar area in south, part of Oman

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The present study deals with the weed flora of arable lands in south area of Oman. A list of 185 flowering plant species and one from Gymnospermae (98 perennials and 87 annuals), belonging to 42 families were given. The most common families were *Gramineae*, *Leguminosae*, *Compositae*, and *Chenopodiaceae*. Therophytes and chamaephytes are the highest life forms. From the phytogeographical point of view, the multiregional species constitute (54 %) of the other flora. The main phytogeographical categories come after Saharo-Arabian were Irano-Turanian and Tropical.

22) Influence of intensive agriculture on seminatural grasslands in north-eastern Bulgaria

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Arable land covers about 60% of north-eastern Bulgaria. The main crops are wheat, corn and sunflower. Similarly to the rest of Bulgaria, cattle breeding suffered a dramatic decline and is based on small private property. Most of the primary steppe communities of the *Stipion lessingiana* alliance have been transformed into cultivated land. Fragments of the communities have only been preserved in small areas. Seminatural grass communities of the *Festucion valesiacae* alliance predominate. They cover about 8% of the total area and are marked by direct or indirect anthropogenic influence:

- Pronounced fragmentation;
- Large-scale ploughing-up of hay-bearing meadows;
- Further from the settlements grazing has been discontinued and trees and shrubs grow into the former pastures;
- Closer to the settlements - concentration of herds, overgrazing, trampling, fertilization, reduced biodiversity, high level of ruderalization;
- Rich genetic bank of ruderal species and weeds;
- Restoration of seminatural grasslands in the place of abandoned arable land.

A relatively large natural potential has been preserved despite the unfavourable changes: over 700 vascular plants, 20 species with a high conservation value, presence of habitats under the Habitat Directive in 43 localities.

Recommendations for the improvement of the present state and the preservation of biodiversity:

- no further ploughing up of hay-bearing meadows; removal of ruderal species and shrubs from the pastures; stimulation of farmers under the National Agroecological Program; development of a system of HNV farmlands.

23) An overview of *Geranio-Cardaminetalia hirsutae*: seminatural therophytic vegetation of the Mediterranean region

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Basing on literature and unpublished data, a syntaxonomical survey of the order *Geranio-Cardaminetalia* has been carried out. This syntaxon groups sciaphilo-subnitrophilous annual vegetation of natural and seminatural habitats, commonly occurring on substrata rich in organic matter, accumulating on stone-walls, shaded rocks and initial soils, often under the canopy of shrubs and trees. In its typical aspect, this vegetation is dominated by microphytes and colonizes small niches and micro-ledges.

The vegetation ascribed to this order ranges all over the Mediterranean basin and stretches northwards and westwards up to the southern temperate and Atlantic region, including Macaronesia. With reference to the Rivas-Martínez's bioclimatic classification, the dwelled sites are chiefly occurring within the thermo- and mesomediterranean thermotypes, with dry to humid ombrotypes.

This order was first described by Brullo in Brullo & Marcenò (1985), and included in the *Stellarietea mediae* because of the occurrence of a rich pool of nitrophilous therophytes characterizing this class. Indeed, as it was first observed by its author, *Geranio-Cardaminetalia hirsutae* is likely including the primary habitats of several species that became synanthropic after the development of the Mediterranean civilization. Subsequently, Rivas-Martínez et al. (1999) put the order at issue at first in a new subclass of *Stellarietea mediae*, proposed as *Geranio purpurei-Cardaminetalia hirsutae*, that more recently has been turned into a new class, named *Cardamino hirsutae-Geranietea purpurei* (Rivas-Martínez et al. 2001, 2002). After the screening of the floristic composition and the ecological features of all the known associations belonging to *Geranio-Cardaminetalia hirsutae*, it is here better esteemed to keep this order into the class *Stellarietea mediae*.

Within the order *Geranio-Cardaminetalia hirsutae*, three floristically and ecologically well defined alliances can be recognized: *Geranio purpurei-Torilidion neglectae*, restricted to the Macaronesian islands with an infra- thermomediterranean bioclimate; *Geranio pusilli-Anthriscion caucalidis*, spread over W-Mediterranean and Atlantic territories with a meso-supramediterranean or infra- to mesotemperate bioclimates; *Valantio-Galion muralis*, common all around the Mediterranean region, within infra- to mesomediterranean bioclimates. It must be noted, however, that a fourth alliance (*Parietation lusitanico-mauritanicae*) have been proposed by Rivas-Martínez et al. (2002) for the "thermomediterranean and mesomediterranean hot biotopes in W-Mediterranean", that does not seem to be unambiguously characterized, as the all associations ascribed to this alliance can be attributed, either, to *Valantio-Galion muralis* or *Geranio pusilli-Anthriscion caucalidis*, depending on their floristic settlement.

