

Traits of Economic Importance and their inter-relationships in cattle and buffaloes (LPM-601)



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Introduction

- India has the world's largest livestock population: **58 per cent of buffaloes** and **15 per cent of cattle**.
- Average productivity of Indian cattle has grown from 1.9 to 3.9 kg per day and of buffaloes from 3.7 to 6.2 kg per day.
- Major causes of low productivity in India:
 - 1. Intrinsic:** Low genetic potential
 - 2. Extrinsic:** Poor nutrition/feed management.
- Hostile climatic condition of tropics
- Smaller land holding
- Excess number of animals,
- Inferior farm management practices,
- Inefficient implementation of breed improvement programmes.

Economic Traits

Important Economic Traits	Dairy Cattle and Buffalo	Beef Cattle and Buffalo
Production	<ul style="list-style-type: none">a. Lactation yieldb. Lactation periodc. Persistency of Milk Yieldd. Frequency of milkinge. Concentration of milk solidsf. Fat contentg. Efficiency of feed utilization and conversion into milkh. Production lifespan	<ul style="list-style-type: none">a. Body size or weightb. Growth ratec. Carcass qualityd. Age and weight at slaughtere. Leanness, carcass percentage

Economic Traits

Important Economic Traits	Dairy Cattle and Buffalo	Beef Cattle and Buffalo
Reproduction	<ul style="list-style-type: none"> a. Age at first calving b. Calving interval c. Service period d. Dry period e. Age at first collection of semen f. Reproductive efficiency 	<ul style="list-style-type: none"> a. Age at first calving b. Calving interval c. Service period d. Mothering ability e. Scrotal circumference f. Reproductive efficiency
Health	Disease resistance	Disease resistance
Management	<ul style="list-style-type: none"> a. Longevity b. Milk let-down c. Total milking time 	<ul style="list-style-type: none"> a. Calving ease b. Temperament
Physical Appearance	Body colour, shape, and dimensions, udder characteristics, structural traits and body condition	Body colour, shape, dimensions, structural traits and body condition

Production traits

1. Lactation Yield: This is total milk produced in a lactation period (305 days).

- Lactation yield depends on: Age at first calving, calving interval, number of calving, persistency in milk yield, availability of feed and fodder, genetic potential of animal, frequency of milking, service period etc.
- Normally in dairy cattle 30 - 40 % increase in milk production from first lactation to maturity is observed.
- After 3 or 4 lactation, the production starts declining.

2. Lactation Period: Lactation period is the length of milk producing period after calving. The optimum lactation period is 305 days.

- Generally, Indigenous breeds have less lactation period, but in some breeds this period is more with very little milk production.

3. Persistency of milk yield:

- During lactation period the animal reaches maximum milk yield per day within 3-6 weeks of parturition which is called peak yield, after which slow decrease in milk yield is observed.
- Milk yield gradually declines at the rate of 7.5 to 11 % in tropical cattle and 5.3 to 7.5% in European cattle every month.
- For high level of lactation yield, this peak yield should be maintained for longer period as far as possible which is called persistency.
- High persistency is necessary to maintain high level of milk production.

4. Frequency of milking:

- More number of times a cow is milked per day, the more will be the milk yield.
- The younger cows seem to show a greater increase in milk yield when subjected to more frequent milking.

5. Concentration of Milk solids:

- When milk is sold in a formal market, the price paid per kg may be adjusted based on concentration of milk solids.
- The milk of buffaloes is priced 1.5 - 2 times more than cow milk due to its greater concentration of milk solids (17-19% versus around 13%) and in certain areas it may be mixed with cow milk to increase the thickness of cow milk to improve its market acceptability.

6. Fat content:

- In India milk prices are still based on fat content of milk, but payment for protein or solids-not-fat is becoming increasingly common.
- This trait is 60-65% heritable and hence selection improves the performance.
- Zebu cattle have more fat content in milk as compare to European cattle. Further, buffaloes produce far more fat content (7-8%) as compare to cattle (4-5%).

Reproduction Traits

1. Age at first calving:

- Most of the Indigenous breeds are late maturing.
- The age of the animal at first calving is very important for high life time production.
- The desirable age at first calving in Indian cattle breeds is 3 years, 2 years in cross breed cattle and $3^{1/2}$ years in Buffaloes.
- Prolonged age at first calving will have high production in the first lactation, but the life time production will be decreased due to less number of calving.

2. Calving Interval:

- Period between two successive calving.
- It is more profitable to have one calf at yearly interval in cattle and at least one calf for every 15 months in buffaloes.
- If the calving interval is more, the total number of calving in her life time will be decreased and also total life production of milk decrease.

3. Service Period:

- It is the period between date of calving and date of successful conception. The optimum service period is 60-90 days.
- Optimum service period helps the animal to recover from the stress of calving and also to get the reproductive organs back to normal.

4. Dry Period:

- It is the period from the date of stoppage of milk production to next calving.
- A minimum of 2-2 ½ months dry period should be allowed to compensate for growth of foetus.

5. Reproductive Efficiency:

- Reproductive efficiency determines the life-time-milk production.
- It is determined by combined effect of heredity and environment.
- Several measures like number of services per conception, calving interval, days from first breeding to conception, etc. are available to understand the reproductive efficiency.

Health and Management Traits

1. Disease Resistance:

- Indigenous breeds are more resistant to majority of diseases compared to exotic cattle/buffaloes due to better adaptation in prevalent climatic conditions.
- Crossbreeding with high yielding exotic breeds with local cattle will help to produce high yielding and disease resistant hybrid animals.

2. Milk let down time:

- It is the duration between touching udder and the complete let down of milk.
- For many indigenous cattle breeds, the presence or suckling by a calf is necessary to ensure milk let-down.
- The milk consumed by the calf may not result in much waste as the milk consumed can improve both the health and growth rate of the calf.

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- **Total Milking time:** Machine milking/hand milking time plus routine time required for cleaning of udder, attachment and detachment of teat cups.
 - Milking of animals must complete within 5-7 minutes, otherwise total milk yield will be reduced.
 - **Milking Temperament:** Docile animals are always preferred over aggressive one, as aggressive animals waste their energy of no use.

Physical Appearance

- Dairy type animals possess typical body conformation and shape.
- Udder capacity, dairy characters, ideal body condition score has significant effect on milk production.



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