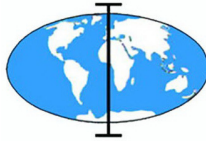


2nd FIP International Conference BOOK OF ABSTRACTS

Rome, 2013, April 11-13

“Sapienza” University of Rome, Botanic Garden



Federation Internationale
de Phytosociologie



SAPIENZA
UNIVERSITÀ DI ROMA



2nd FIP International Conference - Book of Abstracts

Rome, 2013, April 11-13

ISBN: 978-88-908391-1-5

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Printed at Centro Stampa Università
Università degli Studi di Perugia April 2013

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2nd FIP International Conference
Rome, 2013, April 11-13

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Botanic Garden



Federation Internationale
de Phytosociologie

PROGRAMME

2013, April 11th

7:30 - 18:00 | EVS/FIP Joint Excursion - Circeo National Park

19:30 | EVS/FIP Social Dinner

2013, April 12th

8:30-9:15 | Registration & poster setup

9:15 - 9:30 | FIP Conference opening

Carlo Blasi - *Director of the Botanical Garden, Head of the Dept. of Environmental Biology, “La Sapienza” University, Rome, President of the F.I.P.*

Roberto Venanzoni - *President of the S.I.S.V.*

SESSION 1 - *The value of Ecosystems and Biodiversity*

9:30 - 10:00 | Keynote

The value of Ecosystems and Biodiversity - **Pott R.**

10:00 - 11:00

Recording and modelling the value of Ecosystems and Biodiversity - **Otte A., Reger B., Sheridan P., Simmering D., Waldhardt R.**

Preservation of the Biodiversity of cultural landscapes by integration of nature conservation and land use - **Schumacher W.**

Land use enhanced plant landscape biodiversity in a Mediterranean agro-sylvo-pastoral system - **Bagella S., Caria M.C., Farris E., Rossetti I., Filigheddu R.**

11:00 - 11:30 | coffee break**11:30 - 12:50**

Global change impacts on ecosystem functions - the importance of interactive effects - **Härdtle W., Meyer-Grünefeldt M., Oheimb G.**

The value of the West-African savanna vegetation - **Wittig R., Heubach K., Hahn K.**

Restoration of standing water habitats : the study case for the habitat of the European green toad (Bufo lineatus Ninni, 1879) - **Gasparri R., Casavecchia S., Galiè M., Biondi E.**

Vegetation as a tool for monitoring, management and reconstruction of agroecosystems of environmental quality in the CAP (2014-2020) framework - **Rismondo M., Lancioni A., Taffetani F.**

12:50-14:00 | lunch**SESSION 2 - The role of Vegetation Science in habitat assessment, monitoring and restoration****14:00 - 14:30 | Keynote**

Future prospects for the assessment of environmental conservation status at different scales - **Blasi C., Capotorti G., Carli E., Copiz R., Zavattero L.**

14:30 - 15:30

Environmental assessment of Martignano lake (Central Italy) using aquatic vegetation in a European perspective - **Azzella M.M., Rosati L., Blasi C.**

Drivers of beta-diversity variation in Bromus erectus semi-natural dry grasslands - **Burrascano S., Anzellotti I., Carli E., Del Vico E., Facioni L., Giarizzo E., Pretto F., Sabatini F.M., Tilia A., Blasi C.**

Phytosociological analysis as a basic tool for the management and conservation of coastal dune habitats - **Farris E., Bagella S., Pisanu S., Caria M.C., Filigheddu R.**

15:30 - 16:00 | coffee break**16:00 - 18:00 | Open Session**

Annual dune plant communities in Sicily: new insights through the statistical approach - **Minissale P., Sciandrello S.**

A reflection on succession types within dynamic phytosociology - **Monteiro-Henriques T.**

Originality of the vegetation of Southwest Angola - **Cardoso J.F., Costa J.C., Pinto Basto M.F., Duarte M.C.**

A geometric approach for mapping vegetation-types based on environmental data - **Monteiro-Henriques T., Cerdeira J.O., Martins M.J., Silva P.C.**

Importance of autochthonous germplasm in the environmental restoration of semi-natural grassland habitats - Galie M., Casavecchia S., Bianchelli M., Gasparri R., Biondi E.

The vegetation of Buna River Protected Landscape (Shkodra, Northern Albania) - Fanelli G., De Sanctis M., Gjeta E., Mullaj A., Attore F.

18:00 - 19:00 | Poster Session + Happening "Red Wine & Cheese"

2013, April 13th

WORKSHOP: Data Banks and Data Processing

9:30 - 10:00 | Keynote

Improvements and open issues of the database VegItaly. What are the perspectives? - Landucci F., Acosta A.T.R., Agrillo E., Attore F., Cambria V.E., Casavecchia S., Chiarucci A., Del Vico E., De Sanctis M., Facioni L., Geri F., Gigante D., Guarino R., Landi S., Lucarini D., Panfilì E., Pesaresi S., Prisco I., Rosati L., Spada F., Venanzoni R.

10:00 - 13:00 | Practical Course for data managing and upload on VegItaly DB

Registration, Sessions 1 & 2 and Open Session will be held in the Auditorium of the "Accademia dei Lincei", in Palazzo Corsini, via della Lungara 230, Rome

Workshop, Poster Sessions and the Happening "Red Wine & Cheese" will be held at the Botanic Garden of "Sapienza" University of Rome, Dept. of Environmental Biology, Largo Cristina di Svezia 24, Rome



Federation Internationale
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2nd FIP International Conference

BOOK OF ABSTRACTS

Rome, 2013, April 11-13



Federation Internationale
de Phytosociologie

ORAL PRESENTATIONS

Environmental assessment of Martignano lake (Central Italy) using aquatic vegetation in a European perspective

Azzella M.M.¹, Rosati L.², Blasi C.¹

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²Department of Biology, Plant Protection and Agro-Forestry Biotechnologies, University of Basilicata, Italy

Freshwater ecosystems are strongly endangered throughout Europe as they suffer for the ongoing human pressure, pollution and eutrophication. Monitoring species and habitats is essential to address conservation efforts and to assess the results of conservation policies. Moreover, European Habitats Directive (92/43/EEC) and Water Framework Directive (2000/60/EC) ask for monitoring actions. Nevertheless knowledge about hydrophytic vegetation of volcanic lakes in Central Italy is still lacking. We analysed phytosociological data collected in 2010/2012 along 6 random transects performed at Martignano lake (a small volcanic lake 30 km NW from Rome), where previous studies on aquatic vegetation are missing. We detect overall 17 species in 84 relevés; seven species belong to charophyte and ten are vascular plants; species richness ranges from one to eight per relevés. Maximum growing depth was recorded at 15,3 meters. As result of multivariate analyses, the presence of eight communities were detected, three belonging to *Charetea fragilis* (*Charetum asperae*, *Charetum polyacanthae*, *Charetum globularis*) and five to *Potametea pectinati* (*Potametum denso-nodosi*, *Potamo-Myriophylletum spicati*, *Potametum pectinati*, *Ceratophylletum demersi*, *Najadetum minoris*). Structural pattern of aquatic vegetation can be considered similar to the other European calcareous deep-water lakes, allowing to use the European indices of lakes conservation status. The indices showed a good *status* of this lake. The communities found belong to two habitats of Community interest (3140 and 3150) never detected before in Martignano lake. The *Charetum polyacanthae* is protected throughout Europe and never found in Italy until now. Thus, monitoring action are considered necessary, also due to the presence of the invasive alien species *Elodea canadensis*. According to our results, there is an evident incoherence among the absence of Site of Community Importance and the biodiversity values preserved in the lake.

Land use enhanced plant landscape biodiversity in a Mediterranean agro-sylvo-pastoral system

Bagella S., Caria M.C., Farris E., Rossetti I., Filigheddu R.

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Environmental European polices are aimed to the conservation of seminatural habitat and cultural landscapes and to support marginal/less productive farming systems. In this framework Mediterranean agro-sylvo-pastoral systems play a key role in view of the positive contribution that they could offer to a sustainable development of European agriculture. They result from a complex interaction between ecosystems and society and are nowadays strongly threatened by abandonment.

In this context the aims of our research were: i) to model the plant landscape

in a typical Mediterranean agro-sylvo-pastoral system; ii) to evaluate how the landscape was affected by the traditional land uses unchanged over the centuries. The study area, located in north eastern Sardinia, was characterized by a wide variety of land uses related with different types of production activities which are mainly represented by livestock farming, grape-growing and cork extraction Bagella et al. 2013).

The plant landscape was modeled identifying the potential natural vegetation within each land unit (Blasi et al. 2000). The effects of human management were evaluated throughout the analysis of the actual vegetation.

The potential natural vegetation represented a sound reference for the assessment of the effects of management on plant biodiversity at landscape and community level (Farris et al. 2010).

Bagella S., Satta A., Floris I., Caria M. C., Rossetti I., Podani J. 2013. Effects of plant community composition and flowering phenology on honeybee foraging in Mediterranean sylvo-pastoral systems. *Appl Veg Sci*. DOI: 10.1111/avsc.12023

Blasi C., Carranza M.L., Frondoni R., Rosati L. 2000. Ecosystem classification and mapping: A proposal for Italian landscapes. *Appl Veg Sci* 3: 233-242.

