

GLOSSARY

Apomixis. Reproduction involving specialized generative tissue but not dependent on fertilization.

***Bacillus thuringiensis* (Bt).** Bacteria inserted into the gene of a crop to confer crop-specific resistance to specific pests through the production of a specific toxin.

Biofertilizers. Fertilizers produced through the use of organic materials (crop residue, animal waste, urban waste, etc.) rather than chemical reagents.

Bioinformatics. The assembly of data from genomic analysis into accessible forms, involving the application of information technology to analyze and manage large data sets resulting from gene sequencing or related techniques.

Biopesticides. Pesticides produced through the use of parts of plants or animals, rather than chemical reagents.

Biotechnology. Any technique that uses living organisms or substances from those organisms to make or modify a product, to improve plants or animals, or to develop microorganisms for specific uses. These techniques include the use of new technologies such as recombinant DNA, cell fusion, and other new bioprocesses.

Chromosome(s). The physical structure(s) within a cell's nucleus, composed of a DNA-protein complex, and containing the hereditary material i.e. genes; in bacteria the DNA molecule is a single closed circle (without protein).

Diagnostics. The use of molecular characterization to provide more accurate and quicker identification of pathogens.

deoxyribonucleic acid (DNA). The molecule that is the repository of genetic information in all organisms (with the exception of a few viruses). The

information coded by DNA determines the structure and function of an organism.

Functional genomics. The knowledge that converts the molecular information represented by DNA into an understanding of gene functions and effects: how and why genes behave in certain species and under specific conditions. To address gene function and expression specifically, the recovery and identification of mutant and over-expressed phenotypes can be employed. Functional genomics also entails research on the protein function (proteomics) or, even more broadly, the whole metabolism (metabolomics) of an organism.

Gene. The fundamental physical and functional unit of heredity, the portion of a DNA molecule that is made up of an ordered sequence of nucleotide base pairs that produces a specific product or have an assigned function.

Gene chips (also called DNA chips) or microarrays. Identified expressed gene sequences of an organism can, as expressed sequence tags or synthesized oligonucleotides, be placed on a matrix. This matrix can be a solid support such as glass. If a sample containing DNA or RNA is added, those molecules that are complementary in sequence will hybridize. By making the added molecules fluorescent, it is possible to detect whether the sample contains DNA or RNA of the respective genetic sequence initially mounted on the matrix.

Genetic code. The code that translates information contained in messenger RNA into amino acids. Different triplets of bases (called *codons*) code for each of 20 different amino acids.

Genetic engineering. Technologies (rDNA technologies) used by scientists to isolate genes from an organism, manipulate them in the laboratory, and insert them into another organism.

Genomics. The molecular characterization of all the genes in a species.

Genotype. The genetic constitution of an organism as distinguished from its physical appearance (phenotype).

Germplasm. The total genetic variability, represented by germ cells or seeds, available to a particular population of organisms.

High throughput (HTP) screening or analysis. Screening techniques that allow for a fast and simple test for the presence or absence of a desirable structure, such as a specific DNA sequence, and the expression patterns of genes in response to different stimuli. HTP screening often uses DNA chips or microarrays and automated data processing for large-scale screening, for example to identify new targets for drug development.

Hybrid. An offspring of a cross between two genetically unlike individual plants or animals.

Intellectual property. That area of the law involving patents, copyrights, trademarks, trade secrets, and plant variety protection.

Molecular breeding. Identification and evaluation of useful traits in breeding programs by the use of marker-assisted selection.

Recombinant DNA. Hybrid DNA sequences assembled in vitro from different sources; or hybrid DNA sequences from the same source assembled in vitro in a novel configuration.

Single nucleotide polymorphisms (SNPs). The most common type of genetic variation. SNPs are stable mutations consisting of a change at a single base in a DNA molecule. SNPs can be detected by HTP analyses.

Species. Reproductive communities and populations that are distinguished by their collective manifestation of ranges of variation with respect to many different characteristics and qualities.

Tissue culture. The propagation of tissue removed from organisms in a laboratory environment that has strict sterility, temperature and nutrient requirements.

Transformation. The introduction of one or more genes conferring potentially useful traits into plants, livestock, fish and tree species.

Transgene. The specific gene transferred when rDNA technology is used to introduce a gene from either the same or a different species.

Transgenic animals or plants. Animals or plants whose hereditary DNA has been augmented by the addition of DNA, from a source other than parental germplasm, in a laboratory using recombinant DNA techniques

Vaccine technology. Use of modern immunology to develop rDNA vaccines for improved control of animal and fish disease.

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