

ECCB2012

Speed Presentations

SESSION NUMBER 1

SP1.1

With a Little Help from My Friends - Reproductive Success Exotic *Populus x canadensis* Enhanced by the Related Native *Populus nigra*

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Exotic gene flow may have profound effects on wild populations. A potential consequence is the increased risk of extinction of wild species. However, information about hybridization between exotic tree species and their wild relatives is currently limited and the underlying mechanisms behind are poorly understood.

This study examines the risks associated with cultivated hybrid poplar clones when planted near native stands. Introgression of exotic genes in *Populus nigra* populations growing near the cultivated *P. x canadensis* had been found in previous studies, and prompted the need for a more detailed investigation of their crossing relationships.

We investigated these crossing relationships by a series of pollination experiments in the greenhouse. We tested the effect of mixtures of pollen of *P. nigra* and of *P. x canadensis* on mating success in reciprocal crosses. In total, we analysed the results of 75 controlled crosses performed on 1415 pistillate inflorescences.

The results indicate interesting patterns of the implications of interspecific pollen ratios. Unmodified pollen of the native *P. nigra* acted as a kind of “mentor pollen” in helping the otherwise infertile *P. x canadensis* in fertilizing its own flowers. The results have important implications for predicting the risk of exotic (trans)gene flow.

SP1.2

Snow Leopard (*Uncia uncia*) Distribution and Conservation State - A Preliminary Study in Qilian Mountain Nature Reserve, China

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Human activities and habitat loss are the main threats to Chinese snow leopard (*Panthera uncia*) populations. A holistic preliminary study of the almost unstudied Qilianshan Mountains, Gansu Province, was undertaken to gain an understanding of the snow leopards status in light of growing development pressure. Line transects along the valley and infrared camera traps were utilised to monitor snow leopard presence. An extremely high density of snow leopards was recorded. A minimum of 3 individuals were photographed within 32.552 km² and population density in the surveyed area was calculated as between 1.544 and 9.217 individuals per 100 km². Community interviews revealed that the occurrence of conflicts between pastoralists and carnivores as a result of livestock depredation differed within the study region and had a greater impact on participant's happiness (who attitudes towards daily lives) than personal income. The recorded density of snow leopard in Gansu province makes it a conservation priority. The response of communities to carnivore depredation of livestock and the impact of local economic development on this ecosystem must now be understood in order to predict their impact on the endangered species population.

SP1.3

The Effects of Cold-water Stress on Density, Diversity and Gene Expression in Caribbean Symbiotic Zooxanthellae (*Symbiodinium* Spp.)

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Variability within the stress response of symbiotic zooxanthellae (*Symbiodinium* spp.) may be key in understanding the adaptability and survival potential of scleractinian corals in the future. The effects of cold-stress on host zooxanthellae populations of two coral species (*Porites astreoides* and *Montastraea cavernosa*) were analyzed to determine changes in phylotype density and diversity, as well as gene expression related to photosynthesis, immunity, and cell adhesion pathways using differential gradient gel electrophoresis (DGGE) or sequencing of ITS2 regions, and qRT-PCR, respectively. A factorial transplantation study was designed using an inshore and offshore site experiencing variable annual temperature regimes. Differences in measured zooxanthellae parameters were compared within and between host species. Algal densities decreased in both species, with native algal populations staying constant in *P. astreoides*. The higher stress tolerant host species (*P. astreoides*) were more commonly associated with phylotype A, while *M. cavernosa* were more commonly associated with phylotypes B and C. Results of qRT-PCR demonstrated variable cDNA, and therefore gene expression, associated with apoptosis, protein chaperones (HSP70) and photosynthesis (Rubisco) pathways. Results suggest that variability in zooxanthellae phylotype responses to cold-water stress may demonstrate the potential for adaptability in scleractinian corals to future climate changes.

SP1.4

Diversity and Distribution Patterns of Butterflies and Orthoptera and their Responses to Local Climate Change: A Comparative Study for Dardia National Park, Greece over the Last Decade

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We analysed the insect fauna, butterflies and orthoptera, of Dardia National Park in Northern Greece, focusing on species composition and phenology. This survey, conducted in 2011, repeated an earlier sampling conducted in 1998. We used exactly the same methodology and sampling effort. In all we observed 81 butterfly and 46 orthoptera species in our survey, an increase on the numbers found in 1998 (75 and 39 respectively). We divided butterfly species into two groups, cold-adapted and warm-adapted species, according to 10km grid Greek butterfly atlas. The community composition of butterflies had changed over the 13 years between surveys, with the number of warm-adapted species in 2011 up to 32 from 26 in 1998, suggesting a climatic effect. Analysis of temperature records in the area, shows that regional temperatures have increased significantly by between 0.2 and 0.8°C. Moreover, three butterfly species recorded in 1998 (*Melanargia galathea*, *Melanargia larissa*, *Coenonympha leander*), were found only on the north borders of the National Park, outside the area of our study. However, the significance of these observations, tested by randomization approaches, is marginal, and requires further monitoring.

SP1.5

Biodiversity Patterns (Lepidoptera) along an Elevational Gradient in Cyprus

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The present research investigates the effects of an elevational gradient on the distribution of daytime Lepidoptera (butterflies) in Cyprus. The study area was divided into four elevational zones of 500 m each and a random algorithm was used for the selection of thirty sampling sites out of a total area of 1800 km², representing eight habitat types located from 0-1952 m. The sampling was conducted in May-July, October 2011 using the line transect method (300 m-Pollard walk). In total we recorded 33 Lepidoptera species (1372 individuals). Species richness at sites along the gradient showed a decline with altitude for the first three zones and then an increase in the fourth zone. The first and fourth elevational zones have the highest number of species. We conducted a Redundancy Analysis using CANOCO software to investigate the environmental variables shaping the community composition, which showed that flower-heads, vegetation cover, disturbance and rocks are significantly influencing Lepidoptera diversity patterns (explaining 27% of the variance). At this level of analysis elevation was not found to be an important factor that could explain species distribution, and that other factors like vegetation are regulating species richness patterns.

SP1.6

Changes in Florida Lawn Fertilization Practices on Land to Reduce Eutrophication, Algal Green Slime, and Death of Dolphins in Coastal Lagoon Ocean Waters

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In Florida's Indian River Lagoon more than 40 dolphins died every year for three years during the summer rainy months. A number of diseases and toxins were responsible. The Lagoon is a 156 mile long shallow nearly enclosed estuary with significant input of nutrients from the interior of Florida. Eutrophication of the coastal ocean waters was stressing dolphins causing skin-eating fungal infections. Green slimy ocean waters upset beach goers and water recreation. The Ocean River Institute worked with Martin County Commissioners to pass the toughest lawn fertilizer ordinance in Florida, overcoming state opposition to county directed pollution management. The ordinance mandated the use of at least 50% slow release nitrogen and respect of setbacks from waterways. Lawn owners were told to take a vacation from fertilizing June 1 to September 30th. The ordinance is educational and not regulatory. Understanding slow release nitrogen, people are opting for higher percentages. Those who fertilize during hot summer rainy months are punished by seeing efforts and expenditures washed into the Lagoon while neighbor's lawn remains just as green without fertilization. Changing practices on land results in both green lawns and cleaner ocean waters.