Farris E., Filibeck G., Marignani M., Rosati L. 2010. The power of potential natural vegetation (and of spatial-temporal scale): a response to Carrión & Fernández (2009). *J Biogeogr* 37: 2211-2213.

Future prospects for the assessment of environmental conservation status at different scales

Blasi C., Capotorti G.*, Carli E., Copiz R., Zavattero L.

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The assessment of habitat conservation status requires a multi-criteria approach based on qualitative and/or quantitative evaluation of ecological systems condition, size and landscape context.

In addition to the key role played in recognizing habitats of European conservation concern, vegetation scientists historically gave a huge contribution to the definition of scales and indexes for evaluating the environmental quality of habitats and landscapes. Starting from this background, an overview on future prospects of vegetation science is provided. Particular emphasis is given to the importance of floristic and phytosociological knowledge as well as of vegetation potential information and ecological classification of land at different scales.

These elements represent basic biodiversity indicators and essential reference models in order to avoid biases in the fields of environmental assessment and conservation, from the continental to the local level. For that reason, the involvement of geobotanists in the implementation and monitoring of biodiversity targets, posed by European and national strategies, should be actively promoted.

Batista et al. 2012. Conservation status of vegetation in the North and Central area of Pardiola river basin. *Acta Bot Gall* 159.

Blasi et al 2011. Important plant areas in Italy: from data to mapping. *Biol Cons* 144.

Blasi et al. 2008. The concept of land ecological network and its design using a land

unit approach. *Pl Bios* 142.

Capotorti et al. 2012. Ecological classification of land and conservation of biodiversity at the national level: The case of Italy. *Biol Cons* 147.

Ferrari et al. 2008. Evaluating landscape quality with vegetation naturalness maps: an index and some inferences. *Appl Veg Sci* 11.

Géhu, Géhu-Frank 1979. Essai d'évaluation phytocœnotique de l'artificialisation des paysages. *Coll Phytosoc* 3.

Kowarik. 1990. Some responses of flora and vegetation to urbanization in central Europe. In: Sukopp et al. (eds.), *Urban Ecology*.

Drivers of beta-diversity variation in *Bromus erectus* semi-natural dry grasslands

Burrascano S., Anzellotti I., Carli E., Del Vico E., Facioni L., Giarrizzo E., Pretto F., Sabatini M.F., Tilia A., Blasi C.

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The decline in extent and diversity of grasslands throughout Europe in recent decades has become a major conservation problem, because it affects all aspects of biodiversity.

In our study we used 195 vegetation relevés performed in central Italy to identify the main drivers of variation in β -diversity for *Bromus erectus* semi-natural dry grasslands of habitat 6210(*) in order to inform conservation strategies aimed at conserve the maximum possible β -diversity within the habitat.

The relevés were distributed in three nested extents: a single mountain, a mountain chain, and southern Lazio. Multiple Regression on Distance Matrices was performed based on: i) species abundances as response variables; ii) spatial coordinates and environmental parameters as explanatory variables. The two groups of explanatory variables were used separately to partition the variation, and jointly to assess the relative contribution of each variable.

Most of the variance was explained by environmental variables. Community dissimilarity increased in proportion to differences in altitude and spatial distances at every extent.

Our results demonstrate that dry grassland management plans should take into account variation in environmental variables, among which altitude proved to be a critical factor at every extent. Also spatial distances positively affect within-habitat β -diversity levels, and scale-dependent minimum distances among habitat patches should be taken into account when selecting patches of habitat to be conserved in the study area.

An on-going research is also presented that uses existing phytosociological relevés associated to detailed vegetation maps to point out compositional change affecting the habitat 6210 through a multi-temporal approach.

Originality of the vegetation of Southwest Angola

Cardoso J.F.¹, Costa J.C.², Pinto Basto M.F.³, Duarte M.C.³

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We present the plant communities observed in the coastal strip between the cities of Namibe and Tombwa. In this region the bioclimate is Tropical Hyperdesertic. On mobile dunes of Tombwa the community is composed by *Sesuvium sesuvioides*, *Sporobolus spicatus*, *Leucophyrus psamophylla*. On fixe dunes occurs *Brownanthus pseudoschlichtianus* and *Lycium tetrandrum*. On coastal dunes of Namibe we observed four ranges of communities: first one with *Sesuvium mesembryanthemoides*; the second formed by *Indigofera alternans* var. *macra*, *Kohautia angolensis*, *Sesuvium sesuvioides*, *Cleome mossamedensis*, *Helichrysum mossamedense*, *Hypertelis salsoloides* var. *mossamedensis*, *Heliotropium oliveranum*, etc.; the third with *Stipagrostis hochstetterana* var. *secalina* and *Chloris flambellata*, *Brownanthus pseudoschlichtianus*, *Indigofera alternans* var. *macra*, *Kohautia angolensis*, *Sesuvium sesuvioides*, etc; the last one dominated by endemic species *Euphorbia virosa* subsp. *arenicola* with *Stipagrostis hochstetterana* var. *secalina*, *Chloris flambellata*, *Brownanthus pseudoschlichtianus*. On paleodunes of the Namibe, the nanophanerophyte *Euphorbia virosa* subsp. *virosa* is dominant followed by *Stipagrostis hochstetterana* var. *salina*, *Chloris flambellata* and *Hoodia corroi*, accompanied by *Sarcostemma viminale* on depressions. On the saltmarshes we can observe various communities: *Sarcocornia natalensis* var. *affinis* in saltier areas; *Sesuvium sesuvioides* occurring in areas with the greatest periods of flooding; *Sporobolus virginicus* on sandy places flooded with brackish water; *Suaeda fruticosa* is always in high points, most often alone but sometimes with *Juncus rigidus* and *Psycocalon dimorphum*. In this paper, we present also some data on the communities with *Welwitschia mirabilis*.

In a strip between Namibe and Caraculo where the bioclimate is Tropical desertic, we describe several communities with succulent plants with *Euphorbia*.

The vegetation of Buna River Protected Landscape (Shkodra, Northern Albania)

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⁴Flora and Fauna Research Center, Faculty of Nature Science, University of Tirana, Tirana, Albania

This study is a contribution of the knowledge of a site of the Northern Albania that already attracted the attention of researchers for the diversity of vegetation. However, likewise other Mediterranean wetland areas it has been strongly transformed during the last decades.

The area comprises both the alluvial plain that lies over the Neogene Peri-Adriatic Depression of the lower course of the Buna river, that marks the boundary between Montenegro and Albania, and a carbonatic range of Cretaceous limestone. It is

characterized by Mediterranean climate with hot and dry summers and mild winters and it exhibit high rainfall (Velipoje shows the highest value of annual precipitation: 1924mm).

Data on the vegetation were obtained from relevés made in 2012 June-July and September. In total, 113 relevés (including 298 vascular plant taxa) were obtained. A database was created in TURBOVEG and data were then exported as percentages for further analyses.

A multivariate analysis was applied to these matrices using the program Syn-Tax v. 5.0. Diagnostic species of plant communities were determined using the fidelity coefficient.

The area presents a high β -diversity (number 32 alliances, 48 associations). Wetland and dry grassland vegetation are particularly diversified. In the area it is possible to distinguish 1 dunal series, 4 hygroseries with a few variants in the alluvial plain and at least two xeroseries in the carbonatic range. *Asplenio onopteridi-Punicetum granatae*, *Medicago minimae-Aegilopetum triuncialis* and *Periploco-Alnetum* are described as new.

Phytosociological analysis as a basic tool for the management and conservation of coastal dune habitats

Farris E., Bagella S., Pisanu S., Caria M.C., Filigheddu R.

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In the last 50 years dunes located on the northern edge of the Mediterranean Basin experimented high levels of land consumption and degradation due to human impacts.

We used phytosociological data to define the degree of habitat degradation due to tourism pressure (trampling) and invasive plants propagation.

For the first aim, we considered annual vegetation of drift lines (habitat 1210) - *Salsolo kali-Cakiletum maritimae* Costa & Manz. 1981 corr. Rivas-Martínez et al. 1992 association (class *Cakiletea maritimae* Tüxen & Preising. ex Br.-Bl. & Tüxen 1952), embryonic shifting dunes (habitat 2110) - *Sileno corsicae-Elytrigetum junceae* (Malcuit 1926) Bartolo, Brullo, De Marco, Dinelli, Signorello & Spampinato 1992 corr. Géhu 1996 association, and the white dunes communities (habitat 2120) - *Sileno corsicae-Ammophiletum arundinaceae* Bartolo, Brullo, De Marco, Dinelli, Signorello & Spampinato 1992 association (class *Ammophiletea* Br.-Bl. & Tüxen ex Westhoff, Dijk & Passchier 1946) at the Marine Protected Area of Tavolara-Punta Coda Cavallo (north-eastern Sardinia). By means of phytosociological surveys and quantitative data, we found that facility of access to the beaches and time of the sampling activity, strongly affected species number and vegetation cover.

