



# COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

## Item 6.2 of the Provisional Agenda

### Twentieth Regular Session

Rome, 24–28 March 2025

## GLOSSARY FOR AQUATIC GENETIC RESOURCES FOR FOOD AND AGRICULTURE

At its Eighteenth Regular Session, the Commission requested FAO to make available the key terminology from *The State of the World's Aquatic Genetic Resources for Food and Agriculture*<sup>1</sup> (SoW AqGR-1) e.g. as a stand-alone glossary and integrate relevant terms into FAO's Term Portal. In response to this request and in support of strategic priority 1.1 of the *Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture* (Global Plan of Action), FAO has coordinated a process of standardization of terminology related to aquatic genetic resources for food and agriculture (AqGR) across a range of FAO hosted platforms.

FAO has adapted an initial glossary of terms used in the SoW AqGR-1 and broadened it to include additional terms considered to be commonly used or essential for the description of AqGR, including terms defined during the development of AquaGRIS. In finalizing this glossary reference has been made to definitions already included in FAO's Term Portals and definitions used in the scientific literature but referencing their applicability in the context of AqGR used in aquaculture. Input has also been provided by relevant experts experienced in AqGR related terminology. To the extent possible, terms used in the glossary have been harmonized with those used in FAO Term Portals and AGROVOC vocabularies.

The glossary will be made available as a stand-alone glossary on the FAO website and as a thesaurus under AGROVOC,<sup>2</sup> which is a multilingual and controlled vocabulary designed to cover concepts and terminology under FAO's areas of interest. Links to the terms in the AGROVOC thesaurus will be included, as appropriate, in future FAO communications and within AquaGRIS. In the first instance the terms will be published in English but in the future, subject to availability of funds, translations will be added in all FAO's official languages.

<sup>1</sup> <https://openknowledge.fao.org/handle/20.500.14283/ca5256en>

<sup>2</sup> [www.fao.org/agrovoc/](http://www.fao.org/agrovoc/)

<b>English label</b>	<b>Proposed Definition</b>
Aquatic genetic resources	Aquatic genetic resources (AqGR) include molecular sequences, genes, chromosomes, tissues, gametes, embryos and other early life history stages, individuals, farmed types, stocks, and communities of organisms of actual or potential value for food and agriculture
Aquatic protected areas	Freshwater or marine protected areas. These areas usually restrict human activity for a conservation purpose, typically to protect natural or cultural resources
Base population	A cohort of organisms (animals, algae, plants) used to initiate a selective breeding programme
Biotechnology	Any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use
Bioinformatics	A field of science that uses computers, databases, mathematics, and statistics to collect, store, organize, and analyze large amounts of biological data
Breeding nucleus	Within a breeding programme, the elite broodstock maintained only for breeding future broodstock and not for production purposes
Breeding programmes	Systematic and structured programmes to change the genetic composition of a population based on objective performance criteria.
Broodstock	A group of sexually mature individuals used in aquaculture for breeding purposes
Captive propagated (farmed type)	A farmed type for which the life cycle has been closed in captivity (i.e. not wild sourced) at least for one generation, and aquaculture seed is derived from broodstock that have been spawned and reared in captivity but does not meet the criteria as a strain or variety
Capture-based aquaculture	The practice of collecting "seed" material – from early life stages to adults - from the wild, and its subsequent on growing in captivity to marketable size, using aquaculture techniques
Combined selection	An artificial selection programme that combines individual and family selection.
Crossbred (farmed type)	F1 progeny of a cross between two primary farmed types within a species
DNA barcoding	A taxonomic method that uses a short genetic marker in an organism's DNA to identify it as belonging to a particular species. It differs from molecular phylogeny in that the main goal is not to determine classification but to identify an unknown sample in terms of a known classification
DNA markers	An identifiable DNA sequence that facilitates the study of inheritance of a trait or a gene. Such markers are used in mapping the order of genes along chromosomes and in following the inheritance of particular genes: genes closely linked to the marker will generally be inherited with it. Markers must be readily identifiable in the phenotype, for instance by controlling an easily observable feature (such as eye colour) or by being readily detectable by molecular means
Domestication	The adaptation of an animal or plant to life in intimate association with and to the advantage of humans
Domestication selection	An unconscious process of genetic selection (as opposed to intentional selection as part of a breeding programme) in which the farmed type becomes genetically adapted to the captive environment, over multiple generations of domestication
Effective population size	The number of individuals in a population who contribute offspring to the next generation

