

Modelling and Simulating the Architecture and Growth of *Arecaceae*

Presentation of the MOCAF Phoenix research network

Author: René Lecoustre

Information about other authors:

MA ElHoumaizil², M Bensalah³, C Littardi⁴, R Castellana⁴, A Ferchichi³, S Khabba⁵, Benaceur-Hemmouche M⁶, J Dauzat¹, H. Rey¹

1 - CIRAD/BIOS UMR AMAP, Boulevard de la Lironde TA A51/PS2 34398 Montpellier cedex 5 France.

2 - Faculty of Sciences, department of Biology, Oujda, Morocco

3 - Institute of the Arid Areas, laboratory of Arid and Oases cropping, El Fjé, Medenine, Tunisia

4 - Center of Studies and Research on Palm Tree, San Remo, Italia

5 - Faculty of Sciences, Semelalia, Marrakech, Morocco

6 - Faculty of Sciences, Department of Biology, University of Oran Es-Senia, Algeria

Agronomists and research engineers, teamed in AMAP Mixed Research Unit, based in CIRAD BIOS structures have developed field observation techniques, based on the concept of plant architectures developed by botanists from Montpellier. Then they developed methods for the statistical analysis of the resulting probability laws and geometrical characteristics along the lines of operational research. Finally AMAP developed a specific software for calculating and simulating *Arecaceae* plants, which stochastically respects these laws and strategies; this software, is dedicated to the 3D simulation of diverse palm trees, as *Elaeis guineensis*, *Coco nucifera* and *Phoenix dactylifera*. These simulations are able to produce accurate 3D models of the foliage organisation for different cultivars of the same specie and, naturally, these resulting models can be used for studying many components of the palm trees, studies and modeling have been realized on the root system of *Elaeis guineensis*. All these works have been driven with strong partnerships in the different countries and, particularly with Mediterranean teams. The project MOCAF Phoenix was elected in 2009 by the Euromediterranean “3+3” incitation program, it is a network structured around research teams from Morocco, Tunisia, Italia and France, nowadays the network has guest partnerships from Algeria and is looking forward for the adhesion of other countries interested in date palm culture. The purpose of this network is the using of AMAP modeling tools and methods dedicated to the axes bring by each partnership coming from their own interest of particular uses of *Phoenix dactylifera* both for harvesting and landscaping.

Keywords:

Plant architecture, *Palmae*, *Arecaceae*, palm tree, *Phoenix dactylifera*, date palm, architectural model, modeling, simulation, stochastic, research network partnership, scientific network