For the second aim we studied the fixed beach dunes (habitat 2210) - *Helichryso microphylli-Armerietum pungentis* Filigheddu & Valsecchi 1992 and *Ephedro-Helichrysetum microphylli* Valsecchi & Bagella 1991 associations (*Crucianellion maritimae* Rivas Goday & Rivas-Martínez 1958 alliance) located at the mouth of the Coghinas river (northern Sardinia). We found that *Carpobrotus acinaciformis* (L.) L.Bolus, a southern African invasive plant, affected mainly the inland communities than those facing the sea.

In both cases the study of vegetation by means of phytosociological surveys proved to give a significant contribution in habitat assessment and monitoring.

Importance of autochthonous germplasm in the environmental restoration of semi-natural grassland habitats

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European Union Habitat Directive (92/43/EEC) encourages the preservation of biodiversity through measures that aim to ensure maintenance or restoration of habitats and wild vegetal and animal species in an acceptable state. Among the Community habitats that are seriously threatened in Italy at the present there are the habitats of semi-natural grasslands. This study especially focused on the 6210* habitat “Semi-natural dry grassland and scrubland facies on calcareous substrate (*Festuco-Brometalia*)”, which is widely represented in Central Apennines semi-natural grasslands. The conservation of this habitat is not easy in the area because the most of secondary grasslands are abandoned and the consequent development of vegetation series leads to their gradual disappearance. Indeed, abandonment causes a large invasion of shrub species, through spontaneous re-naturalization processes of the vegetation, abundantly documented for Central Apennines (Biondi et al., 2006).

In some cases, this habitat is so prejudiced by vegetation recovery dynamics, that it is necessary to plan environmental restoration works. Habitat restoration techniques that are currently tried include shrub removal and possible reseeding of grasses on soils that are mostly bare. The use of autochthonous germplasm is essential in this kind of works, especially when they concern protected areas. Nevertheless, it is impossible to find autochthonous seeds in the market at the present, since available seed mixtures generally do not contain the most significant species in terms of biodiversity (endemic and sub-endemic species) and, moreover, widely distributed species often have an extra-European origin, too. Therefore, the use of such seed mixtures determines the introduction of clones and varieties allied to the autochthonous ones which interbreed with, leading to genetic contamination. Due to the above mentioned unavailability of autochthonous germplasm, it was carried out a research aimed to recover the germplasm of some Apennine semi-natural grassland grasses to conserve and multiply it *ex situ* in order to use it for environmental restoration works. For this purpose, seed harvests have been carried out in 17 different localities of Central-East Apennines. Subsequently, seeds were conserved and treated according to international protocols (ISTA 2004, ISTA 2006, APAT 2006).

Laboratory tests have been carried out to acquire information about species germination physiology and to establish whether autochthonous germplasm could be suitable for restoration or not. The research was carried out mostly at Amphiadriatic Species Seed Bank (ASSB) and also at Kew Gardens’s Millennium Seed Bank (MSB) and at Valencia Botanical Garden Seed Bank (ICBiBE). Some seed lots were multiplied at “Selva di Gallignano” Botanical Garden in the years 2011-2012. New multiplication parcels were set up in Autumn 2012 at the same botanical garden in order to progressively increase the amount of autochthonous seeds in the bank.

The findings of this research could represent a scientific and technical base for future seed multiplication and restoration works. Moreover, grasses studied in this research are present also in other Italian habitats protected by EU, apart from 6210 Habitat (6230*, 62A0, 6420, 6510 and 6520), therefore, the findings of this study could be useful in restoration projects of these habitats, too.

Restoration of standing water habitats: the study case for the habitat of the European green toad (*Bufo lineatus* Ninni, 1879)

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A basic tenet in species protection and/or conservation is the restoration of their habitats, and therefore of their ecological niche, more than simply protecting the species that are part of a natural habitat. This study showed how the loss or alteration of habitat and/or threatened species can be prevented by putting in place environmental management measures. This was accomplished using a new methodological approach for habitat restoration. This approach involves the study of evolutionary and structural dynamics of the habitat itself and populations harboured in it.

In this study, it is also described the bureaucratic process undertaken by the European Community (E.U.) after the indication of wildlife habitat destruction or alteration. In particular, the case study regards the threat to the conservation of the habitat of the European green toad (*Bufo lineatus*) caused by the urban development for residential purpose in an area of the Musone River (Conero Natural Park).

The habitat alteration which followed the urban development forced amphibians to migrate to other breeding areas. After the indication of this habitat alteration, the E.U. launched an infringement procedure against the municipality of Numana. The purpose of this procedure was to enable the municipality of Numana to carry out a project of mitigation/compensation to recuperate this infringed area, and avoid a nine million euros sanction.

The mitigation/compensation project was carried by Conero Natural Park in collaboration with a multidisciplinary team of which the Marche Polytechnic University was one of the partners. The study area was analysed at different levels. In particular, the monitoring through floristic and vegetation analysis, and inspections/comparisons of/with the area of "Guazzi" (Porto Recanati, (MC)) highlighted the biodiversity value of the infringed area and revealed the occurrence of habitats for species of Community interest, such as *Triturus carnifex*, *Hyla arborea* and *Bufo lineatus* (All. II; All. IV of Habitats Directive" (92/43/EEC) and All. B; All. D of D.P.R. n.357/1997).

Another important part of this study is represented by the eco-physiological study of seed germination of some marsh plants. In particular, germination tests were carried out on *Carex otrubae*, *Carex pendula*, *Carex divulsa*, *Alisma plantago-aquatica*, *Eleocharis palustris*, *Ranunculus baudotii* and *Erianthus ravennae* at different temperatures (constant/ alternating), with different pretreatments (cold/ hot stratification, GA3, chemical /mechanical scarification). In order to gain insights into the restoration process, a model habitat, an artificial "guazzo", was created at the Botanic Garden "Selva di Gallignano". The main aim of this model habitat was to test the plants to be used during the restoration process of European green toad habitat. This artificial "guazzo" also had a role as a reservoir of biological diversity since it represents an area suitable for the reproduction of aquatic plants. In addition, it was also used for educational purposes.

Global change impacts on ecosystem functions - the importance of interactive effects

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Global change drivers such as climate change and atmospheric nutrient loads (particularly of nitrogen) have multiple effects on the functioning and services of ecosystems, and are among the most relevant key drivers of biodiversity loss. Airborne nitrogen loads have tripled since the beginning of industrialisation, and are known to affect ecosystem functions such as primary productivity, nutrient cycling, and plant species competition. Climate change impacts are predicted to become more severe, particularly in the course of this century. The UN Intergovernmental Panel on Climate Change (IPCC 2007) predicts increasing mean annual temperatures, alterations in precipitation patterns and more frequent weather extremes (e.g. severe summer droughts, heat waves and heavy rainfalls). These shifts may influence nutrient cycles, carbon sequestration and ecosystem primary productivity.

Despite recent research on the effects of global change drivers on ecosystem functions, little is known about the interactive effects of co-occurring global change drivers. In principle it is conceivable that ecosystem responses to simultaneous effects of global change drivers are not simply additive, but also interact and thus may be antagonistic or mutually amplifying. The talk will address the impact of interactive effects of climate change and atmospheric nitrogen deposition on ecosystem functions such as plant growth and competition, taking deciduous forest ecosystems (with *Fagus sylvatica* and *Quercus petraea*) and heathland ecosystems (dominated by the dwarf shrub *Calluna vulgaris*) as examples. Based on recent research the talk will provide examples that high airborne nitrogen loads will interact with climate change. We hypothesize that nitrogen deposition will increase an ecosystem's susceptibility to climate shifts (i.e. increasing summer temperatures, drought events). Thus, single factor studies are not always sufficient to predict conceivable impacts of co-occurring global change drivers. Moreover, the talk will explain underlying mechanisms for the ecosystem responses observed.

Improvements and open issues of the database VegItaly. What are the perspectives?

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The database VegItaly (<http://www.vegitaly.it>; GIVD ID EU-IT-001) is a collaborative project supported by the Italian scientific community. Nevertheless it was ideated about ten years ago, has developed especially during the last few years thank to the cooperation of a large group of scientists. An overview of the content of the database, technical improvements and open issues will be showed. At present an amount of 31,100 vegetation plots, including published and unpublished data are stored in the database. Some basic statistics will be analysed; for example, data distribution in space and time and represented vegetation types. Issues related to data import from different formats have been solved by developing user-friendly tools: *archiver*, *VegImport* and *TabImport*. Some minimum standards have been adopted to ensure to the users a good quality and an easier handling of the data. Main advantages of VegItaly and examples of firsts applications will be also showed.

VegItaly represents a milestone in the Italian vegetation science and much progress has been made, but the results obtained are still far to be considered satisfactory for a country so rich in biodiversity as Italy is. What are the perspectives for the future? We will expect that more and more researchers take part into the project, not only providing relevés but also contributing to data storage and, hopefully, fundraising. Moreover new technical improvements have been already ideated to facilitate the data management and exchange/integration with other national and European initiatives.

Annual dune plant communities in Sicily: new insights through the statistical approach

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The ephemeral dune plant communities of the Mediterranean Region are grouped in *Helianthemetea guttati* class. Here we find the *Cutandietalia maritimae* order, proposed by Rivas-Martinez et al. (2002), with annual associations of semi-fixed dunes, and the *Malcolmietalia* order, proposed by Rivas Goday (1958), comprising the inland sandy soil communities, which occurs in the clearings of bushes and woodlands in the themomediterranean dry belt.