Epigenetics	Relating to changes, especially heritable changes, in the characteristics of a cell or organism that result from altered gene expression or other effects not involving changes to the DNA sequence itself
<i>Ex-situ</i> conservation	The conservation of components of biological diversity outside their natural habitats
<i>Ex-situ In vivo</i> conservation	The conservation of components of biological diversity, as live organisms, outside their natural habitats
<i>Ex situ In vitro</i> conservation	Maintenance of cells, tissues and life stages of animals and plants alive or in suspended animation with the capacity to be reconstituted as live organisms at a later time
Family selection	A selective breeding approach in which individuals are selected solely on the basis of their family means
Farmed type	A descriptor applied to farmed aquatic organisms at a level below species, including strain, variety, hybrid, triploid, monosex group, other genetically altered forms or wild-sourced
Fishery stocks	A quantity of fish considered in a given situation
Founder effect	The outcome of the establishment of new populations from a small number of founding individuals. These founding individuals carry with them only a fraction of the genetic diversity of the parental population, and therefore, the founder effect results in a decreased genetic diversity and distinctive allele frequency patterns in the newly established population
Gamete	A mature reproductive cell which is capable of fusing with a cell of similar origin but of opposite sex to form a zygote from which a new organism can develop. Gametes normally have a haploid chromosome content. In animals, a gamete is a sperm or egg; in plants, it is pollen, spermatid nucleus, or ovum
Gene banks	Gene banks are facilities where genetic material can be conserved and made available for users such as breeders, researchers and even farmers. Germplasm – the genetic material of living resources – is the focus of these collections and in the case of plant gene banks is typically stored as seeds, seedlings, tissue and other forms that contain genetic information
Genes	Specific sequences of nucleotides along a molecule of DNA on a chromosome (or, in the case of some viruses, RNA) which represent functional units of heredity that determine the production of phenotypes
Genetic data	Any quantitative and verifiable data at the level of species, strains, varieties. Genetic data can include morphological traits, geographical traits, temporal traits, colour traits or other traits known to have a genetic basis
Genetic drift	Random changes in gene frequency in a population caused by small effective population size, e.g. sampling error. Genetic drift may cause gene variants to disappear completely, thereby reduce genetic variation. Genetic drift is inversely related to effective population size
Genetic engineering	Genetic engineering refers to the direct manipulation of DNA to alter an organism's characteristics (phenotype)
Genetic gain	The improvement in average genetic or phenotypic value in a population over cycles of a breeding programme.
Genetic improvement	Genetic improvement in agriculture refers to the process of selectively breeding crops, livestock or aquaculture farmed types with desirable traits in order to create offspring with improved characteristics. This is typically accomplished through careful selection of individuals with desirable traits and the controlled mating of those individuals to produce offspring with a higher likelihood of inheriting those traits. Traditional selective breeding is increasingly being supplemented by