SP1.7

Developing Capacity for Conservation in Eastern Europe, and Beyond Into the Former Soviet Union

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A necessary condition for implementing conservation activities is the human resources able to do so; where knowledge or skills are insufficient, outcomes may suffer. A new generation of conservation professionals in Eastern Europe are growing in capacity and experience, and spreading their skills into the broader natural resources sector. Further east however, many former soviet states in the Caucasus and Central Asia have a severe lack of capacity for planning, delivering and monitoring effective conservation measures.

We have begun to address this through supporting national level conservation training programmes, and developing accredited networks of trainers within Eastern Europe and beyond to share experience and provide training and mentoring to build capacity for conservation.

In Romania, a national programme of training for Protected Area staff, backed by the development of professional standards, is helping to build the knowledge and skills of land managers. Further east, a nationwide programme in Tajikistan demonstrates the vital need for capacity building in this region, and also highlights the challenges of sustainably developing conservation capacity in countries where environmental issues remain low on the agenda. There are also clear opportunities to share experience between regions, and spread conservation skills eastwards from the edge of Europe.

SP1.8

Communicating Biodiversity in Romania

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Romania has a huge biological diversity, in 5 biogeographical regions (Alpine, Continental, Steppe, Black Sea and Pannonic). A landscape populated by many species and surviving healthy ecosystems, biodiversity conservation is not a priority for the local humans. To build a conservation community, the first step is to make a functional platform of communication, including the people interested in biodiversity: biologists, researchers, academia, university professors, those from the ministry of environment, NGOs etc. A mailing list started in December 2008, has now almost 2,500 people, and after moderation, there were more than 10,000 e-mails going through the list, in 3 years. It's a success of communication; it was realised without any financial support. People are getting the relevant information, are debating conservation issues and are working together in solving different problems. http://tech.groups.yahoo.com/group/conservarea_biodiversitatii/

The quality of the Internet information about biodiversity and protected areas of Romania is not very high. A blog started in April 2011, has now about 80 presentations, mostly about biodiversity of Romania. There are thousands of high quality pictures with species, landscapes etc, visitors are increasing in January 2012 in a month there were more than 11,500.

<http://peterlengyel.wordpress.com>

Two functioning examples of communicating nature.

SP.9

The Conservation Genetics of 3 Sulawesi Ungulates

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The Sulawesi warty pig, babirusa's and anoa's are endemic to the island of Sulawesi in Indonesia (part of the Wallacea bioregion and a hot spot for biodiversity). These (threatened) species are subject to similar conservation issues, in situ and ex situ. Habitat fragmentation due to deforestation, illegal logging and bush fire may decrease the genetic variation of this species which can lead to the lack of ability to respond to environmental change. Furthermore, genetic methods can be handy tools for assessing population structure and for monitoring populations (for eg possible hybridisation levels). As such, studying the genetics characteristics of populations can be supportive to develop better conservation management plans. As the genetics of all 3 ungulate species is little known, the Sulawesi ungulates genetics project was initiated to benefit the conservation of the 3 species mentioned. Samples of wild and captive populations were analysed for 10 microsatellite and two mitochondrial DNA markers. The preliminary results show different levels of genetic diversity in wild versus captive populations and significant population structure according to geographic locations. These genetic data will be valuable for the management of the breeding programs and further development of Conservation Action Plans.

SP1.10

Assessing the Conservation Status of a Urban Population of Lizards: Preliminary Results from Spatial Analysis

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Urban habitats can host high levels of biodiversity, namely in urban parks. However, there are few studies following urban populations for long temporal periods. We aim to present preliminary results on a long-time monitoring project, where we determined daily activity patterns and changes in home ranges of lizards along time and how human activities affect them. We followed an Iberian wall lizard *Podarcis bocagei* population in the Botanical Garden of Porto (Portugal) during five months, in a wall of 2-4 m high and 60 m long. We used the software I3S for lizard permanent identification through pictures of the chest. We marked temporally each individual with coloured inks for visual identification. In order to analyse the vertical surface of the wall in a Geographical Information System (GIS), we corrected five photographs from the wall by a projective transformation to obtain true distances among lizards' locations. We recorded lizards' positions and other related data (substrate, activity and social interactions) in a netbook using a GIS. Wall surface temperature was collected by dataloggers. We analysed in a GIS the lizards' records with spatial statistics and calculated their home ranges with minimum convex polygons. Preliminary results showed a high degree of home ranges overlapping.

SESSION NUMBER 2

SP2.1

Rolling Models Towards Green Infrastructure in Romania - Who Holds the Key Pieces of the Puzzle?

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Romania is home to exceptional plant and animal diversity that supports key populations of large carnivores, including the majority of Europe's brown bear, wolf and lynx populations. These biodiversity reservoirs survived in Romania thanks to the continued practice of traditional agriculture by the region's still-widespread small scale farming communities, which maintain a way of life that has been lost in other parts of Europe. Due to internal and external pressures, these "rolling models" are rapidly disappearing.

This paper emphasizes the necessity of identifying, protecting and planning the long-term management of interconnected networks within Romania's protected areas, which span geographical boundaries, in order to ensure the strategic conservation of landscapes and communities.

Drawing on the experience of conservation efforts of the Zarand Association in the Carpathians, which aims to safeguard natural habitats and major migration routes for large carnivores; and the work of the ADEPT Foundation in Transylvania, which protects one of the most extensive High Nature Value farmed landscapes in Europe. We intend to prove that green infrastructure is integral to the health and socio-economic viability of local communities and landscapes and that it provides a reliable framework for sustainable growth and conservation, while preserving community assets and natural resources.