The aim of this survey is the analysis and review of all syntaxa described in Sicily, related to annual dune vegetation, in order to provide a coherent phytosociological synthesis taking into account the floristic, chorologic, and ecological features.

The vegetation relevés have been made according to the sigmatist phytosociological approach (Braun-Blanquet 1964). On the whole more than 280 relevés were submitted to UPGMA with Bray–Curtis coefficient using SYNTAX 2000 software (Podani 2001). The ordination of the data-sets was performed using the PC-ORD 4.34 software. Detrended Correspondence Analysis (DCA) (Hill and Gauch 1980) was used to establish spatial patterns in the scattergram and to generate hypotheses on the vegetation/environment relationships. For processing the data, relevés of literature (Brullo & Marcenò, 1974; Brullo et al. 1974; Brullo & Grillo, 1985; Brullo et al. 1988; Bartolo et al. 1990; Brullo et al. 1994; Brullo & Scelsi, 1998; Brullo et al. 2000; Minissale & Sciandrello 2005;2010) as well as several unpublished relevés

were taken into account to run the ordination and cluster analysis.

Based on the processed data, it is proposed the following syntaxonomic scheme that highlights the floristic and ecological significance, at the level of orders and alliances, including the ephemeral psammophilous vegetation of Sicily. Nomenclatural and taxonomical aspects are referred to Giardina et al. (2007).

Malcolmietalia Rivas Goday 1958

Spring flowering pioneer therophitic communities growing on deep sandy soils in the thermomediterranean belts of the Mediterranean Region (Diez-Garretas et al. 2003).

Characteristic species: *Avellinia michelii*, *Brassica tournefortii*, *Coronilla repanda*, *Corynephorus articulatus*, *Evax asterisciflora*, *Lotus halophilus*, *Medicago littoralis*, *Ononis diffusa*, *Rumex bucephalophorus*.

***Evaco asterisciflorae-Linarion humile* all. nova prop.**

Ephemeral therophitic community from fossil dunes and deep sandy soils of the Camarino-Pachinense district (Brullo et al. 2011)

Characteristic species: *Astragalus kamarinensis* *Linaria multicaulis* subsp. *humilis*, *Loeflingia hispanica*, *Senecio glaucus* subsp. *hyblaeus*, *Tuberaria villosissima* var. *sicula*.

***Cutandietalia maritimae* Rivas-Martínez, Díez-Garretas & Asensi 2002**

Ephemeral plant communities growing on coastal sands and dunes with salt spray between the perennial vegetation of *Ammophiletea* class.

Characteristic species: *Anthemis peregrina*, *Catapodium hemipoa*, *Cutandia maritima*, *C. divaricata*, *Erodium laciniatum*, *Ononis serrata*, *O. variegata*, *Phleum arenarium*, *Polycarpon diphyllosum*, *Pseudorhiza pumila*, *Rostraria littorea* subsp. *littorea*, *Silene niceensis*, *Triplachne nitens*, *Vulpia fasciculata*.

***Alkanno-Maresion nanae* Rivas Goday ex Rivas Goday & Rivas-Martínez 1963**
corr. Díez Garretas, Asensi & Rivas-Martínez 2001

Ephemeral therophitic communities of the coastal dunes spreading in the Mediterranean Region, from East-Iberian territory to Macedonian and Cretan coast, also reaching coastal areas between Algiers and Gulf of Hammamet (Tunisia) (Diez-Garretas et al. 2003).

Characteristic species: *Alkanna tinctoria*, *Echium sabulicolum*, *Hormuzakia aggregata*, *Maresia nana*, *Matthiola tricuspidata*, *Senecio glaucus* subsp. *coronopifolius*, *Silene nummica*, *Wahlenbergia nutabunda*.

***Laguro ovati-Vulpion fasciculatae* Géhu & Biondi 1994**

Ephemeral psammo-nitrophilous communities of the coastal dunes spreading in the Mediterranean Region.

Characteristic species: *Chamaemelum mixtum*, *Lagurus ovatus*, *Anisantha rigida*.

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A reflection on succession types within dynamic phytosociology

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Dynamic phytosociology studies the temporal succession of phytocoenosis. Among others, two main factors play a major role in succession: i) Disturbance: which is mainly responsible for triggering the successional processes, as usually new sites are made available; ii) Stress: which alters species performance, and consequently shape the succession development. Thereby, different long-term disturbance/stress regimes should cause dissimilar types of succession, with plants evolving and adapting to such regimes. In order to typify the different disturbance/stress regimes, two characteristics of such phenomena were considered: i) the mean duration of disturbing/stressing periods, and; ii) the mean duration of non-disturbing/stressing periods. Different combinations of these two features are related to different vegetation dynamics, which can be considered succession types (sigmetum s.l.) of terrestrial vascular plant communities, namely, as a proposal: ephemerosigmetum, permasigmetum and edaphosigmetum. Each of them determines completely different measures aiming nature conservation and management.

A geometric approach for mapping vegetation-types based on environmental data

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We present a framework for the mapping of vegetation-types, based on environmental data, using a simple and interpretable geometric approach, adopting the convex hull notion. Two main premises are acknowledged: i) presence of different vegetation-types is mutually exclusive in the landscape, although ecotones might exist between them; ii) there is an ecological causation for the vegetation-types distribution in the landscape, therefore it is expected that some environmental variables can discriminate the vegetation-types in the environmental hyperspace.

In order to assist variable selection (both 'which' and 'how many' variables to use) we propose two different measures: i) the percentage of the area where no vegetation-type was predicted in relation to the final map extent, and ii) the percentage of ecotone in relation to the total area predicted as occupied by any of the vegetation-types. Inspecting the trade-off of those measures, the researcher can select the variables and the model dimensionality that, e.g., both minimize ecotones and model overfitting.

This framework is deeply related to the reconstructed natural vegetation concept (sensu Moravec) and thus useful to model it, but can be applied to any kind of vegetation types given that the referred premises are respected, and good environmental variables are available.

Recording and Modelling the Value of Ecosystems and Biodiversity

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From functioning ecosystems humans extract supporting, provisioning, cultural, and regulating services! These ecosystem services originate from the biodiversity on Earth (Carpenter et al. 2006, Naeem et al. 2009). In absence of biological processes on Earth, geochemistry governs surface conditions as on any planet. If one eliminates the biota in the ecosystem, the only fluxes in the pools of carbon, nutrients, and water would be those induced by geochemical processes. The question that arises is: would the maximum for human wellbeing coincide with maximum biodiversity? The Millennium Ecosystem Assessment (MA 2003) united the natural and social environmental sciences by linking biodiversity, ecosystem processes, ecosystem functioning, and the services of ecosystems from the local to the global scale.

What we need are analytical tools for projecting future trends as well as indicators to monitor biological, physical, and social changes.

As an example we have investigated farmland habitat diversity in a marginal European landscape in Hesse (Germany) which has changed significantly in the

past decades (Reger et al. 2009). Further changes toward homogenization are expected, particularly in the course of European agricultural policy. Based on three alternative transfer payment schemes, we modeled spatially explicit potential effects on the farmland habitat diversity in a marginal European landscape. We defined (1) a scenario with direct transfer payments coupled to production, (2) a scenario with direct transfer payments decoupled from production, and (3) a scenario phasing out all direct transfer payments. We characterized habitat diversity with three indices: habitat richness, evenness, and rarity. The habitat pattern in 1995 served as reference for comparison. All scenarios predicted a general trend of homogenization of the farmland habitat pattern, yet to a differing extent. Transfer payments coupled to production (Scenario 1) favored the abandonment of agricultural production, particularly in low-productive areas and arable land use in more productive areas. Habitat richness and habitat evenness had intermediate values in this scenario. Decoupling transfer payments from production (Scenario 2) supported grassland as most profitable farming system. This led to a grassland-dominated landscape with low values of all habitat diversity indices. Phasing out transfer payments (Scenario 3) resulted in complete abandonment or afforestation of agricultural land and extremely low values in all habitat diversity indices. These scenarios are connected with considerable changes of ecosystem services on the spatial and temporal scale.

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The value of Ecosystems and Biodiversity

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Biodiversity is a term for the genetic diversity, the species diversity and the ecosystem diversity on Earth. It constitutes the uniqueness of our planet and forms the base for the entirety of life, including humankind.

Biodiversity does not only encompass the diversity of ecosystems and habitats, it covers the water and solid land of the whole planet and we are a part of that infinite diversity. We share our planet Earth with countless other creatures today, about 1.75 million species of animals, plants and microorganisms are registered and we know that a lot more species exist: it might be between 10 and 100 million species. However, a portion will go extinct before even being discovered. We use uncountable services of nature in our daily lives: air, water, soil, food and energy for our existence absolutely for free. By the destruction and overexploitation of

the natural habitats by human activity, the number of today's known species and ecosystems on Earth decreased by about 40 percent between 1970 and 2000: a decline of nearly a half in just 30 years! This led to the creation of the term The Sixth Extinction to describe the crisis on our planet. In comparison, the dinosaurs went extinct in slow motion during the Fifth Extinction some 65.5 million years ago. We expect between 70 and 100 animal and plant species to disappear from planet Earth every single day, and we do not even have an idea what value for biotechnology, the nourishment of humanity and medicine is irretrievably lost. It is a matter of fact that our unprecedented overexploitation of nature endangers our own base of existence in the middle to long term.

