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## TESTING SEED WATER ACTIVITY VALUES HELPS IN THE CONSERVATION OF THE BRAZILIAN RAINFOREST

**J**osé Marcio Faria from Brazil is doing a PhD in the Nether-

lands on storage protocols for seed drying. In this research water activity plays a major role. His supervisor, Dr. Henk Hilhorst, saw the water activity measurement system of ROTRONIC for the first time with colleagues in the USA. There he became convinced of the capabilities of the ROTRONIC HygroLab system. He insisted on having one himself, and now they are using it enthusiastically in this project on desiccation sensitivity in legume seeds. Both Dr. Hilhorst and Jose are very satisfied with the ROTRONIC system. Jose hopes to finish his dissertation next year.



al., 2002). Intolerance to desiccation is a serious problem with regard to the long-term storage of seeds of this species, as well as other recalcitrant species.

The main objective of this study is to better understand what causes the death of the seeds during drying. This is

the first step towards the development of storage protocols for seeds of this species and other recalcitrant seeds.

Traditionally, most of the work on seed desiccation deals with water in seed by assessing only MC, but, as shown by Vertucci and Roos (1990) and others, water activity ( $a_w$ ) of seeds provides a much better measure of their physiological level, since it relates to the energy status of the water, i.e. the availability of the water to participate in chemical and physical processes. Thus, in these studies  $a_w$  is measured, as it is a much more relevant parameter than MC to assess when desiccation damages start to appear. Another advantage of working with  $a_w$  is the possibility of comparing different species, since a number of physiological processes that are relevant to desiccation tolerance or damage have been shown to occur within a narrow range of  $a_w$  values (Sun, 2002). Moreover, determining the  $a_w$  in single seeds or populations is essentially non-destructive. This is a great advantage when dealing with rare species of which only small numbers of seeds are available.



Riparian forests are those that grow alongside rivers, and they are tightly associated with water, helping in maintenance of water quality and quantity (Figure 1). In Brazil, these forests belong to the most threatened

ecosystems, mainly because of agriculture, grazing and flooding due to formation of lakes for hydroelectric power generation. In a world where the decrease of water supply is of great concern, the importance of the ecological restoration of such kind of forest becomes even more evident. In Brazil, several programs of reforestation with native species have been carried out, attempting to diminish the problem, and seeds are, in practice, the basis of these programs. Thus, the importance of storing in seed banks for use in the future to restore these damaged or destroyed environments is obvious.

One of the main tree species used in ecological restoration of riparian forests in south-eastern Brazil is *Inga vera* (Leguminosae), whose seedlings can withstand up to 3 months of total submersion. Its seeds (Figure 2) are shed with a high moisture content (MC), around 60% (fresh weight basis) and they are recalcitrant, i.e. they die if dried to MCs low enough to allow storage. Fresh *Inga vera* seeds attain 100% of germination, but upon desiccation they quickly lose viability. If MC drops to 30%, they cannot germinate anymore (Faria et

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