

Lab-to-land programme in plant biotechnology: Are we really making significant progress in India to tackle abiotic stress?

Public sector research into classical crop breeding is withering, supplanted by sexier high-tech methods. But without breeders' expertise, molecular genetic approaches might never bear fruit.

—Jonathan Knight¹

Knight's opinion is relevant since many plant biotechnology researchers in India claim that they have found the remedy to tackle the problem of abiotic stresses caused by drought and salinity. They identify, isolate and characterize the genes conferring tolerance to abiotic stresses. Then, they succeed in getting a transgenic plant and profiling the transgenic under laboratory conditions and/or a few field locations. However, they wind up the project by publishing a research paper in a reputed journal, without realizing that they should pass the benefits of their basic research to plant breeders. Since plant breeding is purely an applied science, breeders are more interested in producing a variety that withstands the scrutiny of farmers in the field, than in a publication of academic interest that passes the scrutiny of the editors.

Most practising plant breeders in India with vast experience and understanding about the performance of field crops, lack in their appreciation of the recent developments in innovative breeding approaches. Similarly, the finest molecular biologists in India do not spend sufficient time in getting exposure regarding the agronomic performance of field crops with which they are working. However, the agronomic performance of a variety is highly influenced by the interaction of genes with varying edaphic and climatic conditions. The outcome is that both breeders and molecular biologists are confined to their specific areas of work. The need of the hour is to move forward towards a meaningful working collaboration by learning from each other. This marriage between conventional breeders and plant biotechnologists will be highly beneficial to the farmers, who must be the ultimate recipients of the new technologies.

We have only limited resources. We have large acreage of land with abiotic stress (nearly 8.3 million hectares is salt-affected and nearly 92.3 million hectares

of cultivable area is rainfed). No multinational corporation will come forward to tackle the problem, since they have only a commercial mandate. Even if they succeed in getting a useful transgenic, farmers of these barren lands will not have the purchasing power to derive any benefit. Only public institutions with a social mandate have to tackle the problem. Otherwise, there will be genes conferring salt tolerance or drought tolerance only in the laboratory, without fruitfully culminating into a transgenic variety performing in field with stability. So the success of plant biotechnology must be gauged by the ultimate product, namely the variety rather than by publications alone.

1. Knight, Jonathan, *Nature*, 2003, **421**, 568–570.

R. RAJA

*Department of Plant Breeding and Genetics,
P.J.N. College of Agriculture and Research Institute,
Karaikal 609 603, India
e-mail: rajaraghu@sify.com*

'The art of scientific writing' in the Google era

I was beginning to wonder why the copy of *The Art of Scientific Writing* had of late been accumulating dust in the library shelves, when the answer came to me quite suddenly, in an unexpected fashion.

I had just completed struggling through several versions of the 'Results' section of my student's thesis, to have finally arrived at the 'Discussion'. This section, I knew, would take the maximum of time, effort and attention. Presenting the 'Discussions' was almost always the most challenging part in a thesis or a manuscript, needing one to make incisive insights without excessive speculations or hand-wavings, and tended to be the section that really required the 'art' part of the writing. In the present case, it was not long before I realized that information on an important pathway was completely missing. Details of this pathway (which was actually quite removed from what we were working on) needed to

be read, understood and incorporated into the 'Discussion' since it had clear relevance to the findings of the thesis. I approached my student with some trepidation, knowing his growing impatience with a boss who seemed to be indifferent to his post-doctoral aspirations in the Americas that had been beckoning him for some months now. 'No problem, *kar denge*' (Hindi: will do) he responded calmly, (surprising me to no end), adding something that I thought I heard vaguely that sounded like 'download *ho jayega*' (Hindi: will be done). Sure enough, next morning, I find on my table several pages of printouts on the subject from someone else's carefully designed website on the subject. 'But this is not really what I wanted' I said in exasperation as I explained at some length as to how the subject matter needed to be meaningfully woven into the fabric of the 'Discussion'. He listened very patiently for the

entire length of my sermon and then promptly replied, 'No problem, Sir, Cut-Paste *ho jayega*'.

Some days later I received an urgent telephone call from the Director's office for a meeting on one of the 'mission mode' programs. 'The project has to be written in 48 h', I was informed, 'since the deadline is already over'. I would normally protest tremendously at such demands asking for projects beyond my expertise, and furthermore, at such short notice. But this time, I surprised myself by answering coolly, 'No problem', whispering almost involuntarily, (and I hope no one heard it), 'download *ho jayega*'.

ANAND K. BACHHAWAT

*Institute of Microbiol Technology,
Sector 39A,
Chandigarh 160 036, India
e-mail: anand@imtech.res.in*