A solution for the future is to conserve sufficient amounts of pristine nature and the web of life in all climate-related major biomes and the oceans of the biosphere in order to ensure the required services of the global ecosystems for the future well-being of humanity.

Preservation of the Biodiversity of cultural landscapes by integration of nature conservation and land use. Examples 1980 - 2010 in the Eifel region North Rhine-Westphalia, Germany

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Since more than 30 years in North Rhine-Westphalia, especially in the Eifel region, nature conservation programmes were initiated to conserve and promote rare and endangered species of cultural landscapes. These programmes were performed in close cooperation with farmers and foresters. After ceasing the use of herbicides in field margins or complete fields (pilot project 1978-80) first successes in preserving the flora of crop fields had already been achieved in the early 80ies, some years later also in other regions of Germany. Since 1985 nature conservation programmes were created to preserve species rich meadows, pastures, rough pastures, heathlands and wetlands, but also abandoned and restored areas. In Eifel region nowadays there are about 5000 hectares of these biotopes used as "nature conservation by contract" (now "environmental scheme"), mostly in nature reserves. The important extensive use by mowing or grazing without fertilizer and herbicides is carried out by about 400 farmers, with financial support from North Rhine-Westphalia and since 1998 together with the European Union.

Long time monitoring proves, that numerous rare species like orchids etc. are now more frequent than 20 or 30 years before and some not longer endangered. Furthermore in this region the 2010 biodiversity target of the EU has been reached. This integration of nature conservation in agricultural and forest practices is the most important condition for sustainable preservation of biodiversity and ecosystem services in cultural landscapes.

Vegetation as a tool for monitoring, management and reconstruction of agroecosystems of environmental quality in the CAP (2014-2020) framework

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The main purpose of the study was the acquisition of qualitative and quantitative data concerning the conservation status of biodiversity in an area with mainly agricultural use. The identification of a conservation threshold for the agroecosystems was also made.

The integrated analysis of agro-ecosystems was carried out through the application of cartographic, floristic-vegetational and phytosociology-based indexes at multiple scale of investigation: basin, sub-basin, sample areas inside sub-basins, farms, farmhouse courtyards.

The land-use and hydrographic network analysis highlighted issues related to the urbanization and the application of intensive agricultural techniques. These last have often caused the alteration or deletion of several ditches of order 1.

In the Aspio Basin (average Italian Adriatic coast) the vegetational analysis allowed to detect 41 vegetation associations and 2 subassociations already described, in addition to 7 new associations and 6 new subassociations. The study was focused on herbaceous vegetation, in order to improve knowledge on habitats that are exposed to high levels of human disturbance. The study area is representative of the hilly countryside along the central Adriatic coast. The vegetational landscape is composed by 5 different geomorphologic units and 12 vegetation series (8 series were described at the sub-basin level).

The application of the floristic-vegetation indexes confirmed, through precise measurements, the better conservation status of biodiversity in areas characterized by less intensive agricultural use and higher concentration of semi-natural elements. The comparison between different farms showed an higher level of vegetation maturity according to the organic farming and forage farming.

Management proposals were made in order to ensure agro-biodiversity conservation, monitoring, and reconstruction different types of habitat: road verges, rivers and ditches edges, grassland areas, ecotones and small woods. The proposals are related to the application of the current European directives and regulations (Rural Development Programme, Cross Compliance, Habitat Directive, HNV Farmland Areas).

The savannah vegetation and the livelihood of local people

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The vegetation of the West African savanna contributes in numerous ways to the everyday demand of local people. It serves as a source of phytopharmaca, spices, legumes, fruits, fuel, construction wood etc. Exact figures showing the value of the savanna vegetation will be presented in this contribution.

POSTERS

The vegetation and plant landscape of Piè Vettore (Monti Sibillini National Park, central Apennines)

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We present here a phytosociological study of the vegetation and plant landscape of Piè Vettore (Monti Sibillini National Park, central Apennines) and their connections with the lithology, geomorphology, bioclimate and anthropic features.

The area investigated includes the southern slopes of Monte Vettore and Monte Vettore, between 1300 m and 1600 m in altitude. It is located in the extreme southern sector of the Sibillini Mountains, close to the foothills of the north-western part of the Laga Basin. The vegetation is influenced by the great geological and geomorphological complexity and by human activities, which have profoundly transformed the vegetal landscape over the years.

The detailed phytosociological analyses have made it possible to survey the great floristic and vegetational diversity of the investigated area, as demonstrated by its 12 vegetation types. These were reproduced for the phytosociological map at a scale of 1:5,000. Eight of these vegetation types belong to Habitats of Community Interest. During the detection phase, species of considerable interest were also found: *Moneses uniflora*, *Centranthus angustifolius*, *Goodyera repens*, *Gypsophila repens*, *Asarum europaeum*, *Astragalus danicus*, *A. vesicarius*, ecc.. The synphytosociological analyses also allowed the identification of seven vegetation series, two of which have lasting meaning in relation to the periodic erosion and sliding surfaces that effectively arrest the further evolution of the vegetation. Through the integration of the vegetation series, the model of the plant landscape (geosigmetum) for the investigated territory can be finally proposed. The results of this study have made it possible to increase our floristic-vegetational knowledge of the Sibillini Mountains. They have also helped to clarify the vegetation and landscape framework of this important Apennine area.

Effects of prescribed fire on *Pinus halepensis* Mill tree- rings growth

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In the Mediterranean area wildfires represent one of the most relevant environmental problems. To contrast wildfire propagation and intensity, prescribed burning, used as a fuel management tool, is spreading throughout Europe. However, to evaluate the sustainability of this practice, possible negative effects on ecosystem components should be quantified and excluded.

In this study, we present preliminary results of the effects of an experimental prescribed fire, dated 2009, on tree growth and on the ecophysiological responses of *Pinus halepensis* Mill, planted in the National Park of Cilento and Vallo di Diano, Southern Italy.

The tree-ring width, isotope composition and anatomical traits were analyzed in the burned area and in a control area (unburned) before and after fires to gain ecological responses of trees to possible heat-related damage. $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ were measured in tree-ring chronologies corresponding to the wood formed before and after the prescribed fire event. Indeed, carbon and oxygen isotopic composition of wood rings can provide insight into the ecophysiological processes involved in the response of trees to the fire.

Preliminary findings show no difference in tree-ring width between individuals subjected to the treatment and those in the control area, revealing a marginal effect of fire on tree growth. Future isotopic analyses will clarify the effect of fire events on stomatal conductance and on its interaction with photosynthetic rate, opening a new insight on the possible effects of this management tool on forest ecosystem.

The value of *Posidonia oceanica* (L) Delile biodiversity for marine ecosystem evaluation

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It is well now that biodiversity is an important tool for tracking changes in the ecosystem. Of course, individual ecosystems are very different: it becomes important to define the main elements and the analysis of their behavior in relation to the stress they receive. Particularly, in marine ecosystems *Posidonia oceanica* (L.) Delile is the key species for monitoring these changes. This is the dominant endemic seagrass in the Mediterranean Sea, where it forms meadows which play a crucial role in coastal ecosystems dynamics. In addition to the multiple roles that plays in maintaining the ecological balance of the coastal area, *P. oceanica* is considered useful as an indicator of the quality of the marine environment in which it resides. Its associated community is one of the most important of the Mediterranean both from an ecological (high diversity and biomass) and economic (fishery) point of view. The importance of grasslands, both from an ecological and economic point of view, led the national, European and international to adopt protective measures. During these last two decades we have monitored several meadows of seagrasses at small and large scale. Recently we started a multidisciplinary research for the assessment of *P. oceanica* health stated combined by remote sensing techniques.

Wetland vegetation of the Appia Antica Regional Park (Rome). Characterization of a seminatural urban biotope for conservation purposes

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Historically, wetlands, and in particular those located in urban areas, have represented almost exclusively a problem to human health, with respect to which

it was necessary to take measures of control and remediation. Only in recent decades it has recognized the naturalistic, landscape and recreational value of these peculiar environments, implying a different management aimed at their conservation and restoration. The Appia Antica Regional Park, in Rome, is an area with interesting natural features, especially if you consider the heavily urbanized tissue in which it is placed.

This study is focused to the characterization of the wetlands vegetation inside the park, in order to assess their state of conservation and degradation. Based on the obtained results emerge that the aquatic communities (*Helosciadietum nodiflori*, *Glycerietum plicatae*, *Cladophoretum glomeratae*, Aggl. *Lemna minuta*) are rare and fragmented in the area, for reasons related to water pollution or human disturbance in the riverbed.

Also most of the riverbank phytocoenoses were not well conserved floristically and structurally, being often replaced by ruderal and synanthropic communities. We report, however, some interesting and typical hygrophilous communities, belonging to *Galium-Caricetum ripariae*, *Eleocharidetum palustris*, *Sparganietum erecti*, *Phragmitetum vulgaris*, *Typhetum latifoliae* and Aggl. *Carex pendula*.

