Scientific Report to COST Action ES1104

Training School 6

13 – 21 May 2015

"Iberian Training School on Restoration in Mediterranean Drylands
University of Lisbon (PT) and Autonomous University of Madrid (ES)."

This Training school (TS) was co-organized by members of different working groups (WG) of this Cost Action, the WG 3: Cristina Branquinho and Alejandro Valdecantos, from the University of Lisbon (PT) and University of Alicante (ES) respectively, in cooperation with the member of the WG 4 Maria Jose Marqués, from the Autonomous University of Madrid (ES). The TS started in Lisbon and finished in Madrid.

The TS encompassed lectures, field visits, and selected experiments within dryland ecosystems. About 56 applications were received.

The majority of them: 37 were from the EU, 2 from Israel, 8 from countries of the Middle East, 5 from North Africa 1 from South Africa and 3 from the Western Europe. Only 17 applicants were selected according to their profiles, education background and interest in the themes to be addressed during the TS.

This Iberian Training School focused on drylands ecological restoration and agricultural land management in order to combat desertification through the establishment and management of vegetation.

In Portugal the trainers were Cristina Branquinho, Graça Oliveira, Otília Correia, Adelaide Clemente, Alice Nunes, Teresa Mexia, Alexandra Silva, Ana Paula Costa, Patrícia Pinto da Silva, Manuel Rebelo, Teresa Afonso de Paço, Cristina Máguas and Ricardo Cruz de Carvalho, and according to their expertise, they focused on the revegetation processes: (i) defining the objectives; (ii) soil establishment and improvement; and (iii) revegetation techniques for desertified and degraded areas: planting and seeding methods.

In the field work the trainees put into practice the theoretical knowledge acquired on the previous day: a field survey of plants using different seedlings experiments, and the application of the Landscape Functional Analysis (LFA) method to different areas with different ages after restoration and using different methods. Other field observations and sampling were carried out in an old quarry being restored for the last 30 years, pastures, revegetation of artificial dines, plantations of *Pinus halepensis* and "montado" systems.

In Spain, the students visited the National Centre of Forest Genetic Resources 'El Serranillo' in Guadalajara (50 km from Madrid). The visit was leaded by Alejandro Valdecantos and Jose Luis Peñuelas in a Research and Development Centre aimed at forest improvement and development. Students were informed about: seed collection; seedling production and propagation of Mediterranean trees and shrubs; managing plant, soil and human activities

for avoiding/reversing dryland degradation; plant functioning along a stress gradient; plant-plant relationships in restoration (competition vs facilitation, and the role of nurse plants in restoration).

During the first day at the Autonomous University of Madrid the students learnt the importance of Soil Organic Matter with Zulimar Hernandez (UAM), the Soil Properties related to Water Retention with Maria Jose Marques (UAM), useful information regarding to Management of Vineyards with Andrés García (IMIDRA) and Management of Olive Groves with Blanca Sastre (IMIRA), and finally they were introduced to the Farmer's perception of soil quality with Celia Barbero (UAM) and EU Rural Development Priorities. AKI with Jose Luis Cruz (IMIDRA)

The next day a field trip to the Regional Agricultural Research Centre IMIDRA in Aranjuez, Finca "La Chimenea" was organised to visit the agriculture and land management in the South of Madrid in order to show the results of different projects of sustainable land management to the students: Direct Seeding with Miguel Quemada, Jose Luis Gabriel and Maria Alonso (Polytechnic University of Madrid). This was followed by a demonstration class on Soil characteristics and different soil management in the olive groves with Ramon Bienes (IMIDRA), and cover crops with Blanca Sastre (IMIDRA). During the afternoon the trainees performed different field works to take some soil samples and to complete experiments like infiltration tests and soil structure measurements in different management practices (super intensive, intensive, extensive, flat bench terraces, sloping bench terraces, different cover crops in the strips, etc.), being the teachers Pilar Carral and Maria Jose Marques (UAM).

The last day was devoted to soil analysis in the laboratory of the Geology and Geochemistry department of the Autonomous University of Madrid. The trainers were Maria Jose Marques, Pilar Carral, Zulimar Hernandez, Ana M. Álvarez. The trainees established by different standard methods, the soil pH, Texture, soil porosity and bulk density , soil organic matter, aggregate stability and different soil hydraulic properties. The soils of study were collected both in Portugal and Spain. After analysis there was an open discussion about results to find the most important elements being affected by land use.

During the afternoon the students participated in a World Café with farmers of the region who were happy to share experiences and opinions with the young students. Andrés Morate (farmer); Jesús Fernández (farmer); Eva Ayuso (farmer).

The feedback from the students was very positive and all of them would recommend the experience. Just an example:

"*The school had a multidisciplinary approach to the issue of the restoration. This was a very interesting feature, because it is very rare to have more skills in the same place. Nevertheless at the same time the program was very rich and there was not always the possibility for a in deep study. For this reason it would be interesting to take a deeper look of the topics with the same group of trainers and with the same coordinators, in a second part of the school.''*