About author

Dr. Ahmad Fahim has completed his B.V.Sc & A.H. in the year 2009 from Govind Ballabh Pant University of Agriculture and Technology, Pantanagr, Uttarakhand, India. He got admission in a master's degree program in the subject of Livestock Production Management at Indian Council of Agricultural Research-Indian Veterinary Research Institute, Bareilly, Uttar Pradesh, India after securing 29th rank in All India ICAR-JRF examination. He has completed his Masters degree in the year 2011 and carried out research work on "Phenotypic Characterization of Rohilkhand Local Goats". He has completed his Ph.D. degree in the year 2016 from the ICAR-National Dairy Research Institute, Karnal. His PhD dissertation work was on "Parlour Performance, Udder Health and Milk Quality of Crossbred Dairy Cows in Automated Herringbone Milking Parlour". He was selected as Assistant Professor in the Department of Livestock Production Management, College of Veterinary and Animal Science, Sardar Vallbhbhai, Patel University of Agriculture & Technology, Meerut, Uttar Pradesh, India in the year 2014. He has in his credit more than 40 research papers, 3 books and other publications. He is a member of Indian society of Animal Production Management and actively participates in conferences/ symposiums/ workshops held during the year. He is on panel of experts for framing question papers for various Universities.

Description

This lecture note was prepared and delivered to B.V.Sc..& A.H. students studying the course of Livestock Production Management The course is offered during the first professional of the academic year at College of Veterinary & Animal Sciences, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, India. This lecture provides an over view of economic traits of dairy animals and systems of breeding in livestock. I had tried my level best to extract the contents simplify the facts in easy to memories in very short time. Further constructive suggestions to improve this lecture note are always welcome its users on my email and WhatsApp.

Published Online:
First e-print: 2023

Total pages: 03-06

Published by:
Department of LPM
College of Veterinary & Animal Sciences Sardar Vallabhbhai Patel University of Agriculture and Technology Meerut- 250 110, Uttar Pradesh, India

Publication No. SVP/COAVAS/LPM/944 (4) Dated: 21 October, 2023 (for official use)

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Economic traits of dairy animals

- Play role in selection and judging of the breeding stocks
  - phenotypic and behavioral traits
- These are traits with measurable or having recognizable economic value to be taken
- **The economic traits are typically those traits that affect either the income obtained or the costs of production.**
- Many traits in farm animals are affected by cumulative action of many genes. There is no sharp distinction among phenotypes but there is more or less continuous range from one phenotypic expression to another. These are known as **quantitative trait or economic trait**.
- Environment has great influence on the expression of most economic traits.

Some of the important economic traits in cattle and buffaloes:

Important traits	Dairy Cattle/Buffalo	Beef Cattle/Buffalo
Production	Lactation yield Lactation period Persistency of Milk Yield Concentration of milk solids Fat content Efficiency of feed utilization and conversion into milk Production lifespan Draughtability	Body size or weight Growth rate Carcass quality Age and weight at slaughter Leanness, carcass percentage Draughtability
Reproduction	Age at first calving Calving interval Dry period Age at first collection of semen	Age at first calving Calving interval Mothering ability Scrotal circumference
Health	Disease resistance	Disease resistance
Management	Longevity Milk let-down	Calving ease Temperament

Physical appearance	Body colour, shape, and dimensions, udder characteristics, structural traits and body condition	Body colour, shape, dimensions, structural traits and body condition

Systems of breeding in livestock

Inbreeding

Mated individual have one or more common ancestor in their pedigree up to 4-6 generation

- ✓ Close breeding: More closely related individual. e.g., Parent- offspring, full sib
- ✓ Line breeding: More distanly related. e.g., cousins

Outbreeding

Mating of unrelated animals

- ✓ Outcrossing: Mating of unrelated animals within same breed (Sahiwal X Sahiwal)
- ✓ Crossbreeding: Mating of animals among different breeds (Sahiwal X Brown Swiss)
    - 2 breed cross (Sahiwal X BS)
    - 3 breed cross (Sahiwal X BS X Red Sindhi)
    - Back cross (mating of hybrid to one of pure bred)
    - Rotational crossing
        - Criss crossing (mating of hybrids with pure breeds in alternate manner)
        - Tripple crossing (mating of hybrids with 3 different pure breds in rotational manner)
- ✓ Grading up: Mating of purebred sire with non-descript female for around 5-6 gen. (Murrah X N.D.)
- ✓ Species hybridization: Mating of different species.
        - Jack X Mare – Mule
        - Stallion X Jennet - Hinny

Selection

Certain individuals in population preferred over others for producing offspring of next generation

- Individual selection
    - Selection based on phenotypic characteristics
- Pedigree selection
    - Selection based on performance of anestors
- Progeny testing
    - Selection based on average performance of progeny

Methods of selection

- ✓ Tandem
    - Only one trait selected at a time
- ✓ Independent culling

- Selction on two or more traits at a time

✓ Selection index method

- Several traits selected simultaneously, giving weightage for each trait
- I= b1 x1 + b2 x 2 +.....+bn xn