CODEEFABAR

the commitment to responsible breeding

DEFINITIONS, TERMS AND ABBREVIATIONS.

Code EFABAR 2014/2016

Update Committee 2013

C. DEFINITIONS, TERMS AND ABBREVIATIONS

Albumen firmness: Quality description of the albumen (egg white) of an egg. Albumen is judged on the basis of clarity and firmness or thickness. A clear albumen is defined as being free from discolorations or from any foreign bodies.

Animal Model: Mathematical approach to determine the genetic and environmental factors which may affect animal performances. This system allows an accurate prediction of the breeding values of future reproducers. The Animal Model simultaneously evaluates dams (♀) and sires (♂) using all their ancestor relationships. This means that every animal known in a given pedigree is used to evaluate both the dam and sire. This increases the accuracy of evaluation and should be a major step in breeder acceptance of the new evaluation system.

Artificial fertilisation: The bringing together of semen and eggs under laboratory conditions.

Artificial insemination (AI): Collecting semen from a male and transferring this into the genital tract of a female. The advantages of AI are 1) genetic improvement: superior animals can be used to broader extent and more efficiently, 2) control of diseases: a) semen is tested for multiple diseases b) no transmission of venereal diseases c) instead of males, their tested semen is shipped.

Balanced breeding: Breeding for a combination of characteristics, concerning animal biology, animal health, efficiency, environment, animal welfare, sustainability, robustness, quality and economic viability. Taking into account the variety of environments the animals are destined for.

Beef cattle: Bovines bred for meat production.

Best Linear Unbiased Prediction (BLUP): Statistical method, that gives the estimation of Breeding Values. This is a rating or breeding quality number and is a prediction of the breeding potential of the individual animal and how likely it is that that animal will improve (or not improve) its offspring. BLUP calculations are used to predict the genetic make-up of an animal for all kinds of traits. With BLUP it is possible to track and predict the different inherited traits through complicated mathematical and statistical calculations.

Biopsy: a small tissue sample taken from the animal (i.e. hair, skin, blood, saliva, fat) to analyse its DNA or other components. The protocol for biopsy is specific for the different species, countries and must be customised to the current analysis.

Breeding organisation (BO): Organisation involved in the breeding of farm animals.

Breeding pyramid: The general structure of a livestock industry, with respect to the creation and dissemination of genetic improvement, can be described as a pyramid with nucleus, multiplier and commercial levels. Although selection may be practiced at all levels, it is selection at the nucleus that determines the rate of permanent genetic improvement in the industry. Thus, the selection objectives addressed in nucleus herds must accurately reflect production goals at the commercial level. Typically in the pig and poultry industry commercial products, are crossbreds between different genetic lines.

Breeding value: The estimated additive genetic value of an individual. The part of an individual's genotypic value that is due to independent and therefore transmittable gene effects.

Broiler: A type of chicken bred for meat production.

Challenge test: Tests designed to identify differences between individuals, families, lines or strain crosses in their ability to cope with diseases or stress factors likely to be encountered in practice. Results from challenge tests are used to select relatives for improved resistance. In case of transmittable diseases, test farms are operated with maximal bio-security.

Cloning: Organism cloning (also called reproductive cloning) refers to the procedure of creating a new multicellular organism, genetically identical to another. In essence this form of cloning is an asexual method of reproduction, where fertilization or inter-gamete contact does not take place. Asexual reproduction is a naturally occurring phenomenon in many species, including most plants and some insects. In mammals, in the case of identical twins, this process takes place spontaneously. The source nuclear material can be embryo-derived, foetus-derived, or taken from an adult somatic cell. The first mammal, sheep Dolly, was cloned by nuclear transfer from somatic cells in 1997 (Somatic Cell Nuclear Transfer Cloning).

Congenital defects: Defects present at birth.

Cross-bred animals: A cross of two or more lines or breeds.

Cryopreservation: Preservation by means of freezing, e.g. semen, embryos.

Dairy cattle: Bovines bred for milk production.

Dual purpose cattle: Bovines bred for both milk production and beef production

Embryo transfer: Recovering embryos from a donor animal and transferring these embryos to a recipient animal.

Epigenetics: study of changes in gene expression or cellular phenotype, caused by mechanisms other than changes in the underlying DNA sequence – hence the name *epi-* (Greek: *επί-* over, above, outer) *-genetics*, some of which have been shown to be heritable

Farm animal breeding: Strategies applied by specialized farmers to increase desirable traits selecting the appropriate animals as ancestors of the new generations.

Food and Agriculture Organisation (FAO): www.fao.org.

Fry: Young fish at an early stage.

Gene editing: Gene editing involves snipping the animal's DNA and inserting new genetic material, in effect changing a single one of the three billion 'letters' that make up its genome.

Genetic diversity: Variety of alleles of genes within a population or between populations.

Genetic line: Purebred pedigree population breeding its own replacements to be parents of the next generations. A, B, C and D in the crossbreeding structure refer to genetic lines.

Genome wide selection (genomic selection): Use of Genomic Enhanced Breeding Values for juvenile animals, that combines predicted from a large number of estimated marker haplotype effects across the whole genome with "traditional" breeding valuesSingle Nucleotide Polymorphisms (SNPs) are used as high density markers in genome wide selection.

