Unit 9: Dairy Cattle Production and Management

Introduction to Dairy Cattle Production and Management

1. What is Dairy Cattle Production?

Dairy cattle production, also known as dairying, involves raising cattle specifically for milk and milk products. These cattle are bred to convert feed efficiently into high-quality milk. There are different types of dairy cattle:

- **Dairy Cattle:** Raised primarily for milk production.
- **Dual-Purpose Cattle:** Raised for both milk and meat.
- **Multi-Purpose Cattle:** Used for milk, meat, and sometimes work, with strong bones and a calm temperament.

2. Life Cycle of Dairy Cattle

- **Heifers:** Female calves that reach sexual maturity around 7-8 months old. They are usually bred at 15-18 months.
- **Gestation:** The pregnancy lasts 265-300 days.
- **First Calving:** Heifers generally give birth for the first time at 2-2.5 years old.
- **Breeding Again:** After calving, they are typically bred again 4-8 weeks later.

3. Management Practices

Effective dairy farming includes:

- **Breeding:** Selecting suitable breeding pairs.
- **Feeding:** Providing a balanced diet.
- **Housing:** Ensuring comfortable living conditions.
- **Health Care:** Regular check-ups and vaccinations.
- **Record Keeping:** Monitoring milk production and health.

Dairy Cattle Breeds and Their Selection

1. Types of Dairy Cattle Breeds

Dairy cattle are categorized into two main groups:

- **Bos indicus (Indigenous Cattle):** Adapted to tropical environments (e.g., Sahiwal, Red Sindhi).

- **Bos taurus (Exotic Cattle):** Adapted to temperate climates (e.g., Holstein Friesian, Jersey).

Characteristics of Bos indicus vs. Bos taurus:

- **Bos indicus:** Narrower body, longer legs, humped, adapted to tropical climates, lower milk yield.
- **Bos taurus:** Wider body, shorter legs, less prominent dewlap, adapted to temperate climates, higher milk yield.

2. Ethiopian Cattle Breeds

Ethiopia has various indigenous breeds, such as:

- **Fogera:** White with black spots, small size, produces around 915 liters of milk per lactation.
- **Barca/Begait:** Variable coat colors, yields about 682 liters per lactation.
- **Arsi-Bale:** Found in the highlands, produces up to 516 liters per lactation.
- **Horro:** Brown coat, medium size, produces up to 543 liters per lactation.

3. Exotic Breeds in Ethiopia

- **Holstein Friesian:** Large, high milk yield (over 6600 liters per lactation), low butterfat content.
- **Jersey:** Smaller, rich in butterfat (5%), good for harsh environments.

Selecting Dairy Cattle

1. Breed Selection Factors

- **Climate:** Choose breeds that adapt well to local weather.
- **Production Goals:** Select breeds based on the type of milk products you want to produce.
- **Feeding System:** Match the breed to your feeding practices.
- **Age of Maturity:** Smaller breeds mature faster and start producing milk earlier.
- **Cost:** Consider the cost of the breed, including transportation and incidental expenses.

2. Selecting Individual Animals

- **Physical Characteristics:** Look for a lean, angular body, well-developed udder, and good overall appearance.

- **Performance Records:** Check records for milk yield, composition, and overall health.
- **Health Status:** Ensure the animal is free from diseases through proper testing.

Feeding Management of Dairy Cattle

1. Types of Feed

- **Roughage:** Includes grazing, hay, and silage. Essential for fiber and bulk.
- **Concentrates:** Supplementary feeds with high energy and protein, needed during high production periods.

2. Feeding Practices

- **Balanced Diet:** Ensure a mix of roughage and concentrates.
- **Dry Matter Intake:** Ensure cows consume enough dry matter for optimal milk production. High producers need more dry matter.
- **Water:** Provide clean, fresh water. A cow needs about 5 liters of water for every liter of milk produced.

3. Monitoring Feed Intake

- **Adequate Feed:** High milk yield, good body condition, and clean feeding areas.
- **Inadequate Feed:** Low milk yield, hungry cows, and unclean feeding areas.

Milk Production and Processing

1. Milk Production

Dairy cattle are bred specifically to produce high-quality milk, which is rich in nutrients such as calcium, iodine, potassium, phosphorus, fats, and vitamins B2 and B12. Milk plays a crucial role in food security, providing essential nutrients and contributing to income for dairy farmers.

There are two main milking systems:

- **Hand Milking:** Done manually, usually in smaller operations.
- **Machine Milking:** Uses machines to extract milk, suitable for larger herds.

Key Considerations in Milking:

- **Milking Frequency:** Cows are typically milked twice or three times a day. Consistent timing is important to maintain milk yield.
- **Milking Interval:** The ideal interval between milking sessions is 12 hours to ensure good milk quantity and quality.
- **Milking Duration:** Using machines, milking should take about 5-6 minutes. Hand milking may take around 7 minutes.
- **Milking Order:** Follow this order to prevent cross-infection:
    1. First calf heifers (without mastitis)
    2. Older cows (without mastitis)
    3. Cows with a history of mastitis (if no symptoms are visible)
    4. Cows with abnormal milk

2. The Lactation Cycle

The lactation cycle is the period between two calvings. A typical cycle lasts around 10 months, with the remaining 2 months being the "dry period" where the cow is not milked to prepare for the next calving. The lactation cycle includes:

- **Early Lactation:** Milk yield increases rapidly.
- **Mid Lactation:** Peak milk yield is reached and maintained.
- **Late Lactation:** Milk yield gradually declines.
- **Dry Period:** The cow rests and prepares for the next calving.