SP2.2

Necessity of Set-aside Land for Farmland Biodiversity

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There is a tremendous decline of semi-natural fallow land in Europe due to the current EU agro-policy abolishing subsidies for set-aside land since 2008. For example, in Lower Austria 70% of set-aside fallow land was lost between 2007-2010. In a recent study in Eastern Austria, we investigated the impact of landscape and site factors on the biodiversity and abundance of birds and arthropods in twenty-nine landscape sectors ranging from structurally poor to complex. Species richness of birds, spiders, dung beetles and spring tails increased with the amount of set-aside fallow land, and even reproduction success of common predatory carabids in arable crops decreased significantly with increasing distance to fallows. Therefore, we must expect a significant decrease of farmland biodiversity and predator numbers in European agroecosystems. However, there is a current debate in the EU about which types of semi-natural habitats should be subsidized in 2014-2020. This debate, where we have already made a contribution to, comprises e.g. long-term set-aside fallows without energetic use of biomass, and flower strips with energetic use of biomass. Final decision about future subsidies is crucial for future development of farmland biodiversity, promotion of beneficials and thus ecosystem services in European agroecosystems.

SP2.3

Impact of Agricultural Habitat Structure Upon Population Density of Grey Partridge *Perdix perdix* in South-Central Poland

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In large game management unit „Bogucice” population census of grey partridge and survey of agricultural habitat diversity were carried out during autumn 2001. Using topographic maps, 38 sampling plots (2x2 km each) were established in the study area that covers 16038 ha of farmland. Diagonal of each sampling plot delineated line transect that was used to estimate population density by unfixed line transect method. During population census, number of ecotones and number of patches of various agricultural crops were measured. Grey partridge did not occur in 14 sampling plots, but in 24 sampling plots the population density ranged from 10.5 - 208.2 individuals/100 ha (hectares). Calculated overall population density for the study area amounted to 35.8 animals/100 ha. Significant effects of following ecotones upon population density were found: wheat-meadow ($r=0,59$), wheat-set aside land ($r=0,55$), potatoes-barley ($r=0,35$) and wheat-rye ($r=0,38$). The number of patches of the following agricultural crops boosted the population density of grey partridge: alfalfa ($r=0,58$), wheat ($r=0,57$), set aside land ($r=0,38$), potatoes ($r=0,37$) and barley ($r=0,32$). The optimal agricultural habitat structure for grey partridge is discussed.

SP2.4

Moth Diversity Only Higher on Newly Transitioned Organic Farms

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Despite large sums of money invested into agri-environment schemes to counteract negative effects of the agricultural intensification, evaluations have found mixed biodiversity benefits. Here we evaluated the temporal and landscape structural effects of organic farming on moths. Data was sampled using bait traps on 18 farms in Sweden categorised as conventional, newly organic and old organic ($n_{\text{category}}=6$). The newly organic farms had a mean time since transition (TST) to organic farming of 3.2 ± 2.3 (SD) years and the old organic farms a mean TST of 18.8 ± 3.1 years. No overall effect of farming system was found. However, the newly organic farms had a significantly higher species richness and abundance compared to the conventional and old organic farms. Neither habitat quality on large scale (i.e. proportion arable land in the landscape) nor small scale (i.e. nectar and host plant availability) were found to influence the moths' responses. Plant diversity showed a similar, although not significant, temporal pattern as the moths. Given this pattern, we still believe plants to be one of the factors explaining the moths' responses to the newly organic farms together with additional ambiguous factors which we cannot specify. Evaluations continue to be essential to maximise schemes' cost-effectiveness and outcome.

SP2.5

Do Agri-environment Schemes Deliver Biodiversity Benefits? UK Farmland Bird Populations Still in Decline

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Agri-environment schemes (AES) are the main policy mechanism for reversing farmland bird declines across Europe. Although management options are tested prior to their adoption in schemes, we have little understanding of whether they deliver population level benefits to birds and therefore whether AES can actually contribute to meeting national biodiversity targets. Using the English Entry Level Stewardship scheme (ELS) as an example, we applied a resource modelling approach to examine whether this scheme is likely to reverse farmland bird declines in England. Models were constructed using long-term bird survey datasets in conjunction with AES option uptake and landscape data, to predict how resource (e.g. nesting habitat and food) provision under current ELS agreements will affect local (1km square) bird population dynamics and the implications for national population trends. Resource provision by ELS did not induce a change from overall population decline to overall population growth for any of the 19 Farmland Bird Index (FBI) species. Although square-level variations in effect size and direction exist within species, the overall magnitude of any effect is minimal. As currently implemented, ELS will not reverse farmland bird declines in England. Work to inform scheme design and targeted deployment is needed to maximise benefits.

SP2.6

Moth Diversity and Land Management in Intensively Farmed Landscapes

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Intensive farming, including the use of inorganic fertilizers and pesticides, is commonly seen as a major threat against biodiversity in the agricultural landscape. Agri-environment schemes such as organic farming are used to counteract negative biodiversity trends. However, the success of such schemes needs to be evaluated in ways taking overall differences between conventional and organic farms into account. Here, we have used a standardised farm network to investigate how farming practice and landscape parameters affect an important but often overlooked invertebrate group: the moths.

Using matched landscape pairs, we quantified effects of organic management and landscape parameters on moth abundance and diversity patterns using bait traps. Organic management affects moth diversity positively. Furthermore, the amount of ley in the landscape has a positive effect on moth diversity and abundance. Interestingly, in landscapes where the proportion of grassland is low, even short-term (2-4 years) ley has a positive effect on moth diversity.

The study also shows that several red listed and rare moth species thrive in an intensively farmed agricultural landscape, a habitat previously thought to be poor in terms of moth diversity. This stresses the need to reconsider the importance of the agricultural landscape as a moth habitat in general.

SP2.7

Avian Biodiversity Responses to Land-use in an Eastern Mediterranean Agricultural Landscape, and Potential Effects of Agricultural Change

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Land-use change in agricultural landscapes poses a major threat to bird conservation in Europe, particularly in states newly acceded to the EU. I examine how bird assemblage composition and abundance of priority species vary among land-uses in a multi-scale study across the island of Cyprus, and how recent changes in agricultural policy are likely to affect bird biodiversity. Distance sampling of the bird assemblage and habitats were conducted along line transects, at 202 locations across Cyprus. Bird community composition and abundance of priority species were related to habitat at nested scales of habitat structure, land-use, and landscape-level land cover. Agricultural statistics and policy documents were examined, and agricultural change quantified. Models of farmland bird assemblage responses to landscape structure at multiple scales show which land cover types and land-uses are most important to priority bird species, and the effect of agricultural policy on key land-uses indicates the likely impact on bird biodiversity. These results allow recommendations to be made for targeted farmland bird conservation in Cyprus and the eastern Mediterranean.

SP2.8

Conservation of Steppe Birds at Fine Scale: Does Plant Composition Matters for the Little Bustard?

