



AGROPOLIS
LES DOSSIERS

Expertise of the Agropolis scientific community

Genetic
resources
Genomics
&
Plant
biotechnology



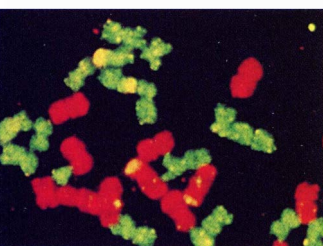
Number 1 – May 2001

Using coloured chromosomes to identify species origin

Genome structure can be investigated using molecular cytogenetics. Fluorescent In Situ Hybridization (FISH) locates precise sequences which will be fluorescently labelled on the chromosomes. Genomic In Situ Hybridization (GISH) differentiates the chromosomes of parental species in interspecific hybrids.

These techniques are particularly useful in cultivated plants with many chromosomes (polyploid) and/or in interspecific hybrids, like sugar cane, banana, coffee, citrus or cotton. The finer techniques of hybridization of Bacterial Artificial Chromosomes (BACs) to chromosomes and to uncoiled DNA complement physical mapping and in particular positional cloning of genes of agronomic interest.

Contact : Angélique D'Hont,
angelique.dhont@cirad.fr



Angélique D'Hont - © Cirad/CA

Fluorescence is used to screen chromosomes in hybrids

Detective work in identifying vine varieties

The vine is a highly diversified species, with 5,000 to 6,000 vine varieties listed worldwide. The INRA at Vassal houses the largest vine collection in the world, with some 2,300 identified vine varieties and a thousand undergoing identification. INRA researchers have begun the analysis of the genetic diversity of this collection using molecular markers (microsatellites and chloroplast markers). The main purpose of these analyses is the characterization and management of the genetic resources of the vine. The goal is the genetic fingerprinting of all these vine varieties. Preliminary results have demonstrated the utility of these genetic fingerprints:

- as an aid to identification: the analysis of the DNA extracted from leaves, wood, roots, or *rafle* (peduncles/pedicels) allows unambiguous identification of unknown samples,
- in the analysis of the origin of current vine varieties: it has been shown that prestigious vine varieties such as Chardonnay, Gamay and Aligoté resulted from seeds obtained by a natural cross between the vine varieties Pinot and Gouais.

Contact : Patrice This, this@ensam.inra.fr

Conserving genetic resources

If we are to meet the foreseeable and unexpected demands of the agriculture of tomorrow, it is vital to conserve the most diversified resources possible. Over the last three decades this goal has led to the creation of **ex situ collections**, in which diversity is conserved outside the natural environment, generally as seeds kept in cold storage, but also as cultivated plants (notably in the case of perennials). The management and utilization of base collections are simplified using **core collections**, in which the diversity of a collection is represented by a small number of plants.

These methods of conservation have proved highly valuable but do have some drawbacks, as they:

- "freeze" diversity,
- are ill-suited to species with unorthodox seeds,
- are subject to climatic or parasitic hazards.

Such methods do not allow the conserved material to evolve in parallel with its environment, and so after 20 or 30 years the conserved plants may no longer be able to survive the new environmental stresses. Furthermore, some plants, notably tropical, poorly tolerate low-temperature storage. Lastly, stored seeds gradually lose their germinative power and must be regenerated regularly, which is costly and labour-intensive.

J.-P. Bruno - © INRA-Domaine de vassal



*Vine variety:
securing identification*