



December 2002

MEDPINE 2, the second International Conference on Mediterranean Pines, took place at the MAICH Conference Center, Chania (Crete, Greece), on September 8-13, 2002, co-organised by the University of Athens, the Hellenic Ministry of Agriculture and the Mediterranean Agronomic Institute of Chania, with an international scientific board chaired by Prof. Costas A. Thanos.

The general theme of the Conference was Conservation, Regeneration and Restoration of Mediterranean Pines and their Ecosystems. Emphasis was placed on the eu-Mediterranean pine species *Pinus halepensis*, *P. brutia*, *P. pinea*, *P. pinaster*, *P. canariensis* and *P. nigra*. Sessions focused on Ecophysiology, Genetics and Breeding, Seeds, Ecology, Management and Conservation.

Eighty participants from 12 countries attended the conference and 77 contributions are included in the Book of Abstracts.

Flash Summary of MEDPINE 2

Theophrastus of Eressus (371-286 BC) already paid attention to pines in his botanical works, including comments on morphology, growth, regeneration, ecological characteristics and useful products.

Pinus halepensis x *P. brutia* hybrids are common, probably due to the introduction of one species in the habitat of the other. No hybrids have been obtained so far between *P. brutia* and *P. nigra* or *P. pinea*. Artificial hybridisation of *Pinus halepensis* x *P. brutia*, always using Aleppo pine males and *P. brutia* females, provided individual trees (F_1 hybrids) growing faster than their parents, a potentially interesting finding for forestry breeding. In addition, some hybrid phenotypes showed significant resistance to *Thaumetopoea pityocampa* and bark beetles, such as *Orthotomicus longicollis*. However, since hybrid vigour is manifested only in the F_1 generation, hybrids should be introduced outside the natural distribution area of parental populations to avoid interspecific gene flow.

Different *P. halepensis* provenances show high diversity in field trials in Israel. Greek provenances, with high heterozygosity, yielded better results than local provenances in extreme arid conditions. Dry conditions have been associated with higher genetic diversity, and thus with greater resistance to extreme conditions, conferred by fluctuating selection with respect to the parental origin populations.

Despite their ability to live in arid environments, pines in general, with little variation among species, show higher vulnerability to drought-induced xylem embolism than other conifers. This limitation is somehow compensated by strict stomatal control. During the last century, Aleppo pine forests in semiarid eastern Spain have experienced a growth decline as detected by tree-ring analysis.

In *P. pinaster* trees introduced in western Australia to ameliorate rising water table, only a single species of mycorrhizal fungus, *Rhizopogon rubescens*, was found and its presence and activity was mostly related to soil moisture.

Several communications presented life history aspects of Mediterranean pines, with particular attention to traits related to fire adaptations, such as serotiny, resprouting capacity (in Canary island pine, *Pinus canariensis*), age to maturity, seed size and hardness, bark thickness, self-pruning of branches and cones. Serotiny is present at various degrees in *P. halepensis*, *P. brutia*, *P. pinaster* and *P. canariensis* whereas *P. pinea*, *P. nigra*, *P. sylvestris*, and *P. uncinata* do not bear serotinous cones. The degree of serotiny in *P. halepensis* is notably higher in burned than unburned stands. Aleppo pine shows a dual regeneration strategy, i.e. postfire regeneration and colonization of open lands in the absence of fire. Seed dispersal is higher close to the tree trunk, but survival is higher at larger distances, partially because of higher predation near adult trees. Therefore peak recruitment is located at some (short) distance away from the trees. Seed dispersal in *P. brutia* takes place throughout the year and mainly during the period July-December (with a maximum in August).

Postfire mortality of Aleppo and stone pine was modelled using tree size and fire-damage descriptors. Aleppo pine post-fire regeneration has been deeply analysed, showing a high recruiting potential, especially during the first autumn-winter after fire. In a particular case on calcareous substrate, the first (female) cones appear in 4 year-old saplings; thirteen years after fire 30% of pines bear cones and saplings taller than 1.5 m are fully reproductive while seed density in the canopy seed bank is estimated to be around 10 viable seeds/m², which is considered insufficient to ensure full recovery of the stand in case of a new fire – 100 seeds/m² is estimated to be the minimum threshold for post-fire recovery and assumed to require around 20 years. Current models issued from European Commission research projects allow predicting post-fire Aleppo pine forest resilience. *P. nigra* ssp. *salzmannii* showed a low regeneration ability after fire, and seedling recruitment occurs only in the proximity of seed-trees. This is probably a major cause for the observed general regression of this species.

Postfire logging operations and rehabilitation measures were assessed in relation to ecosystem conservation and pines regeneration. The use of pine and oak together was discussed for the restoration of degraded Mediterranean lands. Results of field trials with those species and various nursery and field techniques to overcome transplant

shock were presented. Silvicultural and regeneration aspects of *P. brutia* and *P. halepensis* were deeply reviewed. Shelterwood, clearcutting and strip-clear-cut methods could be applied to *P. brutia* forests; density and vigour of pine seedlings were both higher when the natural regeneration methods were combined with prescribed fire. Laying of cone bearing branches on the surface of the soil and additional seeding further guaranteed the regeneration success.

Nursery research was presented for improving substrate and container selection, fertilisation rates, and defining morphological criteria for seedling quality. Stem diameter showed the best positive correlation with field survival. *Pinus halepensis* and *P. pinea* seedlings, cultivated in large containers and low density, showed higher growth in the field.

Analyses of models of stand dynamics, indicate that as a result of their life history traits, pines can persist in heterogeneous and disturbed environments, segregating temporally and spatially with hardwoods. This is in agreement with both current patterns of species distributions along environmental gradients and with palynological records. Model results contradict current phytosociological models that consider pines as transient stages of a climax oak community. Data defined, stochastic spatially explicit simulators that can be implemented on digital terrain are proposed as tools for sustainable forest management in this region.

Within the framework of current biodiversity conservation programs, the necessity of conservation for pine forests was also assessed, taking into consideration the amount and extent of the threats these important ecosystems are exposed to (last but not least fires).

Further information, the conference programme, the book of abstracts and participants list and addresses are available online in:

<http://www.cc.uoa.gr/biology/MEDPINE2.htm/>

International Scientific Board

Costas A. Thanos (University of Athens, Greece) cthanos@biol.uoa.gr
Margarita Arianoutsou (University of Athens, Greece) marianou@biol.uoa.gr
Melih Boydak (University of Istanbul, Turkey) boydakm@istanbul.edu.tr
Spyros Dafis (GBWC Thessaloniki, Greece) ekby@ekby.gr
Gidi Ne'eman (University of Haifa, Israel) gneeman@research.haifa.ac.il
Vittorio Leone (University of Basilicata, Italy) leone@unibas.it
Louis Trabaud (CNRS Montpellier, France) trabaud@cefe.cnrs-mop.fr
Ramon Vallejo (CEAM Vallencia, Spain) ramonv@ceam.es

(The initial version of this document was prepared by Ramon Vallejo; comments and amendments were contributed by several conference participants)