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We investigated microhabitat of little bustard territorial males and females during the nesting and chick-rearing season focusing on plant composition. We searched for relationships between preferred vegetation and arthropod abundance in order to identify the contribution of different vegetation typologies in providing essential trophic resources for the species. Surveys of little bustards were made using car and foot transects. Plant composition was obtained within a 50x50 cm square at four sampling replicates and arthropod availability was sampled using a sweep net. Model averaging on linear and mixed models was applied to evaluate the selection probability of each plant-insect typology. Both males and females occur in sites with higher floristic richness and higher abundance of legume species. The prevalence of legume species is higher at female sites, whereas male sites are related to a higher variety of plant species. These variables were found to be associated with higher abundance of arthropods, notably of Acrididea, Formicidae and Coleoptera, which are known to be crucial during breeding. The information on plant species composition can complement the existing information based on vegetation structure allowing going further in identifying the seed mixtures for pasture improvement most favourable for steppe birds.

SP2.9

Impacts of Grassland Farming on a Grassland Bird, the Whinchat (*Saxicola rubetra*)

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The Whinchat, a meadow-breeding passerine, is a typical example of a grassland bird that has strongly declined in the last decades in many parts of Europe. The main reason for its decline has been attributed to the intensification of grassland cultivation, which involves an earlier onset of the mowing period. In Switzerland, one of the few population strongholds remains in the Goms valley (central Alps), but is increasingly threatened by agricultural intensification. We quantified the conflict between the breeding phenology and the mowing schedule for seven sites on different expositions in the Goms valley (valley bottom vs. N- and S-slopes). For this, timing and extent (surface) of mowing were compared with key data collected on breeding phenology and Whinchat territory distribution in order to quantify the magnitude of this conflict. It was most pronounced in the intensively farmed valley bottoms and was less distinctive on the slopes. The conflict potential correlated negatively with breeding density, indicating the detrimental effects of the past intensification processes. Based on our analysis, we started to implement appropriate conservation measures for this important inner-alpine population.

SP2.10

The Challenge of Maintaining Viable Populations in Intensively Farmed Landscapes: A Case Study

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Intensive agriculture has resulted in huge biodiversity losses, best exemplified by severe declines among farmland bird specialists across parts of Europe during recent decades. While agri-environment schemes offer management options that provide important resources for many species, options to compensate the negative impact of intensive agriculture are lacking for widespread specialists that rely on crop sward structure.

The Royal Society for the Protection of Birds has researched Corn Bunting *Emberiza calandra* breeding ecology since 2006 in England (UK), a farmland specialist that has declined across several parts of Europe and for which simple solutions are still lacking. Breeding performance was studied within two contrasting agricultural landscapes, specifically to identify the benefits of tailored conservation measures. A simulation modelling approach was used to estimate total reproductive benefits and to test crop management scenarios for maximising benefits.

Results show the importance of in-field sward structure for improving productivity, and indicate that low re-nesting rates might be an overriding issue in intensively managed crops.

More research is required for this species to understand what limits re-nesting, to identify the full impact of harvest and post-harvest management regimes on productivity and to find effective ways of providing safe nesting habitat in all agricultural landscapes.

SP2.11

Conservation of the Butterfly Genre *Phengaris* in Urbion Model Forest (Spain) through Land Stewardship Agreements

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Proper livestock management is the crucial element to consider when including the conservation of the butterfly genre *Phengaris* amongst landscape management priorities: abandonment of pastures can be as devastating for populations as over-stocking. Land Stewardship Agreements (LSAs) are designed for the encouragement of responsibility in landowners and land users on the conservation and sustainable use of natural, cultural and landscape values bringing all parts together.

The project is developed through contributions of all parties, steered by the Urbion Model Forest, a landscape-level governance scheme. Therefore, it does not comprise conservation measures alone, but also production, and other socio-economic aspects of the territory. The conservation measures it includes have been demonstrated in several projects in Europe which show actual recovery of lepidopteron populations.

Actions for the recovery of habitat and populations of *Phengaris* are designed for the engagement of social- and productive-sector agents, while the whole mechanism is designed for easy, built-in long-term monitoring. This design fosters sustainability while ensuring the availability of impact data when evaluating the mechanism. It is intended as a demonstration project, so it will provide systematics and data for adaptation and transfer of its results to other territories, thus founding a community of *Phengaris* land-stewardship territories.

SP2.12

The Dynamics of Population Numbers of Partridge (*Perdix perdix*) and Pheasant (*Phasianus colchicus*) in Southern Poland

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The population numbers of both species were estimated in the lowland farmland areas of the Vistula Valley (A) and in the area of the Proszowice Upland (B). The study areas were situated 40 - 50 km east (A) and north-east (B) of the town of Krakow, and their surfaces were 3100 and 3200 hectares respectively. Using a topographic map in a scale of 1: 50000 and UTM grid, line transects with respective lengths of 8.9km (A) and 8.6km (B) were delineated. The absolute population density estimates were obtained using the unfixed transect method. In total, 108 partridges (A=53; B=55) and 706 pheasants (A=423; B=283) were counted. The relative population density index (N/km) showed declining trend of population dynamics of partridges and pheasant in both study areas. The average absolute population density of partridges, calculated as an average for the 4 seasons of research was 2.52 individ./100 hectares (A) and 2.49 individ./100 hectares (B), whereas the same values for pheasants were 24.5 individ./100 hectares and 17.0 individ./100 hectares, respectively. The reason for population dynamics trends was flood in Vistula River, wet growing season in 2010, and severe winter 2010/2011.

SP2.13

Polyculture Productivity: Diversity and Efficiency in Family Food Production

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Mixed cropping systems may help meet societal demands for increased food production, and conservations issues around biodiversity and sustainability of agricultural practices. Land available for growing food is limited by site suitability, competition for other land uses, and land ownership. Improving productivity of existing sites is a key priority in meeting food demands. Plants growing in communities (polycultures) of certain mixtures have been shown to yield more biomass than do monocultures of their constituent species. We use this principle to investigate productivity (per land area, per labour time input, & continuity of production) of food plants in low- (3 species) and high- (12 species) diversity polycultures in family food systems. Vegetable species from a range of plant families were chosen based on spatial occupancy niches & functional attributes, and grown in a participatory trial of 50 households from across the UK. Results show that overall productivity is greater in the high-diversity polyculture when considered per area and also in terms of labour time input. Higher total food production may be thus achieved by using more diverse cropping systems. More diverse systems may also have further benefits for wildlife and the environment.

