Bottle gourd diversity

The white-flowered gourd *Lagenaria siceraria* is also called the bottle gourd, because people around the world use it to make containers.

But its uses go far beyond bottles. The diversity of fruit shapes and sizes is bewildering. A detailed statistical analysis sheds light on bottle gourds and their relatives.

IPGRI scientists and their colleagues collected 269 cultivated varieties of *L. siceraria* and 156 specimens of three wild relatives, *L. sphaerica*, *L. abyssinica* and *L. breviflora*. They took detailed measurements of the shape and size of the gourds and seeds and discovered that in all measurements the bottle gourds showed considerably more variation than the wild relatives. This is to be expected, given both the wide variety of bottle gourd forms and its history of domestication. However, there did not seem to be any particular clustering of bottle gourds into distinct shapes. Different types—for example those with handles—shade into other similar types with less pronounced characteristics.

Y. Morimoto/IPGRI

One of the community-based researchers, Mr Francis Oundo, with a small selection of the bottle gourd diversity collected during the study.

Progeny testing of the offspring of 7 different crossings revealed that for every one of 12 different quantitative traits the 7 strains were significantly different from one another. There is thus a strong genetic component to the observed differences. The different plants of each progeny also differed significantly from one another, especially in measures of the overall gourd shape, but not nearly to the same extent as between strains. This suggests that the level of inbreeding in each strain is high, a most unexpected finding for an insect-pollinated monoecious species — and one with important consequences for the conservation of bottle gourd diversity.

Y. Morimoto/IPGRI

Smaller gourds used as funnels to fill large water carriers, just two of the many ways in which people use bottle gourds of different shapes and sizes.

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Morimoto, Y, Maundu, P, Fujimaki, H and Morishima, H (2005). Diversity of landraces of the white-flowered gourd (*Lagenaria siceraria*) and its wild relatives in Kenya: fruit and seed morphology. *Genetic Resources and Crop Evolution* in press.

Date palm development

Date palms stand at the centre of complex ecological, economic and social networks.

A UNDP/GEF project implemented by IPGRI combines rigorous science with a fully participatory approach to maximize the contribution of date palm diversity to improved livelihoods for oasis dwellers in Morocco, Algeria and Tunisia.

A. Zirari/IPGRI

A. Zirari/IPGRI

Above, Farmers have been involved at all stages of the project. Here they visit the plants created in tissue culture from the varieties they originally selected; *far right*, Having selected the varieties they wanted multiplied, Moroccan farmers brought offshoots to the tissue culture research centre; *right*, *In vitro* date palms growing in tissue culture in Morocco.

Some varieties readily produce offshoots, making it easy for farmers to increase their plantings and diversity. Others do not. Farmers and scientists came together to identify the varieties most in need of conservation. More than 100 new varieties came to light, never before formally described. Around 70 endangered varieties were sent to the laboratory for *in vitro* multiplication. For many this proved vital for their conservation. For example, farmers judge 'Deglat el Bey' and 'Mejhoul' among the best varieties in Tunisia and Morocco respectively, and yet fewer than 100 mature palms of each existed. *In vitro* multiplication has ensured their survival for the future.

A. Zirari/IPGRI

Technology transfer has been a vital component of the project. An equally prized Algerian variety called 'Babati' produces very few offshoots and is both rare and expensive. No farmer would sacrifice an existing palm to enable multiplication. Algerian scientists travelled to Tunisia to learn the technique of using flowers to create micro-plants, and now 'Babati' and other rare Algerian varieties have also been conserved.

Many other aspects of the project have improved livelihoods, for example creating new markets and products that make use of date palm diversity. These efforts have helped to empower women in the communities by giving them independence and the ability to earn income.

Participatory Management of Genetic Resources of Date Palm in the Oases of the Maghreb — Some impacts of the project

Training local staff, R&D and extension	460 trained in 48 sessions
Training farmers	65 trained in six sessions
Internal study tours	More than 100 farmers on seven tours
External study tours	60 farmers on six country visits
Farmer participation in diagnostics workshops and training	More than 1000 men, more than 400 women
Tissue culture	More than 70 varieties conserved in laboratories and multiplied to enable broader use of diversity
Distribution of diversity	More than 1000 *in vitro* plantlets and more than 5000 offshoots of about 25 varieties to farmers
Enhancing GR diversity	More than 100 new varieties discovered in project sites, described and conserved

On 16 October 2005 the Algerian component of the project received a medal from FAO for its contribution to food security.

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Diversity in traditional systems

Much of the world's remaining agricultural biodiversity is found in the traditional systems of small farmers, where it earns its keep in several ways.

IPGRI organized a workshop that brought together researchers in Central and Latin America to share the results of their investigations. The resulting Spanish volume contains much more information than could comfortably fit on a poster. Some highlights.

In Puebla State, Mexico, each ecological niche hosts a group of maize varieties designed and maintained by local people to confront the unpredictable conditions under which they farm. A key variable is time to maturity, which farmers in the central region of Yucatàn use to respond to unpredictable rainfall. Early varieties are called *Nal t'eel*—the Mayan for rooster—and are planted when the rains are delayed. *Xnuuk nal* varieties take longer to mature, and are planted to take advantage of early rains.

CIMMYT

Even though traditional farmers are maintaining diversity, they can sometimes be helped to do so more effectively. In the Central Valleys of Oaxaca a long-term project to evaluate participatory interventions organized field days to give farmers access to varieties that scientists and other farmers had identified as potentially valuable. With the seeds came training in managing and selecting seeds. The selected seeds performed better than traditional varieties, and when the different qualities appreciated by men and women were taken into consideration the total diversity on each farm increased. Training revealed that farmers did not understand some aspects of maize reproduction, but were eager to apply their new-found knowledge. Access to diversity and access to information are thus often limiting factors in the conservation of maize diversity.

M. Bellon/IPGRI

M. Bellon/IPGRI

Top, Field days enable farmers to obtain new kinds of maize and the information and training to improve their harvests; *above*, Selection to maintain diversity begins with the harvest, as farmers choose the best ears to save; *right*, Husking the maize and removing the kernels provides another opportunity to exercise selection.

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Chavez-Servia, J.L., J. Tuxill y D.I. Jarvis (eds). 2004. Manejo de la diversidad de los cultivos en los agroecosistemas tradicionales. Instituto Internacional de Recursos Fitogeneticos, Cali, Colombia.