	advanced technologies such as genomics and genetic engineering, which allows scientists to directly target or manipulate the DNA of organisms to enhance selection to create new traits or enhance existing ones
Genetically modified organisms (GMO)	An organism in which the genetic material has been altered anthropogenically by means of gene or cell technologies
Genetic diversity	Genetic and associated trait differences among individuals and populations <i>within</i> a species
Genetic markers	A DNA polymorphism that can be easily detected by molecular or phenotypic analysis. The marker can be within a gene or in DNA with no known function. Because DNA segments that lie near each other on a chromosome tend to be inherited together, markers are often used as indirect ways of tracking the inheritance pattern of a gene that has not yet been identified, but whose approximate location is known
Genetic material	Any material of plant, animal, microbial or other origin containing functional units of heredity
Genetic resource management	A programme with specific objectives involving conservation, sustainable use or development of genetic resources. Objectives may include breed improvement, maintenance of genetic diversity, maximizing or minimizing genetic diversity, maintaining rare genes, adapting population to changing environments etc.
Genetic stock	Having one or more distinguishing and heritable characteristics that distinguish the wild stock from other wild stocks of the same species within a jurisdiction. These characteristics could include one or more of: genetic differences (i.e. identifiable molecular signatures); morphological/phenotypic characteristics for one or more traits; and proxies for genetic differences such as geographic/reproductive isolation, behavioural isolation, various adaptations, or localized parasitic infestation (definition applied in AquaGRIS)
Genomes	The entire complement of genetic material (genes plus non-coding sequences) present in each cell of an organism, virus or organelle
Genome editing	The process of making genetic engineering techniques that involve DNA repair mechanisms for incorporating site-specific modifications into a cell's genome changes at targeted genomic sites
Gene edited (farmed type)	A farmed type created by the targeted insertion, deletion or replacement of DNA at a specific site in the genome that is inherited by its offspring
Genome mapping	The identification of the position of known genes or genetic markers relative to each other in terms of physical distance on the chromosome
Genomics	The systematic study of the complete DNA sequences (genome) of organisms
Genomic selection	A form of selection based on the principle that information from a large number of markers distributed across the genome can be used to capture diversity in that genome, sufficient to estimate breeding values without having a precise knowledge of where specific genes are located
Genotype	The genetic make-up of an organism at the locus (or loci) that produces a specific phenotype. The organism is either homozygous or heterozygous at each locus; the sum of the total genetic information in an individual or the genetic constitution of an individual with respect to genetic loci under consideration
Genotyping-by-sequencing	A method using high-throughput sequencing to discover, and genotype, genome-wide single-nucleotide polymorphisms within a population
Germplasm	Living genetic resources such as whole organisms, gametes, spores, seeds or tissue, maintained for the purpose of breeding, preservation,

	and other research uses because it contains the information for a species' genetic makeup
Heritability	The degree to which a given trait is controlled by inheritance, as opposed to being controlled by non-genetic factors
Hybrid (farmed type)	The F1 progeny from a cross between two different species
Inbreeding	Mating or crossing of individuals more closely related than average pairs in the population
Inbreeding depression	The decrease in fitness with increased genome-wide homozygosity that occurs with accumulation of inbreeding
<i>In situ</i> conservation	The conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties
Introgressed (farmed type)	A farmed type based on a genetic mix of two or more different species beyond the F1 generation
Introgression	The incorporation of genes from one population to another through hybridization that results in fertile offspring that further hybridize and backcross to parental populations
Invasive alien species	Alien invasive species are plants, animals, pathogens and other organisms that are non-native to an ecosystem, and which may cause economic or environmental harm or adversely affect human health
IUCN Red List	The IUCN Red List of Threatened Species (also known as the IUCN Red List or Red Data List), founded in 1964, is the world's most comprehensive inventory of the global conservation status of biological species. The International Union for the Conservation of Nature (IUCN) is the world's main authority on the conservation status of species. A series of Regional Red Lists are produced by countries or organizations, which assess the risk of extinction to species within a political management unit. The IUCN Red List is set upon precise criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world
Management/assessment unit	Stock of a species in a country that is identified as a management or assessment unit and thus subject to some form of management, monitoring or assessment. This may include fisheries stocks, conservation units, evolutionary significant units, regional management unit or other (definition applied in AquaGRIS)
Marker assisted selection (MAS)	A process whereby a selection decision is made indirectly based on markers, typically genotypes of DNA markers, linked to a trait of interest. MAS is especially useful for traits that are difficult or lethal to measure, exhibit low heritability and/or are expressed late in development
Mass selection (also known as individual selection)	A form of selective breeding in which all individuals in a cohort are pooled and individuals selected as future broodstock based on the phenotypic value for the target trait.
Monosex	1. A single sex cohort of a given species generated through genetic manipulation of sex determination rather than direct manipulation of sex differentiation. (farmed type definition) 2. The selection or rearing of a single sex of a given species in an aquaculture unit in order to avoid uncontrolled reproduction or to obtain higher yields. Commonly used with salmonids and tilapias in which there is a dichotomy between the growth of the two sexes that is activated after the onset of sexual maturity
Non-native species	A species living outside its native distributional range, but which has arrived there by human activity, either deliberate or accidental