SP2.14

Species Distribution Models as a Tool for Conservation Planning in Agricultural Landscapes

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Incorporating information on the distribution of priority and/or indicator species into planning of management and conservation in farmland landscapes can improve our ability to prioritize actions, effectively target efforts, and identify focal areas for conservation or habitat restoration in managed ecosystems. We built Species Distribution Models (SDMs) for conservation-sensitive and indicator avian species, and for species' assemblages sharing the same habitat, at fine spatial scales using high-resolution data, matching the dimension of breeding territories of target species. SDMs showed excellent discriminatory power and reliable outputs; they were used to identify priority areas and habitats for farmland bird conservation, areas most devoted to restoration/recreation of destroyed habitats, and to define priority management options for different areas according to species distribution and to limiting factors negatively affecting species' potential occurrence. SDMs offer new options to include biologically relevant and spatially explicit information on planning at landscape level, e.g. for HNMF definition or targeting of management options, such as agri-environmental schemes. On the other side, fine-scale environmental factors are often crucial in determining occurrence, abundance and reproductive outputs of many species. When available, detailed information on fine-scaled requirements can be integrated within the framework defined at landscape level in a hierarchical process.

SESSION NUMBER 3

SP3.1

Impacts of Hydropower Plant Operations on Habitat Use of Otters *Lutra lutra*

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A semi-aquatic mammal species, the otter, is functionally important to riverine ecosystems. They are predators depending on fish, and thus influencing fish populations. Alterations in habitat due to rapid flow changes as a result of hydropeaking and accidental stops are likely to affect habitat use of these animals. Because no studies exist on the impacts of hydropeaking and increased variation in river regulation on habitat use of otters, we started a pilot study on otter activity patterns along river stretches affected and not affected by hydropower plant operations. Results show that otters avoid river stretches close to the outlet in rivers subjected to extreme hydropower plant operations while they are still using the river stretches close to the outlet in rivers where hydropower plant operations are moderate.

SP3.2

Combined Network of Biodiversity and Acoustic Value in Greece. Identifying Quiet Areas as Ecosystem Services

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Biodiversity loss imposes the inclusion of ecosystem services in conservation planning to highlight the benefits of sustainable management, augment revenues and emerge the internationality of conservation. Our goal was to present a multi-functioning tool providing an added value, the Quietness, in the ecosystem services supplied by the NATURA2000 protected areas. We identified Quiet Areas (QAs) that overlay in NATURA 2000 sites. We, then, focused on priority habitat types that are included in QA network to investigate if high biodiversity areas coincide with QAs. We also superimposed an altitudinal map to estimate the contribution of the combined network to ecosystem representation. The last approach entailed the spatial distribution of the combined network. 71.76% of NATURA2000 network overlaps with QAs. Forest and semi-natural areas prevail in the combined network. 46.20% of the existing priority habitat types form the combined network as well. QA and NATURA2000 network follow the similar altitudinal pattern. In the combined network, the higher values of clustering are found in high biodiversity areas. The proposed combined network could preserve natural soundscapes and protect people from harmful noise effects, promise added revenues by the means of ecosystem services and fulfill Greece' obligations to the Noise Directive (2002/49/EC).

This research has been co-financed by the European Union (European Social Fund - ESF) and Greek national funds through the Operational Program "Education and Lifelong Learning" of the National Strategic Reference Framework (NSRF) - Research Funding Program: Heracleitus II. Investing in knowledge society through the European Social Fund.

SP3.3

Conservation and Management of Forest Genetic Resources in Romania

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Romania is a participant in the EUFORGEN Programme which has developed the minimum requirements standards and descriptors in the conservation on forest genetic resources (FGR). A dynamic gene conservation strategy is based on the maintenance of the evolutionary processes within tree population to safeguard their potential for continuous adaptation: in their natural habitats (in situ) or in artificial (planted) sites (ex situ). There have been established 698 FGR for 45 forest tree species totaling 12922.8 ha core zone. Each FGR is surrounded by a 300-500m wide buffer zone. The most FGR have been constituted for the main autochthonous species and the less for some rare, scattered or exotic introduced species. Also, there have been established conservation units for species vegetating in extreme site conditions. Each FGR is characterized by a unique identification code and a register sheet which contains all descriptive information: administrative and geographical localization, ownership type, region of provenance, surface, description of stand and site conditions, conservation type. The FGR' GIS database was created in the Personal Geo-database format and, also, there have been realized digital maps for their distribution. The technical guidelines for a sustainable management of the FGR were elaborated.

SP3.4

Foraminifera - A Tool to Identify Health of Coastal Ecosystem

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The distribution and diversity of foraminifera collected from the two major harbours of Tamil Nadu, located in the East coast of India have been investigated. The Chennai and Tuticorin harbours are extensively utilized not only cargo handling but also supports variety of commercial fishing activities. From the grab samples sediment texture, heavy metal content and foraminifera have been analysed. The investigations revealed the more abundance of foraminifera in the Tuticorin area compared to Chennai harbor and altogether 106 and 56 species were identified from these harbours respectively. Similarly the analysis of heavy metals (Cu, Pb, Cd and Zn) also exhibited wider variations between these two harbours. Although sediment texture was more or less similar it is inferred that the metals seems to influence the distribution of foraminifera. Further, the Tuticorin area is known for high salinity, temperature, silty sand substrate, and calcium carbonate rich sediments due to the presence of corals and whereby favouring the species richness and diversity of foraminifera. The investigations have been made for four different seasons and the inferences have been made by applying PRIMER software. It is concluded how the foraminifera can be used as a tool to identify the health of the coastal environs.

SP3.5

Zonation of NP Is the Important Tool of Nature Conservation. Consequences of Fragmentation of Zonation in Šumava NP

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The Šumava/Bohemian Forest Mts. NP zonation has been debated since the very NPs establishing and reflects views and opinions on nature conservation principles among various groups of experts. The first zonation developed in 1991 fully respected the original intention of having a NP, i.e. leaving space to spontaneous processes in nature. In 1995, the zonation was dramatically changed, because the NPs senior managers supported the opinion that a European Spruce Bark Beetle (*Ips typographus*) outbreak can be reduced only by forest management measures, i.e. by extensive felling. Thus, only 13 % of the NP's territory was within the Zone 1 and fragmented into 135 patches. The zonation has been valid, although its original intention was almost completely lost, particularly after the hurricane Kyrill in 2007. A new proposal for delineating the Zone 1 is based on the botanical, forest management and zoological criteria, carefully assessing the NP's values. The proposed Zone 1 covers 39.2 % of the NP's territory and is distributed in 10 units. Proposal was delivered as a background for a working group drafting a New Act on Šumava NP on behalf of the Ministry of the Environment of the Czech Republic.