The found plant coenosis may be considered as relictual elements of aspects of hydrophilous and hygrophilous communities, probably much more extended along the banks of ditches and waterways of the city. For this reason, it is hoped that there will be by the competent authorities a greater consideration in terms of protection and conservation of these vegetation elements, most of which rare or not reported to Rome.

Diversity of meadow communities on abandoned agricultural lands (Russia, Pskov province)

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The aim of our investigation is to reveal a community diversity and to assess the successional status and conservation value of the meadow communities on abandoned agricultural lands. We used 35 relevés of seminatural meadows with various moisture conditions at abandoned hayfields and pastures (Russia, Pskov province, Nevel' district, in the vicinity of village Fenyovo). Syntaxonomical analysis was carried out using Braun-Blanquet approach. For ordination we ran Detrended Correspondence Analysis (DCA).

As a result of the syntaxonomical analysis, a classification scheme is given. Two associations have been classified into two alliances: *Cynosurion* and *Filipendulion ulmariae* representing class *Molinio-Arrhenatheretea*. Using ordination approach we have shown the differences in the environmental conditions in communities of these associations.

Without agriculture influence we have observed appreciable resumption of trees (predominantly *Malus spp.*) on low-herb meadows (*Anthoxantho-Agrostietum tenuis*). In the case of wet tall-herb meadows (*Lysimachio vulgaris-Filipenduletum ulmariae*) no undergrowth of trees were observed, so these communities are more stable. Both associations are typical zonal communities formed of the widely-distributed species. However, they need maintenance by agriculture influence such as moderate grazing and haying.

Phytosociology applied to conservation of protected areas of Palermo Mts. (North-Western Sicily): the Site of Community Importance "Capo Gallo" (ITA020006)

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Environmental conservation and recovery of the plant landscape are among the priority tasks of the managing bodies of protected areas. In this perspective, the phytosociological approach - aimed at the interpretation of the types of current and potential vegetation - is an effective tool in land use planning and in conservation of biodiversity at various levels (flora, vegetation, fauna, etc.). This study concerns a survey on phytocoenotic biodiversity of the Site of Community Importance "Capo Gallo" (ITA020006), significant biotope located along the coast of North-Western Sicily. The area is dominated by the relief that encloses on the west the Gulf of Mondello and the Plain of Palermo, culminating in the peaks of Pizzo Vuturo (512 m a.s.l.), Pizzo della Sella (562 m a.s.l.) and Pizzo dello Stinco (612 m a.s.l.). Under the geological aspect, the territory falls within the "Palermo Mts." Series, constituted by sediments relating to the "Panormide Platform", as a result of a tectonics that caused the overlay of mainly carbonate units. The plant landscape is noticeably affected by the intensive uses of the past, as well as by fires that occur almost annually. A recent geobotanical survey, carried out in the SCI area, has highlighted the presence of various habitats relating to the Annex I of the Habitats Directive 92/43/EEC, as well as several plant communities ascribable to the following vegetation series (a-d) and edaphic microgeoseries (e-g): a. dwarf palm series (*Pistacio-Chamaeropo humilis* Σ), along the subcoastal slopes; b. ombrophilous-calcicolous series of holm oak (*Rhamno-Quercu ilicis pistacietoso terebinthi* Σ) on debris slopes; c. calcicolous series of wild olive (*Rhamno-Euphorbio dendroidis* Σ), on ledges and the most xeric rocky ridges (south side); d. thermophilous-calcicolous series of holm oak (*Pistacio-Quercu ilicis* Σ), in the upper part of the plateau; e. microgeoseries of rocky coasts; f. microgeoseries of inland cliffs; g. microgeoseries of debris areas.

Vegetation and habitats of Community interest of an isolated biotope of the "Gessoso-Solfifera" Formation (inland of Sicily): the Site of Community Importance "Monte Conca" (ITA050006)

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The substrates of the "Gessoso-Solfifera" Formation that develop in the Sicilian inland - in particular among Agrigento, Caltanissetta, Enna and part of Trapani area - are characterized by a very bare and monotonous plant landscape, as a result of a human activity lasting from very remote historical periods. This led to an almost complete loss of the forest formations and the extreme rarefaction of the native woody species, confining natural aspects in circumscribed biotopes, such

as the SCI of Monte Conca (ITA050006). The protected area - surveyed as part of the activities related to the writing of the Management Plan - is located between the municipalities of Campofranco and Milena (Caltanissetta province), extending over an area of 333 hectares. The physiognomy of the territory is defined by the relieves of Monte Conca (437 m a.s.l.), Cozzo Don Michele (374 m a.s.l.) and Rocche di Tullio (342 m a.s.l.), separated by a short stretch of the Gallo d'Oro River. The area, falling within the lower thermomediterranean upper dry bioclimatic belt, gravitates on substrates of the evaporitic complex, mainly consisting of banks of gypsum alternating with gypseous clays; some shallow karst phenomena are significant, as in the case of the "Inghiottitoio" (on Monte Conca south side) and of the "Risorgenza" (on the north side of the same relief). The plant landscape is quite bare and the habitats of Community interest generally occupy small areas; among the "priority" habitats, there are only the xerophilous grasslands (6220* - Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea*), which colonize gypseous outcrops, sporadically mixed with patches of garrigue and low maquis. Along the clayey slopes of the hilly relieves the extensive crop typologies are more common, dominated by weedy and anthropogenic vegetation; other interesting aspects, located along the river, are made up of riparian communities with a subhalophilous character, distributed on small surfaces.

The *Betula aetnensis* Raf. vegetation on Mt. Etna (Italy) and its management

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The distribution area of *Betula aetnensis* Raf. is located on Mt. Etna. The Etnean birch vegetation extends on western and particularly on eastern slopes of the volcano, between 1450 and 2000-2100 m a.s.l.

The aim of this study were to reach some knowledge about the *Betula aetnensis* vegetation so as to obtain some information for its management and its restoration. The study was carried out according to the Braun-Blanquet's method. Some data were collected about the dynamic of the vegetation.

The study allowed to point out that the *Betula aetnensis* vegetation is mostly constituted by old coppices, which since long time have been subjected to man intervention. There are different birch communities (Poli Marchese and Strano 2011); they are principally dynamic stages. The first stages colonize areas which were affected by fire (caused by man or by the high temperature during volcanic eruptions). Other stages are characterized by *Betula aetnensis* and *Pinus laricio* Poiret; in some stages *Quercus cerris* L. and *Quercus congesta* Presl are also present. At the highest altitudes the stages are only characterized by birch.

Many birch stumps are affected by very serious pathologies which cause the death of numerous trees, moreover the seed origin birch regeneration is almost absent; it is abundant only on burned surfaces (Poli Marchese and Turrisi 2012). The Etnean birch vegetation therefore needs a careful and adequate management for: to defeat the pathologies; to do a restoration, also through a right reafforestation, of areas where pathologies affect woodlands and of new areas; to help the growth of birch seedlings and saplings on sites where they are present, controlling the presence of *Pinus laricio*; to do a rigorous control of man intervention. This can help to safeguard such significant endemic woody vegetation.

This study was realized within the research project: "The Forests of Mt. Etna", funded by the Dipartimento Regionale Azienda Foreste Demaniali, Regione Sicilia.

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***Elymus elongatus*: plant communities and genetic diversity in some Apulian costal wetlands**

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Elymus elongatus (Host) Runemark ssp. *elongatus* (= *Agropyron elongatum* (Host) P. Beauv; *Elytrigia elongata* (Host) Nevski; *Thinopyrum elongatum* (Host) D.R. Dewey; *Lophopyrum elongatum* (Host) A. Löve) are perennial, herbaceous, caespitose, allopolyploid species (from diploid to pentaploid). Being halophilous and xerophilous, and well adapted to the severe environmental conditions of the sandy shores, this species thrives in saline soils of the retro-dunal areas and wetlands. These habitats, characterized by high biological diversity and delicate ecological processes, are particularly vulnerable to land use changes. Their conservation status is usually evaluated by monitoring and updating the composition and structure of plant communities, plant-plant interactions, and the genetic diversity of plant populations and species. A consolidated approach to evaluating the genetic diversity of plant populations and species in the *Poaceae* family is to employ biochemical characterization of the kernel proteins extensively used to supply new genes from wild to cultivated wheats.

Three protected coastal sites of the Apulia region (Natura 2000 network) have been chosen for the collection and the survey of *E. elongatus* ssp. *elongatus* populations. Twenty-five populations were selected inside the areas of interest for a phytosociological survey and seed sampling required for biochemical analyses of kernel proteins.

The results show: (1) the characterization of plant communities (associations) where *E. elongatus* ssp. *elongatus* was found; (2) the polymorphism of seed storage proteins, gliadins and glutenins, extracted from twenty-five populations of this species; (3) the frequencies of genotypes belonging to each plant community (association). The genotypes identified, and in general the observed polymorphism, provide additional information about the biodiversity changes that occurred in each area and plant community where the target species was collected, and this could be useful to develop plans for the conservation of habitats and ecosystems.

