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### OLD-GROWTH FORESTS IN ITALY: RECENT RESEARCH DEVELOPMENTS AND FUTURE PERSPECTIVES

*In Italy there are no truly primeval forests because forest exploitation has been very pervasive since Roman times. All along the centuries intensive silvicultural systems have heavily modified forest composition and structure. Nevertheless, in particular situations there are forest stands that have not been impacted by utilization for very long periods of time and show old-growth characters. The contribution recall the main projects dealing on characterization and monitoring of old-growth forests in Italy starting from the activities of Prof. Pavari in 1954. It then introduces the papers presented in this special issue resulting from the activities of different recent research projects funded by national authorities. Most of these contributions were presented in a national congress held in Prati di Tivo (TE) from 25 to 26 of June 2010 titled "Old-growth forests in Italy: identification, characterization, management", organized with the support of the Gran Sasso and Monti della Laga National Park.*

*Key words:* old-growth forests; sustainable forest management; monitoring; Italy.  
*Parole chiave:* boschi vetusti; gestione forestale sostenibile; monitoraggio; Italia.

Mediterranean-type ecosystems rival tropical regions for biological richness, particularly in plant species (MOONEY, 1988).

Integrated research efforts in forests in the Mediterranean region, combining ecosystem functional observations with silvicultural management

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options in order to develop sustainability indices, are today an important research need (SCARASCIA-MUGNOZZA *et al.*, 2000).

In Italy there are no truly primeval forests because forest exploitation has been very pervasive since Roman times (MOTTA, 2002). All along the centuries intensive silvicultural systems have heavily modified forest composition and structure.

Nevertheless, in particular situations (remote areas, specific protection status, etc.) there are forest stands that have not been impacted by utilization for very long periods of time and show old-growth characters. Long term survey of these rare tracts of forest is therefore one of the upcoming research issues in Italy. Although several researchers have approached this theme in the past, it is only in recent times that large cooperative research projects have started with the aim of creating a comprehensive network of old-growth forests in the country.

In 1954 Aldo Pavari established the first network of 24 protected forest areas in several forest types in the main Italian biogeographical areas (GUIDI and MANETTI, 1999). The aim of the project was to monitor natural evolution of forest ecosystems to derive useful information for the implementation of “close to nature” silvicultural methods.

More recently, several authors have identified and studied what have been defined as potential old-growth forests in Italy. These are mainly located in mountain areas in the Alpine (MOTTA, 2002; MOTTA and EDOUARD 2005; MOTTA *et al.*, 2006) and Apennine regions (PACI and SALBITANO 1998; PIOVESAN *et al.*, 2005; BURRASCANO *et al.*, 2009;). Potential old-growth forests have been studied in Italy also in different ecological conditions (for example in the Mediterranean area, e.g. CITTERIO *et al.*, 2007).

Recently a large research project was funded by the Italian Ministry of the Environment with the aim of carrying out a comprehensive assessment of potential old-growth forests in National Parks (BLASI, 2010). The study was based on a field survey with 20 m radius sampling plots. For each plot a number of different old-growthness indicators was calculated (CORONA *et al.*, 2010). A total of 157 potential old-growth forests were identified in 18 National Parks, 68 of them were investigated in the field. Five of them were classified as real old-growth forests while the remaining 63 were considered with a medium or low old-growthness level. The results of this project were published in a special issue of Plant Biosystems (144/2010).

In 2007 the Italian Ministry of University and Research funded two national research projects (MIUR-PRIN) dealing with old-growth forests. The first one analyses “Innovative methods for the identification, characterization and management of old-growth forests in the Mediterranean environment” (2007TFREJ9 - National Coordinator Gherardo Chirici,

University of Molise); the second one examines “Climate change and forests - dendroecological and ecophysiological responses, productivity and carbon balance on the Italian network of old-growth beech forests” (2007AZFFAK - national coordinator Gianluca Piovesan, University of Tuscia).

Following this renewed interest, a national conference on “Old-growth forests in Italy” was organized on the 25<sup>th</sup> and 26<sup>th</sup> of June 2010 in Prati di Tivo, in the “Gran Sasso e Monti della Laga” National Park. A total of 14 oral contributions were presented in three sessions and several other projects and studies were illustrated in posters. Approximately 250 people attended the conference to discuss characterization, definitions, functions and role of Italian old-growth forests.

The Italian Journal of Forest and Mountain Environments/L'Italia Forestale e Montana, is now publishing the works presented in this conference in two consecutive issues.