Genomics: Study of an organism's genome and the use of the genes (the genes of a cell, or tissue, at the DNA (genotype), mRNA (transcriptome), or protein (proteome) levels). It deals with the systematic use of genome information, associated with other data, to provide answers in biology, medicine and industry. The field includes intensive efforts to determine the entire DNA sequence of organisms and fine-scale genetic mapping efforts, and also includes studies of intragenomic phenomena such as heterosis, epistasis, pleiotropy and other interactions between loci and alleles within the genome. The major tools and methods related to genomics are bioinformatics, genetic analysis, measurement of gene expression, and determination of gene function. Such identified genes can be called major genes located at Quantitative Trait Loci (QTL). Although the term QTL strictly applies to genes of any effect, in practice it refers only to major genes, as only these will be large enough to be detected and mapped on the genome. Following the pattern of inheritance at such QTL might assist in selection.

Haugh units: A measure of the firmness of albumen in the eggs, correcting albumen height for variable egg weight (layer chicken).

Hermaphrodism: Biological mode of reproduction in which an individual presents alternatively or simultaneously male and female territory in its gonad.

IMF: Intramuscular fat or marbling of muscle meat.

Inbreeding: Genes that two animals have in common due to common ancestors. Inbreeding can be used to increase genetic variation between families in order to increase response to selection. In commercial breeding programmes, inbreeding is seldom used. Loss of genetic diversity due to inbreeding depends on effective population size and selection intensity.

Interbull: International breeding value estimation in dairy cattle. Interbull is a non-profit organisation, responsible for the standardisation of international genetic evaluations for cattle. In practice this means, that a French farmer may use semen from a South American bull with known breeding value for French conditions, because the international breeding value is comparable globally. There is an extensive international trade of bull semen, globally.

In vitro embryo production: The production of embryos outside an animals' body using sperm and unfertilised eggs.

Layer: A type of chicken bred for egg production.

LCA: Life Cycle Assessment. Method to calculate the inputs and outputs of (agricultural) production systems. It is a technique to assess environmental impacts associated with all the stages of a product's life from-cradle-to-grave.

Marker assisted selection (MAS): Selection using genomic markers. The idea behind marker assisted selection is that there may be genes with significant effects that may be targeted specifically in selection. Some traits are controlled by single genes (e.g. hair colour) but most traits of economic importance are quantitative traits that most likely are controlled by a fairly large number of genes. However, some of these genes might have a larger effect.

Mass selection: A form of selection in which only individuals with phenotypic values greater or less than a threshold level are used for breeding. It involves no use of family information. (Compare with pedigree selection).

Monofactorial genetic effects: One gene being responsible for a certain genetic effect, e.g. halothane gene, BLAD, CVM.

Monosex population: Production of population of animals of only one phenotypic sex by gamete management (sperm sexing, gynogenesis, sex inversion) or by the control of environmental factors as grading or for example in fish by the application of hot or cold temperature during the sexual differentiation period.

Muscle hypertrophy: Extreme growth of skeletal muscle as in some breeds of cattle, sheep, pigs (double muscling).

Oestrus induction: Hormonal stimulation of oestrus at desired moment to ensure a better control and care of reproducing females and their offspring.

RYR-1 gene: Also known as halothane gene, is a gene that encodes for the skeletal muscle rynodine receptor in pigs. The locus RYR-1 has two alleles (N: normal, dominant and n: halothane sensitivity, recessive). Pigs with nn or Nn genotype are more susceptible to stressful stimuli. This pork gene causes the pork to be pale, soft, and exudative. A DNA-test has been developed to detect this gene in pigs, so that the pigs carrying this gene are not used for selection. It was the first genome test in farm animal breeding.

Somatic cell count: The somatic cell count (SCC) is commonly used as a measure of milk quality. Somatic cells are simply animal body cells present at low levels in normal milk. High levels of these cells in milk indicate abnormal, reduced-quality milk that is caused by an intramammary bacterial infection (mastitis).

Sperm cells from embryonic stem cells: Creating fully functional sperm from embryonic stem cells.

Sperm sexing: Separation of male and female spermatozoa. After the sexing procedure, the semen can be used to produce predominantly either male or female offspring.

SPF: Specific Pathogen Free. Deliverance of breeding material, free of specific pathogens, e.g. Salmonellae, Leucosis, Mycoplasmae.

Sustainability: Sustainability in farm animal breeding and reproduction means the extent to which animal breeding and reproduction, as managed by professional organisations, contribute to maintenance and good care of animal genetic resources for present and future generations. (www.sefabar.org).

Traceability: Organisation of a production process in such a way that all the steps can be 'traced'. E.g. when a piece of meat is bought in a supermarket, it should be possible to 'trace' back to the farm where it was produced, and to the parents of the animal.

Transgenic: Animals with an artificially modified gene or a gene of another species introduced into their genome, e.g. a gene that can produce milk causing no allergic reactions in humans. Introducing such a different gene into an organism is called 'genetic modification': GM

Triploidy: biological mechanism happening in which an individual developed with 3 sets of chromosomes (i.e.: 2 of its mother and 1 from his father) instead of 2 in diploids (1 from each of its parents).

Weaning: Accustom animals to do without the mother's milk (mammals) or leaving prey (fish).

Yolk/albumen ratio: Amount of yolk compared to amount of albumen in an egg. It can be used as a measure of egg quality in layer breeding programmes.

Zoonotic disease: Disease that can be transmitted from animals to humans.