Outbreeding depression	Refers to cases when offspring from crosses between individuals from different populations have lower fitness than progeny from crosses between individuals from the same population
Polyploidy	General term referring to the number of homologous chromosomes (ploidy) in a somatic cell within one organism. Polyploidy usually indicates the presence of more than two sets of homologous chromosomes within a somatic cell. Polyploidy can occur through whole-genome duplication or fusion of unreduced gametes within the same species (autopolyploidy) or through hybridization of different species (allopolyploidy)
Polyploid	An animal or plant having more than two sets of chromosomes
Quantitative trait loci (QTL)	Genomic regions associated with complex quantitative traits governed by several large effect as well as smaller effect genes. Special statistical software is needed to identify the locations and effects associated with these regions
Selective breeding	A breeding programme whereby only those individuals or families are chosen or saved that meet or exceed predetermined phenotypic criteria for quantitative phenotypes or those individuals that exhibit the desired qualitative phenotype. Individuals that do not meet these criteria are culled from the programme
Single nucleotide polymorphism (SNP)	A single base pair variation in a genetic sequence which occurs at a significant frequency in a population
Species	A group of organisms of common ancestry having common characteristics, that are typically able to reproduce only among themselves to produce fertile offspring and which are usually geographically distinct. It constitutes the fundamental rank in the taxonomic hierarchy
Species diversification	Species diversification in aquaculture refers to a process of increasing the diversity of species or farmed types under culture. Diversity here reflects not only the number of species or farmed types (i.e. richness) but also the relative abundance or relative production levels of the various species and farmed types (i.e. evenness). Species diversification is widely recognized as a development strategy that could reduce risks, broaden market opportunities, optimize resource utilization, promote ecosystem health, adapt to climate change, and foster innovation in aquaculture. The converse of species diversification is species concentration in which there is increased emphasis on the development of aquaculture of a small number of species or farmed types
Stocks	A group of similar organisms in the wild that share a common characteristic that distinguishes them from other organisms at a given scale of resolution. For infra-specific use a stock would signify a segment of a species that can be distinguished from other segments of that species
Strain (farmed type)	A farmed type of aquatic animal or microalgal species having a common breeding history, relatively homogeneous appearance (phenotype), behaviour, performance and/or other characteristics that distinguish it from other organisms of the same species in that country, and that can be maintained by propagation
Subspecies	A geographically localized subdivision of a species, genetically and morphologically distinguishable from other subspecies, described according to taxonomic rules, and given a Latin name
Surrogate broodstock	Sterile animals used for the production of gametes of another individual, strain or species, typically through germ cell transplantation

Trait	Physical or external appearance of an organism as contrasted with its genetic constitution. Measurable/observable character of an individual
Transgenics (farmed type)	Individuals in which a transgene has been integrated into their genome. In transgenic eukaryotes, the transgene must be transmitted through meiosis to allow its inheritance by the offspring
Variety (farmed type)	A farmed type of aquatic plant or macroalgae species with common breeding history, having relatively homogenous appearance (phenotype), performance and/or other characteristics that distinguish it from other farmed types of the same species in that country and that can be maintained by propagation
Wild relative	An organism of the same species as a farmed organism (conspecific) found and established in the wild, i.e. not in aquaculture facilities
Wild sourced (farmed type)	A farmed type in which aquaculture seed or broodstock are sourced from wild stocks, i.e. have not been bred in captivity
Wild types	Wild types apply to a combination of characteristics (phenotype) that is expressed by majority of individuals in a natural population of a species
Within-family selection	A selective breeding program for quantitative phenotypes, whereby selection occurs at the family rather than at the individual level. In within-family selection, each family is considered to be a sub-population, and selection occurs independently within each family