

RESEARCH
GLOSSARY
Second Edition





NCGA ON THE INTERNET

www.ncga.com

www.corncommentary.com

www.cornfarmerscoalition.org

www.commodityclassic.com

www.corntechconf.org

www.genotypingcenter.com

www.twitter.com/nationalcorn

www.facebook.com/corngrowers

www.youtube.com/nationalcorngrowers

www.flickr.com/photos/ngcapictures

In 1997, NCGA spearheaded the National Plant Genome Initiative (NPGI), which sequenced the corn genome and other plant genomes. The draft of the corn genome sequence was completed in 2008. The next phase of the project is to apply genomic knowledge to improve plant performance in the field. Scientists are using genotyping as an important tool to develop new products and traits.

Abiotic stress: stress caused by non-living factors such as herbicides, drought, heat, salt, etc.

Agrobacterium: *Agrobacterium tumefaciens*, bacterial species used for plant **transformation**

Allele: an alternate form of a **gene**

Amino acids: a group of 20 naturally occurring molecules that are combined to make proteins

Artificial chromosome: synthetic **DNA** used to insert a **transgene(s)** into a plant cell - artificial **chromosomes** are not incorporated into the plant's chromosomes

Assay: a test for determining presence or absence, sequence, or composition of **DNA**, proteins or other cellular components

Bacillus thuringiensis (Bt): a bacterium whose crystals act as an insecticide

Base: a single **nucleotide**

Base pair: the bonded structure between two complementary **nucleotides** (A-T) or (C-G)

Bioeconomy: the investment and output from the application of **biotechnology**

Bioinformatics: use of computer programs for searching and analyzing electronic databases of **DNA** and protein sequences

Biolistics: the process of introducing **DNA** into plants cells by shooting DNA-coated pellets into the cell

Biomass: the organic mass that can be used as an energy source

Biotechnology: the scientific and industrial use of living organisms

Biotic stress: stress caused by living organisms such as insects, bacteria, viruses, fungi, parasites, etc.

Carbohydrates: molecules that are made up of sugars

Cellulose: a fibrous, complex **carbohydrate** (sugar) that is the main ingredient in cell walls

Chromosome: a complex **DNA** chain that contains genetic information

Cytoplasm: the mixture of water, proteins, fats, sugars and salts found outside the nucleus of a cell

DNA: the four primary **nucleotides** (A, T, C, G) that with sugar are the primary components of the double helix

DNA base pair: the bonded structure between two complementary **nucleotides** (A-T) or (C-G) on different **DNA** strands

DNA chip: spots of **DNA** arranged on a glass or silicon chip used for **nucleic acid assays**

DNA marker: a **DNA** sequence that exists in two or more forms that can be used to **genotype** individuals

DNA profiling: the term used to describe different methods for the analysis of **DNA** to establish the **genotype** or identity of an individual

DNA sequencing: determining the order of **DNA** bases

Dominant gene: a **gene** whose **phenotype** is expressed when it is present in only one copy

Epigenetic: heritable changes in gene expression due to **base** modification and not **nucleotide** changes

Functional genomics: determining the function of **gene** products

Gene: the unit of inheritance consisting of a **DNA** sequence

Genetic engineering: altering the genetic structure of an organism by adding foreign **genes** or altering or removing native genes through technology

Genetic map: map giving relative distance and position of one **gene** with respect to other genes

Genetic polymorphism: differences between **DNA** sequences

Genome: the collection of all **genes** for an organism

Genomics: study of the genetic make-up of an organism, including **DNA sequencing**, mapping and determining function

Genotype: the genetic composition of an individual

High-throughput screening: the use of robotics to run thousands of **assays** in a short time

Intellectual property: all patent applications, patents or trade secrets that make up proprietary information

Marker assisted breeding: plant breeding assisted by using **DNA markers**

Molecular breeding: plant breeding assisted by using **DNA markers** or protein markers

mRNA: a single stranded **RNA** molecule

Mutation: an alteration in **DNA** structure or sequence

Nucleic acids: **DNA** or **RNA** molecules composed of nucleotides

Nucleotides: the basic structure of **DNA** and **RNA** consisting of a nitrogenous base, a phosphate and a sugar

Nucleus: a membrane bound compartment found in cells that contains most of the cell's genetic information

Oligonucleotide: a short string of **nucleotides**

Phenotype: the observable or measurable characteristics of an individual

Plasmid: a heritable piece of **DNA** that is not part of a **chromosome**

Polymerase chain reaction (PCR): a process that reproduces a specific stretch of **DNA**, going from very few copies to millions of DNA copies

Polymorphism: differences between **DNA** sequences

Proteome: the complete set of all proteins in a cell

Proteomics: the study of protein function and structure

Recessive gene: a **gene** whose **phenotype** only is expressed when it is present in two copies

RNA: ribonucleic acid

Single nucleotide polymorphism (SNP): a single **base** change in a **DNA** sequence, such as a change in the **nucleotide** sequence GGCA to GGTA

Transgene: a **gene** that is transferred from one species to another

Transgenics: an organism whose **genome** has been altered by the transfer of genetic material through artificial means

Transformation: the change in the genetic structure of an organism by the incorporation of new **DNA**

Vector: a **plasmid** used for carrying cloned **DNA**

Sources

1. A Guide to the Biopharmaceutical Lexicon 2011 Edition, Waters Corporation
2. www.biotechnology4u.com
3. www.biology-online.org



NATIONAL
CORN GROWERS
ASSOCIATION

www.ncga.com