



PROGRAMMA DI RICERCA STM REPORT

Dr. Carla Pinheiro, 9-21 June 2014

Place of visit: CNR - Istituto per la Protezione delle Piante, Via Madonna del Piano 10, Sesto Fiorentino 50019 Firenze

Title of the program: C₃-C₄ intermediate *Moricandia* plants performance under a typical summer stress (heat and drought) in the Mediterranean region

The aim of the short-term mobility program was to study the C₃/C₄ intermediate *Moricandia moricandioides*:

- Biological systems under evaluation

Moricandia arvensis (C₃), *M. moricandioides* (C₃/C₄ intermediate), and since no *Moricandia* species has a true C₄ metabolism *Cleome gynandra* is to be used instead.

- Assay design

Germination, growing conditions and stress imposition and characterization were discussed. It was decided that the several genotypes will be screened under non-stressful conditions in order to assess for the maximum potential (carbon assimilation and partitioning);

It was decided to evaluate the effect of progressive drought prior the multiple stress assay.

Stress characterization will be performed at plant level through the evaluation of the fraction of transpirable soil water (FTSW) impact on leaf stomatal conductance (gs). At this point it is foreseen the sampling of six points (between 50% and 20% gs) and recovery. The stress effect on the mesophyll and stomatal conductance's as well as on the biochemical cycling (carbon partitioning between photosynthetic carbon reduction/oxidation) will be evaluated.

The preliminary analysis of the single stress effects will provide the basis for the experiment on the combined effect of drought and high temperature.

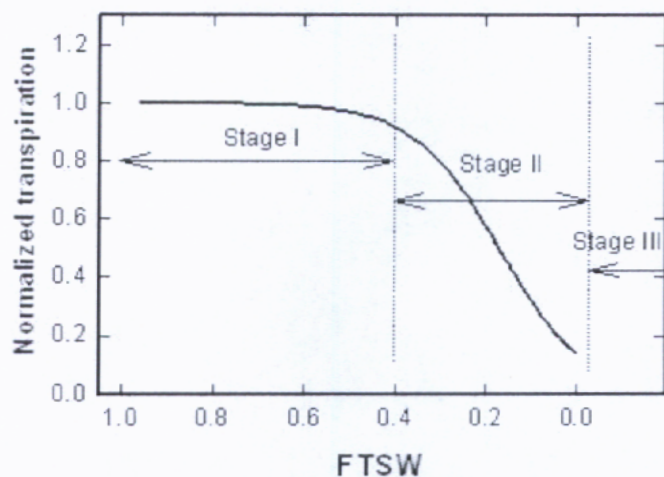
The running and sampling conditions are now established but it was decided that the best approach multiply the *Moricandia* and *Cleome* seeds in the CNR prior to the experimental assay. Small stocks of seeds were received through the project partners, which will not support an assay with the convenient replicates. On the other hand, by using seeds that were obtained in the same conditions the inherent variability due to environmental effect will be normalized.

- Drought Experiment

This experiment will be conducted by IPP in Firenze. The drought stress will be monitored using FTSW. This experiment will be helpful in order to identify how the different C₃, C₄ and C₃-C₄ intermediate species behave during drought stress and



how long it takes to reach different levels of drought (stages I and II) as reported in the following figure:



Samples collected during the different phases of the experiment will be shipped to Portugal and analyzed by Dr. Carla Pinheiro to determine the contribution of stress hormones to the metabolic adjustments occurring in the species with different photosynthetic pathway.

- Training of IPP personnel

Ph.D. students and young Postdocs have been trained in biochemical technics that will be used to assess the physiological status of *Moricandia* and *Cleome* plants during the planned experimental activities. In particular, IPP personnel have been trained in assessing ABA, ABA-GE, starch and oxidation state.

- Networking and future collaborations

Several meetings with IPP researchers, students and visitors were taken, in which running experiments and data were discussed, new assays were planned and new lines of investigation were planned.

Firma del Proponente