Impact of Phytopathogenic Fungi on Natural Plant Communities in Some Protected Areas of Croatia

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Plant pathogenic fungi can cause various diseases on plants in natural ecosystems and can cause various changes in their populations like mortality, reduction of fecundity and plant fitness, and also affect the structure and composition of plant communities. Occurrence of plant pathogenic fungi can be especially important on plant species in protected areas like national parks, nature parks, botanical reserves etc. Knowledge about plant pathogens and their accurate management on plants is one of the protection measures proposed in the IUCN documents. From 2007 to 2012 surveys were conducted in different protected areas of Croatia (Paklenica National Park, Northern Velebit National Park, Biokovo Nature Park, Žumberak-Samoborsko gorje Nature Park etc.) in order to determine the presence of plant pathogenic fungi and their impact (disease incidence) on various native plant taxa. Identification of fungal species was performed on the basis of morphological characters of their spore-bearing structures and spores. A relatively great number of fungal species was determined, but mostly with small disease incidence on plants. The most often disease symptoms of fungi on plants were necroses in form of leaf spots and blotches, blight and occasionally decline or dieback of entire plants.

Assessment of vegetation biodiversity in Natura 2000 sites in the agricultural landscape of Lombardy (Italy)

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Since the 8,32% of Lombardy Utilized Agricultural Area (UAA) is included within the Natura 2000 network, the system of protected sites would be threatened by rural land use practices. This study aims to evaluate the impact of agricultural practices on biodiversity and phytosociological composition of plant natural communities near the cultivated fields in traditional, biodynamic and integrated farming system. Forty phytosociological relevés in natural habitats bordering the crop and in the ecotonal vegetation, were carried out on every farm following the Braun-Blanquet method (Braun-Blanquet 1951, 1964). Species average cover-abundance values for each community were subjected to importance-values distribution analysis using DIVFIT pc-program (Ganis 1991). The habitats are characterized by plant communities with curves approaching the log-normal distribution. The species x relevés matrix was subjected to multivariate analysis using PAST (PAleontological STatistics) (Hammer et al. 2001). Woodlands in biodynamic and integrated farms can be classified as *Alno-Ulmion* Br.-Bl. et Tx. 43, *Carpinion betuli* Issl. 31 em Oberd. 57 and *Balloto nigrae-Robinion* Hadač et Sofron 80, while in traditional farm can be classified as *Carpinion betuli*. The wet fringes of floodplain forests in the biodynamic and integrated farms has been classified

as *Convolvulion sepium* Tx. 47 em, while the nitrophilous and mesophilous wood fringes in traditional farm as *Alliarion* Oberd. (57) 62. Some of the communities occurring in the ecotonal vegetation of the biodynamic farm show the influence of the bordering crops and could be identified as *Oryzetea sativae* Miyawaki 1960 and in *Digitario-Setarietion* (Siss. in Westh. et al. 46) Oberd. 57 (weed communities of crops typical to acidic-neutral light soils, such as maize) (Oberdorfer 1977).

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Vegetation dynamics of *Pinus nigra* reforestation about 100 years from replantation: three cases study

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We present here an integrated dendrometric-structural and floristic-vegetational study performed in three representative reforestation areas of *Pinus nigra* that are located in protected areas in the Umbria-Marche Apennines. The aim was to assess their renaturation state a century from their replantation, through the study of their vegetational dynamics. The reforestation areas considered were: the Mt. Predicatore pinewoods (Regional Park of Gola della Rossa and Frasassi); the Mt. Tegolaro pinewoods (near to the Site of Community Importance [SCI] of 'Monte Giuoco del Pallone e Monte Cafaggio IT5330009'); and the Piè Vettore pinewoods (National Park of the Sibillini Mountains). The analyses were carried out in representative areas that were homogeneous in their general features and size. To verify the present-day dynamics, diachronic analyses were also carried out using data from the literature and the available cartographic material. The results of this study have made it possible to show that the vegetational dynamics have been strongly influenced by the different levels of coverage of the pine trees. The typical and gradual vegetation succession that has developed in the adjacent sectors is often simplified within the reforestation areas considered. For the Piè Vettore pinewoods, the presence of sub-acidophilous species was also revealed, which were not found in the surrounding native woodlands, and therefore this allows the hypothesis of the impact of the coniferous litter on species diversity. On the basis of data obtained in the investigated reforestation areas, the process of renaturation is advanced over large areas, with the entry of numerous nemoral species and with more than sufficient regeneration of these. As well as providing important ecological information, the present study has provided an essential knowledge-base for the planning of future silvicultural actions that will be designed to further promote the renaturation that has already started.

The Santa Giustina Wood: a biodiversity hot-spot in the Po Delta

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The Santa Giustina Wood is a little wooded area (1,1 kmq), that lies near the wider and famous Mesola Wood (“Gran Bosco della Mesola”), in the Po River Delta territory (Emilia-Romagna, Italy). Both woods have the same origin, soil and vegetation types, that include: extrazonal holm oak woods (*Vincetoxico hirundinariae* – *Quercetum ilicis*), mixed meso-thermophilous oak-hornbeam woods (*Quercus robur* and *Carpinus betulus* community of *Quercetalia pubescenti-petreae*) and southern ash swamp woods (*Cladio marisci* – *Fraxinetum oxycarpae*), in a strictly closed mosaic.

The Wood is property of the Emilia-Romagna Region; the surrounding areas are almost entirely cultivated, except for two little biotopes: the “Mendica” wetland (*Juncus subnodulosus* community of *Holoschoenetalia*) and the “Asinara” salt meadow (*Carex extensa* and *Juncus gerardii* community of *Juncetalia maritimi*).

Unlike the wider Mesola Wood, whose vegetation is affected by overgrazing of introduced fallow deer, the Santa Giustina Wood doesn’t host ungulate populations, so that its vegetation is naturally developed.

Some plant species of the Ferrara Province live only within the Santa Giustina Wood: *Allium carinatum*, *Platanthera chlorantha*, *Rhamnus alaternus*, *Silene nutans*, *Veronica officinalis*, *Viola alba* ssp. *dehnhardtii*. In the surrounding areas two little populations of *Dactylorhiza incarnata* and *Puccinellia fasciculata* are seriously endangered: the creation of a buffer zone between the wood and the cultivated land have major priority to preserve the entire biotope.

Plant communities and habitats of Directive 92/43/EEC in National Park of Alta Murgia (Apulia Region - Southern Italy)

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A phytosociological study on plant communities of National Park of Alta Murgia (Apulia Region, southern Italy) was performed. The Park covers a total surface area of around 70,000 Ha, and its altitude is comprised between 300 and 700 metres a.s.l.. The climate is of Mediterranean semi-arid type characterized by hot and dry summers and moderately cold and rainy winters. The mean annual precipitation is about 550 mm/y, and the maximum potential evaporation ranges between 5 and 6 mm/day in the month of July. The Alta Murgia is a calcareous highland with a geological substrate mainly consisting of limestones that date back to the Cretaceous period (about 130 million years ago). The typical Mediterranean vegetation of the area includes natural forests and scrubs, pastures and land cropped by seasonal crops, e.g. winter wheat. Serious alterations of the morphology of wide zones of the area are caused by the practice of “rock-breaking” often applied to turn the original pasture to cropped land. The landscape porosity is greater than that

of nearby landscapes (Mininni, 1996). The vegetation analysis was performed according to the method of Braun-Blanquet (1932). We report the first records of new aspects of rocky and meadow vegetation, habitats also investigated by Terzi & D'Amico (2008) and Forte et al. (2005), woodlands communities and temporary ponds. Some important syntaxa and habitats of 92/43/EEC Directive identified are: *Stipo bromoidis-Quercetum dalechampii* Biondi et al. 2004 (habitat: Eastern white oak woods, 91AA*); *Verbenion supinae* Slavnic 1951 (habitat: Mediterranean temporary ponds, 3170*); *Campanulo versicoloris-Dianthion japigici* Di Pietro & Wagensommer 2008 (habitat: Calcareous rocky slopes with chasmophytic vegetation, 8210); *Acino suaveolentis-Stipetum austroitalicae* Forte & Terzi in Forte, Perrino & Terzi 2005 (habitat: Eastern sub-mediterranean dry grasslands (*Scorzoneretalia villosae*), 62A0).

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The bryophyte association *Solorino saccatae-Distichietum capillacei* Reimers 1940 on the Mediterranean mountains: a tool for evaluating natural and conservative environments

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This study is focused on *Solorino saccatae-Distichietum capillacei*, a terri-saxicolous bryophyte association, occurring on soil covered rocks, preferably limestone, in crevices or fissures of rocks with a thick layer of soil. The association belongs to the alliance *Distichion capillacei* Ștefureac ex Klika 1948, grouping post-pioneer, sciophytic, mesophytic, basophytic communities rich in exochomophytes and chasmophytes; the alliance is referred to the order *Ctenidietalia mollusci* Hadac & Šmarda ex Klika 1948, class *Ctenidietea mollusci* v. Hübschmann ex Grgić 1980. Based on literature and unpublished data, *Solorino saccatae-Distichietum capillacei* is found on the Mediterranean mountains of northern and eastern Sicily, southern Italy, Greece, Albania and Macedonia. The identification of the bryophyte vegetation was carried out using the classic phytosociological method of Braun Blanquet (1964). Then, we proceeded a synecological analysis by some biological and ecological parameters, such as life forms and life strategies, considered for each *taxon* of the community; the life forms follow the concept of Mägdefrau (1982), those of the life strategies During (1979) and Frey & Kürschner (1991).