SP3.6

The Role of Ecosystem Services in the Biological Control Research

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Human well-being depends on various ecosystem services, which mainly rely on biodiversity. Biological pest control provided by natural enemies is one of these ecosystem services. The aim of our study was to reveal the extent to which the conservation of natural enemy assemblages is represented in the literature of biological control. We chose the journal *Biological Control* and reviewed the research articles published in the last ten years (2001-2010). For each article the topic and the organization level of the study was recorded. Our study showed that the largest proportion of the reviewed 1512 papers (40.3%) examined single species on molecular or population level, 37.2% of the studies dealt with interaction between pests and control agent. The multi species interaction studies represented only 8.5%, while 11.5% of the studies examined biological control at landscape scale. 31.9% of the landscape level studies (thus 3.6% of all studies) aimed to conserve natural enemies. By the conservation of natural predator assemblages, we can facilitate biological pest control, and thereby mitigate the damage caused by pests - a win-win situation for conservation and production. However, the conservation efforts require landscape level approach, which need to be strengthened in the field of biological control.

SP3.7

Measuring the Dead Wood Volume in the Niepołomicka Forest, Southern Poland

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In spring of the year 2010, the volumes of dead wood were measured in timber stands of the Niepołomicka Forest. The deadwood volumes in moist deciduous forest (Tilio-Carpinetum) and in mixed coniferous forest (Pino-Quercetum) were compared. The measurements were carried out in 10 m wide strips along the diagonals of forest compartments (n=10). In commercial moist deciduous forest (CMD), the total volume of dead wood was estimated to be 18.1 m³/hectare with the largest proportion made of lying trees and branches. In the same forest habitat type but maintained under reserve protection management (RMD), the volume of dead wood was 64.5 m³/hectare, again with the highest proportion (56%) of lying dead trees and branches. In commercial mixed coniferous forest (CMC), the volume of dead wood was estimated to be 7.0 m³/hectare whereas in the reserve in this type of forest (RMC) - 31.3 m³/hectare. In the CMC, the dead brushwood constituted the largest component (27.8%) of dead wood whereas in the RMC - the dead standing trees (55.7%). In the categories of forest studied in the project, the volume of dead wood exceeded the levels stipulated in the relevant provisions of the Forest Management Instruction.

SP3.8

The Effect of Habitat Types and Age Classes of Forests on the Frog Population Densities in the Niepołomicka Forest, Southern Poland: A Preliminary Report

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The population densities of two species of frogs (*Rana temporaria*, *Rana arvalis*) were studied in Tilio-Carpinetum (T-C), a moist deciduous forest and a moist-mixed coniferous forest Pino Quercetum (P-Q) within the Niepołomicka Forest (total area 10.8 thousands hectares). In total, 16 sampling plots each measuring 40x40m, were marked in the area. In July 2011, 40 frogs were captured there, including *Rana temporaria* (n=29) and *Rana arvalis* (n=11). In the T-C timber stand, a total of 34 individuals were captured with a total biomass of 481.5g, which represents 53.1 ind./hectare, and 752.3g/hectare. In the P-Q timber stand, 4 individuals were captured (6.2/hectare) and their total mass per area was a mere 1.53g (2.4g/hectare). In the T-C young forest plantation, only two individuals were captured (3.1/hectare) whose biomass amounted to 38.5g (60.1g/hectare). No frogs were found in the P-Q young forest plantation. Among the frogs captured, 14 individuals (35.0%) were in the 0-2g range of body mass, whereas the remaining individuals had body masses ranging between 10-20g (n=13), 20.1-25g (n=11g), and above 25g (n=2). In the study area, the T-C timber stand is an important habitat for frog populations and therefore the roads cutting through these habitats should have underpasses for amphibians.

SP3.9

Production of Bilberry Berries (*Vaccinium myrtillus* L.) in the Niepołomicka Forest, Southern Poland

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In 2010 and 2011, the production of bilberry fruits was estimated in the Niepołomicka Forest (10.8 thousands hectares) for 719 plots, each of 1m². The plots were situated in each of the 4 types of forest habitats taking into account 4 forest age classes: young plantations (YP), thickets (TH), pole stands (PS), and timber stands (TS). In the fresh mixed coniferous forest, the density of berries per 1m² (x +/- SE) was 12.7 +/- 2.15 (PS), and 23.4 +/- 6.03 (TS). In the moist mixed coniferous forest this density was 15.8 +/- 1.62 (PS), and 12.7 +/- 1.97 (TS). The lowest density of berries was found in the moist mixed deciduous forest: 0.27 +/- 0.23 (PS) and 3.8 +/- 2.14 (TS). The statistically significant differences in density of berries were shown between the TS and PS of the fresh mixed coniferous forest and moist mixed deciduous forest (p= 0.00006, p= 0.0297 respectively). Significant differences in the density of berries were found between the PS of the moist mixed coniferous forest and the moist mixed deciduous forest (p= 0.0342). The production of berries under study area amounted to 0.436 g dry weight/m².

SP3.10

Is the Present Population Density of Wild Ungulates a Threat to the Biodiversity of Polish Forest?

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According to Polish Statistical Yearbook, the numbers of red deer (RD), roe deer (RO), and wild boars (WB) have increased in last decade, from 121,000 to 189,000 (RD), from 458,000 to 752,000 (RO) and from 228,000 to 308,000 (WB) respectively. The figures are not very reliable because they have been based on guesstimates by hunters. Therefore, in 2010 - 2011, the population numbers of these three species were verified in 12 forest districts (total area 188,000 hectares) using large sampling plots, snow track counts, driving censuses and analysis of collective hunting data. Results showed, the population densities calculated per 1000 hectares of forest yielded to: 24.1 - 128.0 (RD), 75.2 - 324.5 (RO), and 28.2 - 110.3 animals (WB). The results obtained exceeded hunting statistic data by 42.3% (RD), 84.8% (RO), and 34.1% (WB) respectively. The estimated population densities were two to four times higher than the densities recommended by the Forestry. The resulting pressure exerted on young forest plantations by the deer, means that the majority of the latter are fenced. The fencing undoubtedly increased the pressure by these three animal species on forest floor vegetation and understory, although no research has been conducted on this topic.

SP3.11

Shrub Layer Dynamics on an Oak Forest in North-Hungary

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Shrub dynamics can be used as an indicator of forest health. We have analyzed the changes in shrub layer of an oak forest (*Quercetum petraeae-cerris*) in North-Hungary after a decline of specimens in the canopy. We used correlation analysis to explore the relationships between overstory characteristics and structural parameters in the shrub layer. Height and diameter of shrubs were registered in a 48×48 m sample area; their location and cover were mapped from 1972 every 4 years. The objectives of this study were to (1) document any structural changes in the forest; (2) provide ecological explanations for why these changes occurred; (3) give any possible prognostication in the future. There were 17 woody species continuously in the site. The mean height and diameter of dominant woody species (*Acer campestre*, *A. tataricum* and *Cornus mas*) increased significantly after the oak decline. Density of *Euonymus verrucosus* increased remarkably, but they never grow up higher than 4 m. We found no correlation between oak tree density and total shrub cover, and surprisingly we found a positive relationship between oak tree density and dominant woody species density. Our study revealed that the forest responded to the decline by structural changes in the shrub layer.

