GUEST EDITORIAL

One of the three objectives of the International Plant Genetic Resources Institute (IPGRI) is to develop and disseminate knowledge and technologies relevant to the improved conservation and use of plant genetic resources. Furthering the understanding of biological mechanisms underlying desiccation sensitivity and tolerance of seeds and vegetative tissues is at the core of IPGRI *ex situ* conservation research activities. For this reason, IPGRI responded positively to the request of the Workshop's organizers to sponsor this Special Issue of *Seed Science Research*, which includes many of the papers presented during the 3rd International Workshop on Desiccation Tolerance and Sensitivity of Seeds and Vegetative Plant Tissues, as we had responded positively three years ago to the same request for the second Workshop of this successful series.

IPGRI was particularly keen to sponsor this Special Issue as a large number of the papers included reports of work performed on non-orthodox tree species. Research on tolerance and sensitivity of seeds to desiccation is of particular relevance to tree species since it is estimated that more than 70% of tree species in tropical forest ecosystems have seeds with recalcitrant or intermediate storage behaviour.

IPGRI's research agenda includes numerous activities focusing on various aspects of recalcitrant tree seed research. A Danida-funded project, initiated jointly with the Danida Forest Seed Center, on handling and storage of recalcitrant and intermediate tropical forest tree seeds – involving over 20 seed centres, research institutes and universities in Africa, Asia, Latin America, Europe and North America – has developed improved techniques for seed collecting, handling and the determination of seed storage physiology for 20 economically important species. A second phase of the project, which involves several new partners, has been initiated recently. An additional 28 tropical forest tree species will be screened for seed storage behaviour and large-scale seed handling and storage trials will be performed with three species from the first phase of the project.

IPGRI is also involved with collaborators from the University of Natal, Durban, South Africa in basic studies on embryos of recalcitrant seeds in order to understand better responses to desiccation and freezing. These studies include investigations on cell cycling immediately prior to, and at various intervals after, shedding, as well as reaction of the cytoskeleton and the intracellular milieu to both water removal and cooling – and during rehydration after cryopreservation. Ongoing experimentation on the manipulation of dehydration and cooling parameters is also being undertaken, with the objective of obtaining explanations of tissue responses, which might serve to put cryopreservation on a more scientific basis, in place of the *ad hoc* approaches that have characterized much of the effort in the past. Finally, numerous IPGRI-funded projects performed in collaboration with genetic resources centres and research institutes worldwide aim at developing cryopreservation protocols for various tropical fruit and forest tree species and at testing the applicability of cryopreservation for germplasm storage in a genebank context, to complement more traditional conservation techniques.

Significant advances have been made in the understanding of desiccation sensitivity and tolerance mechanisms in seeds and vegetative tissues, as attested by the papers included in this Special Issue. It is IPGRI's intention to make this Special Issue available to national plant genetic resources programmes worldwide, to scientists who have to translate research results into practical applications and to curators who are the end users of improved storage technologies. It is our hope that this will stimulate and reinforce collaboration between the research and the plant genetic resources communities, thereby contributing to the improved conservation of plant genetic resources.

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