XV OPTIMA Meeting
June 6-11, 2016
MONTPELLIER

Organization for the Phyto-Taxonomic Investigation of the Mediterranean Area

Symposium

- Taxonomy
- Systematics
- Flora
- Plants
- Fungi
- Biogeography

Poster session

- Conservation

Excursion

- Collecting data
- Mediterranean area

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- Abstracts -

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Abstracts

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OPTIMA (Organization for the Phyto-Taxonomic Investigation of the Mediterranean Area)

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Abstracts
Oral presentations, Poster presentations

Editors: Frédéric Médail & Gianniantonio Domina
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Mediterranean carob populations, native or naturalized? A continuing riddle

J. Viruel¹, F. Médail¹, M. Juin¹, A. Haguenaüer¹, G. Nieto Feliner², M. Bou Dagher Kharrat³, S. La Malfa⁴, L. Ouahmane⁵, H. Sanguin⁶ & A. Baumel¹

¹Institut Méditerranéen de Biodiversité et d’Écologie marine et continentale (IMBE), Aix Marseille Université, CNRS, IRD, Avignon Université. Faculté des Sciences et Techniques St-Jérôme - Service 421 - Av. Escadrille Normandie Niémen – F-13 397 Marseille cedex 20, France. E-mail : juan.viruel@imbe.fr
²Real Jardín Botánico (CSIC), Plaza de Murillo 2, 28014 Madrid, Spain.
⁴Dipartimento di Agricoltura, Alimentazione e Ambiente (Di3A) Università degli Studi di Catania Via Valdisavoia 5 - 95123 Catania, Italy.
⁵Laboratoire d’Ecologie et Environnement. Faculté des Sciences Semlalia, Université Cadi Ayyad Marrakech, Maroc.
⁶CIRAD, LSTM, Tropical & Mediterranean Symbioses Laboratory. TA A-82/J Campus International de Baillarguet 34398 MONTPELLIER CEDEX 5, France.

Carob (Cassiope siliqua L.) is a well-known Mediterranean tree whose domestication was contemporaneous to that of the first trees (e.g. olive, fig) probably in the Middle-East. Since then, carob has played a crucial role in Mediterranean societies due to its edible fruits used for cattle forage and subsistence agriculture. Carob plants are able to grow on stressful rocky soils increasing the socio-economic value of many Mediterranean dry lands. Despite its economic importance, the origins and history of carob populations are still under debate. Since De Candolle, the wildness of carob populations has been questioned on the basis of paleo-botanical, archeological and philological evidences and, unfortunately, the scarce studies on the ecology and genetic diversity of wild populations have not thrown much light on this topic. The extremely low cold-stress tolerance of carob plants constituted the main argument against a long-term persistence of natural populations throughout Pleistocene glaciations in the Mediterranean. Under this scenario, the current distribution would be explained by human dissemination. However, a global phylogeographic study covering the entire distribution of carob is still lacking. In this context, we aimed at exploring the two main hypotheses about the origin of carob populations: their possible persistence in unknown refugia during the Pleistocene or their putative naturalization after human dissemination. We used Environment Niche Modeling (ENM) under present and past climatic conditions (Mid-Holocene – Last Glacial Maximum, LGM; and Last Interglacial Maximum) to investigate the potential range changes that carob could have undergone driven by climatic oscillations. Additionally, we sequenced three plastid regions from both natural and cultivated populations covering the whole current distribution of carob to explore its phylogeography based on coalescent methods. Our results point towards two distant and separated phylogroups at southern boundaries of carob range during LIG, which left a strong genetic footprint within carob natural populations. This was followed by a reduction of the potential distribution area during LGM, which subsequently expanded during Mid-Holocene up to the current Mediterranean known distribution of carob. The current potential distribution modeled for carob is extremely restrictive to the coastal areas of the Mediterranean, and its actual distribution is probably linked to strong selection pressures at the margins of its range. Forthcoming population genetic studies through SSR and SNP markers will reveal the impact of human dissemination versus natural expansion of carob populations.