

**Phenotyping course for drought-related traits across tropical legumes – Concepts
and practices
ICRISAT, 3-28 March 2008**

Summary

Attendees

The course was held between March 3rd and March 28th 2008. A total of 27 participants attended, plus 4 resource people from outside ICRISAT and 3 resource people from ICRISAT (not including PIs). Participants were mostly from the African National programmes (24), spanning across the different species of the TLI project, plus a few scientists from India (3). The detailed list of participants is available on request. For groundnut, institutions included the Nalendiele Research station (Tanzania), Chitedze Research Station (Malawi), ISRA-CNRA (Senegal), ICRISAT Mali and Niger. For cowpea, institutions were the INERA/CRREA (Burkina Faso), ISRA-CNRA (Senegal), IITA-Kano station (Nigeria) and the Eduardo Mondlane University (Mozambique). For bean, institutions were the University of Nairobi, CIAT (Colombia), the Crop Breeding Institute (Zimbabwe), Kasinthula Agricultural Research Station (Malawi). For chickpea the institutions were the Ethiopian Institute of Agricultural Research (Addis Ababa), and the ARI- UKIRIGURU (Tanzania). The role of the participants was to receive training in different phenotyping techniques that they would subsequently use in their location for phenotyping activities within the TLI project.

The workshop provided participants with: (i) a practical hands-on training in the measurement of drought-related traits and data management, (ii) an understanding of the key principles of phenotyping, and (iii) opportunities for cross-legume (groundnut, cowpea, bean and chickpea) discussions on key traits involved in their adaptation to drought.

Discussions and outcomes

We had a number of discussions on: the traits we measure and their relevance to drought adaptation; the key environmental variables to measure while phenotyping; the experimental design; the logistical issues related to large phenotyping experiments, and more. Discussions used both background data from the PIs' own research and data collected during the course itself, using experiments that were designed specifically to instigate discussion on key issues such as the environmental variables. We had several sessions of discussion on key aspects of drought adaptation, such as canopy temperature, root and water uptake, water use efficiency, etc. We also had discussions on the phenotyping experiments that would take place under the TLI project

The major outcome of the workshop was that the methods in which the participants were trained will be used to carry out the work in their respective locations. In the recent TLI meeting in Dakar, the national programmes in Tanzania and Kenya also decided to invest in root research, which was the fruit used for the demonstration of training techniques. This decision to invest followed long discussions held on that particular topic.

Next steps to be taken

Several sessions during the course dealt with comparing crop responses to stress across legumes. We explored the possibility of having same traits measured across key genotypes of the four legumes crops, under the same environments, making the hypothesis that common traits operate towards a better adaptation to water limitation across crops. The next step would then be to exchange genetic materials of different legume species, contrasting their adaptation to drought in order to initiate a cross-species comparison of several traits. This would be carried by institutions that have developed the skills to assess a particular trait, such as leaf canopy temperature (IITA – ICRISAT), roots (ICRISAT), and carbohydrates (CIAT).

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