SP3.12

Effect of Agricultural Land Use on Biodiversity and Ecosystem Function in Wetlands

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Wetlands are among the most diverse ecosystems, and deliver vital services to human kind such as nutrient cycling and carbon sequestration. Yet they are also among the most threatened by global change, due to a high susceptibility to increased nutrient input associated with agricultural land use. We conducted a landscape-scale experiment to examine the effect of agricultural land use intensity on biodiversity and ecosystem function in 10 freshwater wetlands, whose watersheds lie along a land-use intensity gradient. Leaf decomposition - which underlies nutrient cycling and carbon sequestration - and biodiversity of aquatic insects and terrestrial plants were measured.

Land use intensity within the watershed was a good predictor for wetland nitrate and phosphate concentrations. Leaf decomposition rate was affected by nutrient concentrations as insect-mediated decomposition was raised with increased nutrient concentrations. Interestingly, decomposition by microbes remained stable over the nutrient gradient. Plant community composition was more similar in wetlands with similar nutrient concentrations.

This study reveals the importance of agricultural land use mediated impacts on biodiversity and functions of freshwater wetlands. To assess effects of global change on ecosystem services it is important to look at a number of different services as their providers might be affected very differently.

SP3.13

Smaller Fragments of Calcareous Grasslands Support a Higher Beta-diversity of Plants, Leafhoppers and Snails

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During the course of agricultural intensification calcareous grasslands became highly endangered due to abandonment, fragmentation and isolation. We investigated the impacts of decreasing fragment size, decreasing landscape complexity and increasing isolation on the diversity of plants, leafhoppers and snails on calcareous grassland fragments in central Germany. Using an additive biodiversity partitioning approach, we focussed on beta-diversity, an important, often overlooked part of total species diversity (gamma-diversity). We selected 14 large (1.5 to 8.5 ha) and 14 small (< 1 ha) grassland fragments along two gradients: isolation from nearest grassland fragment (0.1 to 2.2 km) and percentage of arable land within a 500 m buffer around fragments (30 to 70 %). We found that for all three taxa beta-diversity accounted for a large part of species richness. Both gamma-diversity and overall beta-diversity were higher in small fragments. Subdividing into habitat specialist and generalist beta-diversity made clear that this effect was mainly driven by generalist species. Isolation from the nearest grassland fragment and the percentage of arable land did not affect beta-diversity. We conclude that in small fragments edge effects cause a higher species turnover rate of generalist species, leading to an increase in gamma- and beta-diversity compared to large fragments.

SP3.14

The Mortality of Vertebrates Caused by Motor Vehicles on Local Roads in the Niepołomicka Forest, Southern Poland

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The Niepołomicka Forest (10.8 thousand hectares), is situated in the fork of the Vistula and Raba Rivers, 35 km east of the Kraków conurbation (having ca. one million residents). The length of asphalted local public roads in the area is 56 km, of which 8.6 km cut through the forest. In July, August, October, and November of 2011, the roads were driven along 27 times during the early mornings of Saturday, Sunday or Monday. Dead animals found were collected, their taxonomic identity determined, and the place where they were found recorded. A total of 237 vertebrates were collected. The most numerous were amphibians (51.0%), followed by mammals (43.5%), birds (4.2%), and reptiles (1.3%).

The most numerous among the killed vertebrates were two species of frogs (*Rana temporaria* and *Rana arvalis*) (n=120), followed by hedgehogs (n=29) and small rodents (n=28). Also collected were the bodies of 17 domestic cats, 9 foxes, 8 martens, and 7 rabbits. The results of the study may be useful therefore, in indicating the sites where underpasses for both species of frogs should be built.

SP3.15

Spatial Analysis of Amphibian Road-kills in Northern Portugal Country Roads

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Animal mortality caused by vehicle collisions is one of the main road's ecological effects. Amphibians are the most affected group and road fatalities have a significant impact on population dynamics and viability. By being more permeable to amphibian passage, country roads are a greater source of amphibian mortality than highways, which act as barriers. Due to the extensive country road network, the identification of the precise locations (hotspots) and their associated variables is needed to apply mitigation measures successfully. The aim of the study was to analyze the spatial occurrence and related factors linked to amphibian mortality on different country roads in northern Portugal, using spatial statistics implemented in GIS and applying a binary logistical regression. In a total of 631 km of road surveyed (corresponding to seven transects), 404 amphibians were observed: 74 (18.3%) alive and 330 (81.7%) road-killed. *Bufo bufo* represented 80% of the mortality records. Three transects showed clustered distribution of road-kills: broadleaved forests and road ditches were the most important factors associated with hotspots. Logistic regression models showed that habitat quality, *Bufo bufo*'s habitat preferences, and road ditches favoured amphibians' mortality, as well as average altitude and length of walls were negatively associated.

SESSION NUMBER 4

SP4.1

Institutional Factors Transform Biodiversity Impact Assessment Tools: The Case of High-speed Railways in France

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Faced with complex and hard-to-assess risks, as is the case for environmental damage, organizations tend to act not only to reduce, but also to transform this risk.

One of the main tools for assessing and mitigating risk from development on biodiversity are environmental impact assessment (EIA) procedures. We analyzed the way impact mitigation methods, in particular GIS-based scenarios of railroad routes made from hierarchisation of biodiversity zoning (Natura 2000, natural reserves, inventory-based zones etc.) were built up in 3 large high-speed railroad projects in France. We examined several factors: the kinds of data set used and the weight given to each of them, the criteria of choice given for the scoring, and the way in which individual and institutional actors have been involved in the process of discussing these choices.

Our results show that biodiversity zones that were given the highest score carried a high level of legal, financial and/or reputational risks for the company, independantly of their ecological quality or importance.

These results show that project assessments led by organizations can shift the goal of environmental impact assessment away from assessing and mitigating ecological damage towards becoming a device for minimizing business risk.