Four papers in this issue present the first results from the PRIN-MIUR Project “Innovative methods for the identification, characterization and management of old-growth forests in the Mediterranean environment”. The project was based on a standard survey in 12 potential old-growth forests located in Mediterranean areas and selected on the basis of prior studies. The survey was conducted in spring-summer 2009 and 2010 in large study areas 1 ha wide (100 m x 100 m). The field protocol was based on the georeferenced census of all aboveground living and dead trees. Information on bushes, lichens, tree regeneration, and tree age was also acquired with a sampling approach. LOMBARDI *et al.* present the first results from a deadwood survey on all plots. CIANCIO *et al.* analyze a Calabrian pine old-growth forest in relation to forest landscape conservation and possible lessons for silviculture. In some of the investigated sites special studies were carried out: RAVERA *et al.* report on epiphytic lichens, while DI PAOLO *et al.* discuss the combination between high resolution remotely sensed data with forest structure indicators.

NOCENTINI discusses if and how research on old-growth forests can support forest management and planning in areas where forests have been heavily and pervasively modified during the centuries.

The first results from the PRIN-MIUR project “Climate change and forests - Dendroecological and ecophysiological responses, productivity and carbon balance on the Italian network of old-growth beech forests” are presented in PIOVESAN *et al.* The survey examined nine beech forests (*Fagus sylvatica* L.) located in eastern Alps and in central Apennines to assess: *i*) the degree of ‘old-growthness’ on a structural and dendroecological basis; *ii*) the carbon (C) stocks in the different ecosystem compartments; *iii*) some ecophysiological traits using stable isotopes.

MOTTA *et al.* report on stand structure, quality and quantity of coarse woody debris (CWD) in a Northern Apennine mixed beech-fir forest ("La Verna Forest" in the "Foreste Casentinesi, Monte Falterona, Campigna" National Park), long managed according to a very low impact type of silviculture.

BERTOGLIATI aimed to reconstruct past disturbances and the age structure of an ancient coniferous forest in Canton Ticino.

SABATINI *et al.* compared vascular plants understory from old-growth and from regularly managed stands demonstrating that the old-growth stand is characterized by a higher environmental heterogeneity.

VETTORI *et al.* examined genetic characterization of beech old growth-stands.

More contributions presented at the Prati di Tivo Conference will be published in the next issue of this journal.

All the papers highlight the involvement of the Italian scientific community in the identification, characterization and definition of old-growth forests from Alpine to Southern Mediterranean areas. In ecological studies, the occurrence of persistent woodlands where no silvicultural activity has been carried out for a long period of time, is a unique opportunity for monitoring natural forest dynamics. In the last five years the amount of quantitative data available for potential old-growth forests characterization in Italy has considerably increased.

Future research efforts should be directed towards: *i*) harmonizing field assessment methods in order to identify a good common basis for "old-growthness" evaluation of forests in different environmental conditions; *ii*) completing the survey in potential old-growth forests in Italy; *iii*) ensuring protection and long term monitoring of these areas and related buffer zones; *iv*) evaluating the need for a specific definition of old-growth forest for Mediterranean conditions; *v*) deriving useful operative inputs for standard forest management.

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## RIASSUNTO

**Boschi vetusti in Italia: recenti sviluppi della ricerca e prospettive future**

A causa dell'intensa e pervasiva utilizzazione delle risorse forestali iniziata fin dai tempi della civiltà dell'antica Roma in Italia non esistono foreste vergini. Nel corso dei secoli l'applicazione di modelli selvicolturali semplificati e intensivi hanno profondamente modificato le caratteristiche strutturali e compositive dei nostri boschi. Cionondimeno, in particolari condizioni ambientali, alcuni popolamenti risultano da lunghi periodi di tempo abbandonati alla libera evoluzione e mostrano quindi caratteri di vetustà. Questo contributo richiama alcuni dei principali progetti relativi alla caratterizzazione e al monitoraggio dei boschi vetusti in Italia a partire dal 1954 con le attività del Prof. Pavari. Vengono successivamente introdotti i contributi presentati in questo numero speciale risultanti da una serie di progetti di ricerca finanziati da diversi organismi nazionali. La gran parte di questi lavori è stata presentata a Prati di Tivo (TR) il 25 e 26 giugno 2010 nel corso della conferenza nazionale intitolata "Boschi vetusti in Italia: identificazione, caratterizzazione, monitoraggio".