3. Milk Processing

Milk must be processed to ensure its safety and extend its shelf life. Common milk processing methods include:

- **Cooling:** Milk should be cooled to 4°C or below immediately after milking to prevent spoilage.
- **Pasteurization:** Milk is heated to kill harmful bacteria. For example, heating milk to 63-65°C for 20-30 minutes or 72-75°C for 15-30 seconds.
- **Cream Separation:** Fat is separated from milk to produce cream. This can be done using a centrifuge.
- **Fermentation:** Milk is fermented with bacteria to make products like yogurt. The process involves heating milk, adding bacteria, and fermenting at controlled temperatures.
- **Cheese Making:** Milk is coagulated, and the curds are separated from the whey. Cheese can be made from various types of milk and has different forms, such as hard and soft cheeses.
- **Butter:** Made by churning cream to separate butterfat from buttermilk. Butter typically contains 80-85% milk fat.
- **Ghee:** Clarified butter produced by heating butter to evaporate moisture, leaving behind almost pure butterfat.

Summary: Understanding milk production and processing is crucial for dairy management, ensuring both quality and efficiency in milk production. Proper handling and processing extend the shelf life of milk and create a variety of dairy products.

Major Diseases of Dairy Cattle and Their Control Methods

1. Common Diseases and Their Causes

Dairy cattle, like all livestock, are prone to various diseases that can impact their health and productivity. Here's a brief overview of some major diseases and parasites affecting dairy cattle:

- **Foot and Mouth Disease (FMD)**: Highly contagious viral disease affecting cloven-hoofed animals.
- **Blackleg**: A bacterial infection causing sudden death.
- **Anthrax**: Serious bacterial disease often leading to sudden death.
- **Brucellosis**: Bacterial infection affecting reproductive organs.
- **Chronic Respiratory Disease (CRD)**: Caused by viruses and bacteria, leads to respiratory issues.
- **Contagious Bovine Pleuropneumonia (CBPP)**: Bacterial disease causing severe lung inflammation.
- **Internal Parasites**: Liver fluke and schistosomiasis.
- **External Parasites**: Ticks, fleas, and tsetse flies.
- **Nutritional Disorders**: Bloat, diarrhea, acidosis, ketosis, and milk fever.
- **Reproductive Diseases**: Dystocia (difficult calving), retention of placenta, and vaginal prolapses.

2. Symptoms and Transmission

Each disease has specific symptoms and ways of transmission:

- **Chronic Respiratory Disease**: Symptoms include a swollen face, nasal discharge, and difficulty breathing. Spread through contaminated feeds, water, and bedding.
- **Bovine Tuberculosis (TB)**: Symptoms are dry coughs, blood-stained sputum, emaciation, and death. Spread through inhalation of aerosol droplets or contaminated feed.
- **Blackleg**: Symptoms include lameness, depression, loss of appetite, and a hot, painful swelling on a limb. Transmitted via ingestion of bacterial spores while grazing.
- **Mastitis**: Symptoms are uneasiness during milking, blood in milk, and a swollen, painful udder. Transmitted through contaminated feed, water, or injuries.
- **Trypanosomiasis**: Symptoms include drowsiness, severe anemia, weight loss, and death. Transmitted by tsetse flies.

3. Prevention and Control Methods

Effective control and prevention of these diseases involve:

- **Vaccination**: Important for diseases like FMD, Blackleg, and Bovine TB.
- **Good Sanitation**: Regular cleaning of housing, equipment, and milking facilities.
- **Proper Nutrition**: Ensuring cattle receive balanced and adequate feed to prevent nutritional disorders.
- **Hygienic Practices**: Disinfection of hands and equipment before milking to prevent mastitis.
- **Pest Control**: Use of insecticides to manage external parasites like tsetse flies.
- **Good Ventilation**: Proper airflow to prevent respiratory diseases.

4. Summary Table of Diseases

Here's a summary table to help with quick reference:

Disease	Symptoms	Transmission	Prevention and Control
Chronic Respiratory Disease	Swollen face, nasal discharge, breathing issues	Contaminated feeds, water, bedding	Vaccination, good sanitation, ventilation
Bovine Tuberculosis (TB)	Dry coughs, blood-stained sputum, emaciation	Aerosol droplets, contaminated feed	Vaccination
Blackleg	Lameness, depression, limb swelling	Ingestion of bacterial spores	Vaccination
Mastitis	Swollen udder, traces of blood in milk	Contaminated feed/water, injury	Good sanitation, disinfection, antibiotics
Trypanosomiasis	Drowsiness, anemia, weight loss	Tsetse fly bites	Insecticides, good sanitation

By following these guidelines, you can help keep dairy cattle healthy and productive, leading to better economic returns and overall farm success.