The analysis of the bryophyte vegetation can be an useful tool to provide

information about the quality of the environment. For this aim we analyzed the data of the association *Solorino saccatae-Distichietum capillacei*; the results of the research show that this association is linked to natural, lasting and conservative habitat of which it can be considered a good bioindicator.

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Phytosociological study in coastal salt marshes restoration

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The capacity to define suitable habitat is often an important parameter in conservation and restoration projects of plant populations, and it requires previously a fine knowledge of their ecological features and dynamics. This study is a part of the SIMBIOTIC Project - Enhancing Sicily-Malta BIOgeographical Transboundary Insular Connectivity (Operative Programme Italia-Malta 2007–2013) whose overall objective is to enhance the ecological integrity, connectivity and management effectiveness of protected area landscapes in the Pachino-Gozo cross border area. Coastal salt marshes from southern Sicily, particularly Pantano Ponterio, are the sites chosen for the implementation of the pilot project. According to the bioclimatic classification proposed by Rivas-Martínez (2004), this area can be referred to the Mediterranean pluviseasonal oceanic bioclimate, with low thermomediterranean thermotypes and semiarid ombrotypes (Brullo et al. 1996; Scelsi and Spampinato, 1998).

The aim of this research is to recognize the different vegetation zones of salt marshes, to find the characteristic/structurally dominant species of each habitat, to cultivate the target species identified, and to analyze the processes of colonization and development of the target species in their habitats. The main purpose was to produce a model of restoration of salt marshes.

The vegetation analysis, carried out with the phytosociological method, has allowed to identify different plant communities. On the basis of a total of 136 relevés 23 plant communities have been defined.

The vegetation is represented by flooded communities of *Ruppiaetea* "cod.1150*" (*Enteromorpha intestinalidis-Ruppiaetea maritimae*, *Ruppiaetea spiralis*), by helophytic communities of *Phragmito-Magnocaricetea* (*Phragmitetum communis*, *Scirpetum compacti*), by hygrophyte communities of *Juncetea maritimi* "cod. 1410" (*Schoeno-Plantaginetum crassifoliae*, *Juncetum maritimo-acuti*, *Juncetum subulati*, *Inulo crithmoidis-Juncetum maritimi*, *Spartino-Juncetum maritimi*), by halophytic communities of *Sarcocornietea fruticosae* "cod. 1420" (*Arthrocnemo-Juncetum subulati*, *Juncetum subulati-Sarcocornietum alpini*, *Juncetum subulati-Sarcocornietum fruticosae*,

Halimiono portulacoidis-Sarcocornietum alpini, *Halimiono-Suaedetum verae*, *Agropyro scirpei-Inuletum crithmoidis*), by annual halo-nitrophytic communities of *Saginetea maritimae* "cod.1310" (*Parapholidetum filiformis*), by annual communities of *Isoetonoanojuncetea* "cod.3170*" (*Brizo minoris-Isolepidetum cernui* ass. nova), by annual halophytic communities of *Thero-Salicornietea* "cod.1310" (*Salicornietum emerici*, *Suaedo-Salicornietum patulae*, *Salsoletum sodae*, *Atriplici salinae-Suaedetum spicatae*, *Cressetum creticae*) and by halo-higrophite wood of *Nerio-Tamaricetea* "cod. 92D0" (*Limbaro crithmoidis-Tamaricetum africanae* ass. nova).

The target species identified and seeds collected in the salt marshes from southern Sicily are: *Sarcocornia alpini*, *Arthrocnemum glaucum* and *Juncus subulatus* (lower marshes), *Sarcocornia fruticosa* and *Limonium narbonense* (middle marshes), *Juncus acutus*, *J. maritimus*, *Limbaro crithmoides*, *Elytrigia scirpea* (upper marshes). Regarding the processes of colonization and development of the target species we are awaiting the first results.

The study has highlighted that the different plant communities are distributed in the salt marshes in relation to length of flooding, water level, salinity and soil texture and suggests guidelines for restoration activities to be held in the Pantano Ponterio.

Vegetation dynamics on landslide: the study case of Cervinara (Southern Apennines, Italy)

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In Campania region (southern Italy) several massifs surrounding the Somma-Vesuvius complex and Phleagrean Fields are covered by pyroclastic deposits; these deposits are made of different layers of ashes and pumices turning on the top in soils thanks to pedogenetic processes. These volcanoclastic soils are frequently interested by landslides (mainly debris flow), causing human victims and severe damages to buildings and roads. Moreover these phenomena destroy previous vegetation and provide new substrates, resulting to be a major factor driving vegetation dynamics and therefore increasing the diversity of both landscape and plant communities. In December 1999 several landslides affected the municipality of Cervinara (AV), causing victims and damages; in this research we studied the dynamic of vegetation after this event both at landscape and community level. Aerial photos before and after the landslides were analysed and used to obtain vegetation maps; GIS analysis were performed to evaluate the area covered by different vegetation types and vegetation dynamics. Along all the area interested by the landslide, vegetation sampling of the existing plant communities were carried out using phytosociological method; the resulting matrix was statistically analysed using a multivariate approach (classification and ordination). The research evidenced that:

1) the landslides affected mainly a chestnut plantation (90%) but the landslide originated from the boundary between this plantation and coppice, and precisely were a trackway occurred; 2) five years after 95% of the area interested by landslide was recovered by vegetation; 3) plant communities in the landslide area belong to the *Anemone apenninae-Fago sylvaticae* sigmetum.

A beech forest diversity along an altitudinal gradient at Monte Acuto (M. Catria-Nerone, Central Apennines)

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The knowledge of plant diversity and ecological processes occurring in a specific area are an important tool for sustainable management and a warrant for conservation or restoration of plant biodiversity. This is particular true in areas of the Natura 2000 network where conservation issue becomes crucial for assessment of environmental quality.

In this direction we carried on an interdisciplinary survey, based on phytosociological, structural and dendrometric approaches, of the beech forests (Habitat 9210* "Apennine Beech forests with *Taxus* e *Ilex*") extensively covering the northwestern slope of the Monte Acuto, a main peak of the Catria-Nerone group in the central Apennines, within the SCI: IT5310019.

A detailed study performed along a representative altitudinal gradient between 1000 and the current timberline at 1400 m asl allowed to define the spatial succession of the beech forest in relation to the main local ecological factors, which proved to be altitude and geolithological features. For each forest type, we were able to identify a group of specific ecological (abiotic and biotic) indicators useful for planning of possible and recommended silvicultural treatments. This study is a part of the FORESTPAS2000 Research Project (Ministry of Agriculture, Food and Forest Policies) aimed to provide guidelines for sustainable management of silvo-pastoral systems, under different property regimes, in Natura 2000 Network of central Italy. It integrates a previous geobotanical survey of the upper timberline ecotone on the same mountain slope (Gallucci et al. 2010).

Gallucci V., Allegrezza M., Urbinati C., 2010. Dinamismi spazio-temporali e sensibilità climatica: uno studio su faggete del limite superiore nell'Appennino centrale. *Sherwood. Foreste ed Alberi Oggi*, 164: 11-15.

Emergy evaluation of Pinewood (*Pinus pinaster*) forest. A whole system assessment of Matsucoccus bast scale consequences.

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Pinus pinaster Aiton plays a very important role providing a set of ecosystem services, from soil erosion prevention and CO₂ sequestration to reforestation of degraded areas. Since the 90's *Matsucoccus* bast scale affects *P. pinaster* in the most part of Mediterranean basin. The alien pest causes damages from resination or defoliation to, in the end, tree death. These effects strongly reduce the ability of pinewood ecosystem to supply services. A study about *Matsucoccus* infection has been carried out in the East side of the Ligurian region, where the pest has been

detected at different levels of damage. The study area is within 5 Terre National Park, a zone exposed to high hydrogeological risk in order to quantify, from an ecological and economic perspective, negative impacts arising from the *P. pinaster* loss. To this aim Emergy analysis is proposed: a quantitative analysis able to account direct and indirect solar energy used to maintain the *P. pinaster* system, expressed in solar energy joules (seJ). Two macroareas exposed at different level of infection (pinewood without visible damages by bast scale and a clearly damaged one) were analyzed. *P. pinaster* tree and understorey vegetation aboveground biomass was estimated using allometric equations based upon the diameter at breast height, tree age, volume and cover and depending on the sampled species. Emergy maintaining these biomasses was evaluated and then translated in economic units (Em€). This value represents an estimate of pinewood ability to provide ecoservices calculated in a non anthropocentric perspective. These results can be helpful to provide information to be passed on to not skilled people or managers and decision makers in order to make explicit consequences of implementing different policies. In fact, in a management perspective, the application of phytosanitary measures against introduction and spread of invasive plant pests must include accurate assessments of potential economic benefits and costs.

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