A syntaxonomical scheme, up to the alliance level, of the surveyed vegetation is reported here:

STELLARIETEA MEDIAE R. Tx., Lohmeyer & Preising ex von Rochow 1951

Syn.: *Stellarietea mediae* R. Tx., Lohmeyer & Preising 1950, nom. inval. (art. 8).

Chenopodietea Br.-Bl. in Br.-Bl., Roussine & Nègre 1952, nom. illeg. (art. 22).

Sisymbrietea Gutte & Hilbig 1975, nom. illeg. (art. 22).

Geranio purpurei-Cardaminetalia hirsutae (Rivas-Martínez, Fernández González & Lloidi 1999) Rivas-Martínez, Fernández González, Lloidi, Lousa & Penas 2001, nom. inval. (art. 6).

Cardamino hirsutae-Geranietea purpurei Rivas-Martínez, Fernández González & Lloidi (1999) 2002, nom. illeg. (art. 22).

GERANIO PURPUREI-CARDAMINENEA HIRSUTAE Rivas-Martínez, Fernández González & Lloidi 1999

GERANIO PURPUREI-CARDAMINETALIA HIRSUTAE Brullo in Brullo & Marcenò 1985

Geranio purpurei-Torilidion neglectae Lohmeyer & Trautmann 1970 corr. Lohmeyer 1975

Bas.: *Geranio-Torilidion* Lohmeyer & Trautmann 1970.

Syn.: *Senecion tussilaginis* Oberd. 1965, nom. inval. (art. 8).

Galio-Geranium purpurei Lohmeyer 1975, nom. illeg. (art. 22).

Geranio pusilli – Anthriscion caucalidis Rivas-Martínez 1978.

Syn.: *Parietaron lusitanico – mauritanicae* Rivas-Martínez, Fernández González, Lloidi, Lousa & Penas 2001, nom. inval. (art. 8).

Parietaron lusitanico – mauritanicae Rivas-Martínez & Cantò in Rivas-Martínez et al. 2002 Itinera Geobot. 15: 154, nom. illeg. (art. 22).

Valantio muralis – Galion muralis Brullo & Marcenò 1985

24) Relic mires in peninsular Italy and NATURA 2000

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Not received

25) Natural and synanthropic fragmentary vegetation on the northwestern side of Catania town

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The study of the rests of vegetation within towns and urbanized areas is of the great interest, particularly in Mediterranean region, where some rests had been loss.

Since some years we are studying the flora and the rests of natural vegetation of Catania town (Poli Marchese et al. 1990, 2004).

In this study we took the rests of vegetation into account. The aim is to identify the fragments of natural and synanthropic vegetation and highlight those of particular interest. Given the diversity of the territory where the Catania town had been built, we chose as study area the north-western side of Catania. It is located between 60 and 250 m a.s.l..

The climate, with an annual mean temperature of 18,2°C and with an annual mean precipitation of 600 mm about and five-six months of summer drought belongs to the thermo-Mediterranean type. The substrates belong to different geological terrains: old lava substrates, recent lava substrates and sand and clay. The recent lava flow are the most widespread substrates.

The study was carried out according to the phytosociological Zurich Montpellier School's method.

The cluster analysis was made up of Syntax 2000. The dendrogram shows different groups of clustering.

The data obtained allowed to identify some plant communities, belonging to bush, woody and herbaceous communities often represented by vegetation fragments.

The communities more widespread are:

- *Euphorbia dendroides* maquis, *Euphorbia dendroides*-*Olea europaea* var. *sylvestris* maquis, *Euphorbia dendroides*-*Rhamnus alaternus* maquis, belonging to *Pistacio-Rhamnetalia alaterni* communities;

- xerophilous herbaceous communities as the *Cymbopogon hirtus*-*Oryzopsis miliacea* community and *Oryzopsis miliacea* community, belonging to the *Stellarietea mediae* class.

In a very few areas, on lava flow substrates, there are woody communities characterized by *Quercus ilex* or *Quercus virgiliana*, belonging to *Pistacio-Rhamnetalia alaterni* communities.

The results obtained highlight that very significant aspects of natural vegetation are still present on Catania town. They need to be protected.