

A Global Strategy

for the conservation and use
of Coconut Genetic Resources

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interpretation of the information available. The COGENT website⁴⁰ provides a single point of access for all the elements of the Coconut germplasm Information System.

3.8.1 Data management in genebanks

As seen in section 2.4.1 ('Local genebank management systems'), data loss in genebanks is a real threat. Therefore, it is imperative to make sure that all collected data remains available and securely stored for many years. Initiatives are needed in most genebanks to install and/or improve local information management systems to facilitate accession management and data sharing.

Characterization and evaluation data from ex situ genebanks and breeding trials should be computerized and systematically duplicated in another geographically different location. These may be two different national institutes, or a national institution cooperating with a specialized international research institute. The COGENT secretariat already played a role in safeguarding data, especially in Côte d'Ivoire. This role could be extended with respect to intellectual property of institutions and countries if appropriate resources are made available.

Given the rapid evolution of information technology, the software "Coconut Data Management" (CDM) is now becoming obsolete. *A more complete and modern software should be developed for managing palm-by-palm data.* The many technical operations linked with controlled hand-pollination need also to be computerized. Homemade basic software is sometimes used for this last purpose, but a more global and standardized approach would favour efficiency and quality in the management of controlled pollinations. Genebanks may hold collections of other crops; they are often spread over several locations, and coordination would require a significant amount of time or computer equipment. *The local genebank information system should be able to compute the average values for data obtained from specific trees in the field, that are stored as characterization data in the CGRD database.* This will facilitate the task of curators for documenting the international database.

A possible option could be to adopt a widely standardized system such as GRIN-Global⁴¹. However GRIN-Global was initially conceived for annual and seed crops and may need to be customized for managing coconut germplasm. This is exemplified by exchanges with the Genesys multi-crop database, where coconut data transmitted more than 18 months ago is yet to be included in this database (2013). *So before engaging in GRIN-Global, COGENT must receive a clear commitment from the software providers and agree with them on detailed planning.* This should include training, with GRIN-Global experts carrying out this initial set-up in collaboration with genebank curators.

⁴⁰ See the URL: www.cogentnetwork.org

⁴¹ GRIN-Global is a project whose mission is to create a new, scalable version of the USDA's Germplasm Resources Information Network system (GRIN) suitable for use by any interested genebank in the world. It is being developed in a joint effort with the Crop Trust, Bioversity International, and ARS/USDA. The project's goal is to provide the world's crop genebanks with a powerful, flexible, easy-to-use global plant genetic resource (PGR) information management system. The database and interface(s) will be designed to accommodate both commercial and open-source programming tools, to be database-flexible, and to require no licensing fees for genebank use.

Plate 3.4

Spicata forms of coconut varieties

Wider coconut diversity

Spicata are forms in which most of the flowers are mainly attached to the inflorescence axis, instead of being attached to the spikelet. Such rare forms are found in many countries and varieties.

1. Spicata (left) compared with a normal coconut inflorescence (right) for Red Dwarf varieties.
2. Same for Green Dwarf varieties.
3. Some Spicata forms have also fewer spikelets.
4. Samoan Tall, Spicata inflorescence.
5. Terminal portion of a Spicata inflorescence with many male flowers in Fiji.
6. View of the central axis, Fiji. Many male flowers are hidden and squeezed between the female flowers, making the inflorescence difficult to emasculate for breeding purposes.
7. Papua New Guinea Red Dwarf Spicata.

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Research needs to be conducted regarding the techniques for numbering palms in the fields. Presently, numbers are painted on the stems but these last only four to five years. Missing or erased numbering was identified as a main source of error for field characterization and evaluation. Technologies such as Global Positioning Systems (GPS) and barcoding are currently not used in coconut collections, but these are becoming less expensive and more widely available, and likely to be increasingly important in managing genetic resources in the future. In some countries like Brazil, this process has already started: under a new law, all germplasm accessions of all species will have to be geo-referenced (GPS positioned). Another cheaper and simpler technique could be to carve numbers on the stems with basic precautions for avoiding diseases transmission.

For a fully efficient management of palm-by-palm data and controlled pollinations, it is expected to develop a new dedicated software. Curators of the coconut genebanks will need to be trained to its use. Already existing data will be carefully transferred under this new system, which will include a systematic data duplication, at least within countries.

3.8.2 International databases on *ex situ* conservation

The coconut genetic resources database (CGRD) is the database gathering specific data (passport and characterization using agreed standard descriptors) from all the genebanks of COGENT member-countries, be they national or international⁴². Given evolving computer standards, CGRD will become outdated. So there is a need to upgrade the CGRD. During the transition phase to upgraded software, where CGRD is no longer operating due to material constraints, Excel templates could be developed to help curators provide standardized information whenever possible.

The new CGRD will need to link to existing international databases (utilizing standardized variety identification codes), such as TropGENE (a multi-crop database storing data on molecular marker, genetic and physical maps, and phenotyping or genotyping studies), in order to access additional information of interest to potential users of the germplasm. This will take the form of either a direct link (taking the user to the other database) or a web service (where information is retrieved from another database, but integrated into the host's output). Users of these international databases will also be able to link back to CGRD to access information on individual accessions and their availability.

COGENT plans to develop a data-sharing agreement (DSA)⁴³ between each COGENT country-member as the data provider, and the COGENT Secretariat as the data receiver, to increase the level of legal protection of the data and to

⁴² See <http://www.cogentnetwork.org/cgrd-version-6-0-test-version>

⁴³ A Data Sharing Agreement (DSA) comprises a number of regulations for managing shared data between the Data-provider and the Receiver in several specific domains and contexts. This is an official accord between the parties that distinctly establishes which type of data is being shared, the obligations involved, the permissions required and how the data can be used. It ensures the protection of the Data-provider and the Receiver, by establishing regulations and agreed terms and conditions of use in diffusion to third parties.