## REFERENCES

- BERTOGLIATI M., 2010 – *Historical and dendroecological reconstruction of past disturbances and dynamics in ancient protective forests: a case study from Southern Switzerland*. L'Italia Forestale e Montana, 65 (5): 607-619.
- BLASI C., 2010 – *Introduction*. Plant Biosystems, 144: 128-129.
- BURRASCANO S., ROSATI L., BLASI C., 2009 – *Plant species diversity in Mediterranean old-growth forests: a case study from central Italy*. Plant Biosystems, 142 (2): 313-323.
- CIANCIO O., IOVINO F., MENGUZZATO G., NICOLACI A., VELTRI A., 2010 – *Stand structure of Calabrian pine old-growth forest: indications for the forest management and forest landscape preservation*. L'Italia Forestale e Montana, 65 (5): 529-544.
- CITTERIO G., PUXEDDU M., GIANNINI R., 2007 – *La foresta relitta di roverella dei Monti del Gennargentu, Sardegna*. Forest@, 4 (1): 11-18.
- CORONA P., BLASI C., CHIRICI G., FACIONI L., FATTORINI L., FERRARI B., 2010 – *Monitoring and assessing old-growth forest stands by plot sampling*. Plant Biosystems, 144: 171-179.
- DI PAOLO S., GIULIARELLI D., FERRARI B., BARBATI A., CORONA P., 2010 – *Support of multispectral very high resolution remotely sensed imagery for old-growth beech forest detection*. L'Italia Forestale e Montana, 65 (5): 519-527.
- GUIDI G., MANETTI M.C., 1999 – *L'area Pavari nella faggeta della Foresta Umbra: caratteri strutturali e trend evolutivo*. Annali Istituto Sperimentale di Selvicoltura, Arezzo, 28: 39-46.
- LOMBARDI F., CHIRICI G., MARCHETTI M., TOGNETTI R., LASSERRE B., CORONA P., BARBATI A., FERRARI B., DI PAOLO S., GIULIARELLI D., MASON F., IOVINO F., NICOLACI A., BIANCHI L., MALTONI A., TRAVAGLINI D., 2010 – *Deadwood in*

- forest stands close to old-growthness under Mediterranean conditions in the Italian Peninsula*. L'Italia Forestale e Montana, 65 (5): 481-504.
- MOONEY A.H., 1988 – *Lessons from Mediterranean-Climate Regions*. In: Wilson, E.O. (Ed.), Biodiversity. National Academy. Press, Washington, p. 156-165.
- MOTTA R., 2002 – *Old-growth forests and silviculture in the Italian Alps: the case-study of the strict reserve of Paneveggio (TN)*. Plant biosystems, 136: 223-232.
- MOTTA R., BERRETTI R., BORCHI S., BRESCIANI A., GARBARINO M., TRUCCHI D., 2010 – *Stand structure and coarse woody debris profile of "La Verna" Forest (Arezzo, Italy)*. L'Italia Forestale e Montana, 65 (5): 591-605.
- MOTTA R., BERRETTI R., LINGUA E., PIUSSI P., 2006 – *Coarse woody debris, forest structure and regeneration in the Valbona Forest Reserve, Paneveggio, Italian Alps*. Forest Ecology and Management, 235: 155-163.
- MOTTA R., EDOUARD J.L., 2005 – *Stand structure and dynamics in a mixed and multilayered forest in the Upper Susa Valley (Piedmont, Italy)*. Can. J. For. Res., 35: 21-36.
- NOCENTINI S., 2010 – *Old growth forests in Italy: links to forest management and planning in areas with long-standing human impact*. L'Italia Forestale e Montana, 65 (5): 545-555.
- PACI M., SALBITANO F., 1998 – *The role of studies on vegetation dynamics in undisturbed natural reserves towards the need of knowledge for close-to-nature silvicultural treatments: the case study of Natural Reserve of Sasso Fratino (Foreste Casentinesi, northern-central Apennines)*. AISF-EFI International Conference on "Forest Management in Designated Conservation & Recreation Areas (Morandini R., Merlo M. and Paivinnen R. eds.), 7-11 october 1998, Florence, Italy. University of Padua Press, p. 145-156.
- PIOVESAN G., ALESSANDRINI A., BALIVA M., CHITI T., D'ANDREA E., DE CINTI B., DI FILIPPO A., HERMANIN L., LAUTERI M., SCARASCIA MUGNOZZA G., SCHIRONE B., ZIACO E., MATTEUCCI G., 2010 – *Structural patterns, growth processes, carbon stocks in an Italian network of old-growth beech forests*. L'Italia Forestale e Montana, 65 (5): 557-590.
- PIOVESAN G., DI FILIPPO A., ALESSANDRINI A., BIONDI F., SCHIRONE B., 2005 – *Structure, dynamics and dendroecology of an old-growth Fagus forest in the Apennines*. Journal of Vegetation Science, 16: 13-28.
- RAVERA S., GENOVESI V., FALASCA A., MARCHETTI M., CHIRICI G., 2010. *Lichen diversity of old-growth forests in Molise (Central-Southern Italy)*. L'Italia Forestale e Montana, 65 (5): 505-517.
- SABATINI F.M., BURRASCANO S., BLASI C., 2010 – *Niche heterogeneity and old-growth forests conservation value*. L'Italia Forestale e Montana, 65 (5): 621-636.
- SCARASCIA-MUGNOZZA G., OSWALD H., PIUSSI P., RADOGLU, K., 2000 - *Forests of the Mediterranean region: gaps in knowledge and research needs*. Forest Ecology and Management, 132: 97-109.
- VETTORI C., PAFFETTI D., CIANI L., GIANNINI R., 2010 – *Fonte Novello old-growth forest*. L'Italia Forestale e Montana, 65 (5): 637-651.