SP4.2

The Role of Institutions of Indigenous Peoples in Conservation in Arctic Region of Russia

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The vast expanse of the North of the Russian Federation inhabited by the indigenous peoples are exploited by industrial companies which deeply influence on eco-systems. After Agenda 21 adopted by the UN Conference on environment and development in 1992 which determined the basic principles and strategy of sustainable development research the participation of indigenous peoples in making decision in this sphere became actual. Institutions of indigenous peoples are represented in the legislative branch of power, non-government organizations and communities can be observed as objects of regional politics in Russia. The main problem is absence of effective mechanisms of accounting for the interests of the small-numbered indigenous peoples in the planning and execution of projects on territories of their traditional settlement in Russia. One of the case studies is situation in the Bikin valley of Far East of Russia where indigenous peoples Udege are settled. Udege have conflicts with timbermen who would like to deforest the territories of their traditional nature use. After protest actions of local community the company had to refuse to cut the forest. Indigenous peoples demand to make the territory of traditional nature use of indigenous peoples of federal significance.

SP4.3

Implementation and Monitoring of Natura 2000 in Flanders (Northern Belgium)

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Natura 2000 targets the sustainable conservation of Europe's biodiversity. An important cornerstone of Natura 2000 is the Habitats Directive, which is currently implemented across member states. In Flanders (northern Belgium) two crucial stages in this process are nearly accomplished. First, Sites of Community Importance have been delineated for European protected habitats and species. Second, conservation objectives and measures are being formulated to ensure a favourable conservation status. A full designation of these sites as Special Areas of Conservation is thus almost completed, and is the result of a close collaboration among scientists, policymakers and stakeholders. To determine whether the proposed protection measures are adequate, frequent reporting of the conservation status of habitats and species to the European Commission is mandatory. Consequently, the development of an operational monitoring plan is currently in progress, using principles of scientific merit and cost-efficiency. Two complementary approaches are in elaboration for habitats, being a refinement of the territorial-covering Biological Valuation Map, and a new sample-oriented assessment of habitat quality through vegetation relevés. As for species, partnerships with the extensive network of volunteers from nature conservation organisations will be expanded, with a redirection of gathering purely opportunistic observations to more standardized occurrence/population data.

SP4.4

Long Term Monitoring of Birds in a Mediterranean Nature Park in Israel: Multi-dimensional Analysis

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Ramat Hanadiv is a 500-hectare park, located in Israel's Mediterranean region.

The park is extremely diverse in terms of vegetation formations, and supports diverse wildlife. For the past 22 years, bird surveys were conducted in the park, to evaluate the dynamics of species presence and populations' size as well as the impact of vegetation management - thinning and grazing - on the bird community. Monitoring is carried out using a variation of the "territory mapping" method and focuses on changes in the most typical "sparse garrigue" formation. 43 bird species bred in the park between 1988-2010, only 18 of them nested in all surveyed years and 5 ceased nesting regularly. Most populations have undergone significant changes in size over the survey period. Some species (fan-tailed warbler, whitethroat, corn-bunting) were negatively affected by the intensive grazing, while others (goldfinch, greenfinch) that were expected to gain from the increased supply of thistle weed seeds, probably disappeared due to factors acting at larger scales. Surprisingly, ground nesting birds like chukars and stone-curlews were not affected by grazing.

Ramat Hanadiv's bird community demonstrates multi-dimensional dynamics: species appear or disappear due to succession and habitat changes and regional and global processes play a major role.

SP4.5

Soil Biodiversity Monitoring in Italy: Research Needs and Opportunity

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Italy shows the highest soil biodiversity in European and Mediterranean Countries. Its land use / soil type mosaic allows a high variety of adaptations and several groups show numerous endemic species, sometimes over 50%. Several areas are not yet studied, though. In this complex landscape, human impacts are mainly due to habitat fragmentation and land use change. Therefore, it is paramount to monitor soil biodiversity in an integrated and effective manner, so as to allow providing data and information useful for a correct management and a sustainable use of natural resources. These information might provide useful insights also on natural restoration programmes. A series of different scale monitoring examples and case studies on the databases available and under preparation are shown, with suggestions for International collaboration programmes and future research needs.

SP4.6

Test of Bird Nest Analysis

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Several species of small passerines use mammal hair for nesting material. Collecting the nests after breeding to separating hair and identifying species is a new method in mammal faunistic (Tóth 2003). We have studied the cavity-nesting *Parus major* and *P. caeruleus* hair-search behavior in mountain forest areas (Pilis, Börzsöny), in Hungary in 2007. We offered many colored hair and feathers in several points in several different ways to model their natural availability. Finding a colour in a nest meant a measured geographic location and a source type. The average collecting distance was 102-118m according to species and the study area without significant differences. Some data shows about 200-250m distance that means this birds use bigger area to collect nest material than its territory size. They used almost every modelled type - the small, segregated portions of hair as well as the carrion model mean concentrated source of lining material. Some data of greatest distances connected with rubbing trees which suggest that tits know where to find these special hair sources.

SP4.7

Cost Efficient Fenced Enclosures: Large or Small?

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The reestablishment of wild populations is the ultimate goal of captive breeding programmes. Unfortunately, many reintroduction attempts fail due to ongoing predation by introduced species. Fencing reserve areas is a proven method of providing the necessary low pest densities for successful threatened species reintroductions. The optimal planning of these fences inherently demands a trade-off - is the risk-mitigation gained by splitting into two fenced areas worth the loss of overall area and increased ongoing costs? This key question applies not only to predator-proof fences in Australia but also widely to any spatial conservation action requiring a barrier to be constructed. Here we present a decision-theoretic approach to solving this problem by building a *Macrotis lagotis* (greater bilby) population model including economic factors for each fencing strategy. We assess and compare these strategies under multiple objectives and find that the optimal decision under each objective depends largely on the distance between the two fences, as well as on the population and financial parameters. As a general rule we find that two small fences are preferred if we aim to maximise persistence for minimum cost whereas a single large fence is preferable if we aim to instead to maximise abundance.

SP4.8

Using of Pulmonary Snail *Achatina fulica* for Monitoring Air Pollution in Largest Cities

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Incineration of rubbish and pyrolysis of sewage sludge in the incinerators are an important source of air pollution. After a long suction through a layer of hexadecane (S₁₄ N₃₀) smoke gas (SG), it was found by UV absorption spectrum the traces of POC, such as - biphenyl (B) in a mixture with ortho-terphenyls (o-TF). In the bioelectronics system the indicator group of mollusks (*Achatina*) obtains SG after cooling and diluting by pure air in the 100 times. Daily testing procedure was consist of monitoring of cardiac activity (HR) in response to intense air flow direct to the head and tentacles of mollusks. In mollusks, exposed in SG, the degree of reduction of HR was weaker than in the control group. The disturbance in the reflex of animals can be serving as a marker for the action of toxic substances. The results showed small, but significant ($P \leq 0,01$) increase of HR compared with the background, obtain after 2-hour exposure of B.

Thus, analysis of HR after 4-5 months exposure the mollusk in SG from sewage sludge incinerator showed that proposed method could be use for the monitoring of air pollution in large cities.

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