



**SWAZILAND DAIRY BORD**  
*(Established in terms of the Dairy Act 28/1968)*  
**OPERATING AS SWAZILAND DAIRY DEVELOPMENT BOARD  
TO PROVIDE DEVELOPMENTAL AND REGULATORY SERVICES  
TO THE DAIRY INDUSTRY**



## **DAIRY CATTLE BREEDING**

### **ARTIFICIAL INSEMINATION, HEAT DETECTION AND HEAT SYNCHRONISATION IN DAIRY CATTLE**



## **1. What is Breeding?**

It is the science of multiplying dairy cattle to meet laid down objectives.

### **1.1 Objectives**

- To increase milk production
- To breed better functional characteristics

## **2. Functional Characteristics**

- Milk yield
- Good feet
- Good udder
- Good teats
- Dairyness
- Body capacity

## **3. Methods of Breeding**

- (a) In-Breeding - Mating of closely related animals
- (b) Line Breeding- Breeding of descendants of certain renowned ancestors
- (c) Out Crossing - Mating of animals of the breeds but not related.
- (d) Cross Breeding- Mating of animals of different breeds but same species

## **4. Dairy Cattle Selection through Culling and Purchasing**

### **4.1 Selection**

- Cull animals with undesirable characteristics.
- Keep animals with good characteristics.
- Select animals with high milk production and longevity.

### **4.2 Dairy Cattle Purchasing**

Use selection guide lines. The guide lines are as follows:

#### **4.2.1 Economic Factors**

Choose a breed that produce high quantity and high quality at lowest possible cost e.g. jersey.

#### **4.2.2 Climatic Conditions**

Choose a breed which suite the climatic condition e.g. Friesians for a cool place and Jerseys for hot and cool areas.

#### **4.2.3 Feeding System**

- Jerseys are better grazes than Holstein/Friesians. Jersey are suitable for extensive dairy farming.
- Holstein/Friesians are good under zero grazing system.

#### **4.2.4 Marketing Requirements**

- Know the requirements of your customers.
- Some markets require milk with high butter fat some need milk with low butter fat.
- Some are concerned with high milk volume

### **5. Which Breed to Choose?**

This is determined by:

- (a) Market demand
- (b) Advantages of the breed
- (c) Disadvantages of the breed

#### **5.1 Holstein/Friesian**

Advantages

- High milk volumes
- Huge frame to produce meat when culled
- High legs for easy milking

Disadvantages

- Milk with low butter fat
- Have calving problems
- Cannot walk long distances
- Consume a lot of feed
- Not hardy

## **5.2 Jerseys**

- Eat less than other breeds
- Have good udders
- Less calving problems
- Produce milk with high butter fat and proteins
- Less affected by high temperatures
- Good grazers

### Disadvantages

- Produce less milk than Holstein/Friesian.
- Unsuitable for meat production

## **6. Other Dairy Breeds**

Guerneys

Ayrshires

Brown Swiss or Dairy Swiss

Dairy Simmental

## **7. What to Choose Between a Cow and a Heifer**

You can choose any of the two but consider the following

- Buy from a breeder with good reputation
- Seek assistance from extension Officers
- Check records of animals eg milk production, butter fat health etc
- Buy animals which are healthy – free from TB, CA, FMD etc

### **7.1 Heifers**

#### Advantages

- Adapt easy to new environment
- Experience less stress when transported
- Not infected with mastitis
- Will milk longer than cows
- Usually cheaper than cows

#### Disadvantages

- Produce less milk in first lactation
- Production potential not proven

## 7.2 Cows

### Advantages

- Produce more milk once they adapt to new environment
- Income is immediate

### Disadvantages:

- Farmer will not sell his best cows
- The cow may be infected with mastitis or other clinical diseases.
- Collapsed udder or some quarters may not be functioning
- One or more teats might not be functioning or damaged
- Might have conception problem or calving difficulties.

## 8. How are Dairy Cattle Selected

This is based on certain criteria. If not familiar with the criteria seek assistance from a veterinarian or Extension Officer.

- Milk production - Select cows with high volume of milk and good quality  
Use production records
- Hooves and legs - In some farms, cows walk long distances for grazing. The soil may be hard and rocky. This might cause the hooves to crack and cause foot rot
- Observe closely how cows walk
- Closely observe hooves and legs
- Udder -       The udder is a milk factory
  - Buy cows with good udders
  - Good udder is soft, slightly warm, and without lumps.
  - Good udder should not hang below cow's hock
  - All four quarters should be symmetrical and functional
- Teats -       Should not be injured
  - Should be centrally placed on each of the four quarters
  - Should not be too wild apart
  - Should not have long teats

## 9. Body Capacity

Cows should have deep and long well sprung ribs. Good food digestive ability and they turn to produce a lot of milk.

Selection also considers the ideal structure of a dairy herd or herd composition. This will also help prevent dry periods of milk at some stage of the year. A good structure consists of the majority of cows under lactation/milking.

## 10. Herd Composition

Lactating cows	85
Dry cows	15
Heifers	89

## 11. Insemination Practices

There are two practices of dairy cattle multiplication

1. Natural Breeding
2. Artificial Insemination

Natural Breeding

- The use of a bull
- It is most efficient in small herds
- In big herds it is not efficient

### 11.1 Advantages of Natural Breeding/Insemination

- Conception is most successful
- No need for heat spotting

Disadvantages

- Not efficient in large herds
- Spread of diseases
- High chances of dystocia
- May promote in-breeding
- Corrective breeding cannot be practiced



## 12. Artificial Insemination

### 12.1 Definition

- It is the mechanical placement of the bull semen into the uterus of a cow on heat. Bull semen of high quality is collected, processed and exported anywhere in the world. The semen is stored in liquid nitrogen. The semen can be used long after the bull has died.
- Can breed a big number of females using one bull.
- In natural breeding a bull is limited to no more than 40 females per breeding season.

**THANK YOU!!!!!!!**



### 12.2 Advantages of Artificial Insemination

- Use of proven superior to a large number of females
- Use of a high quality bull that you would never be able to purchase
- Less expensive than keeping a bull especially in a small herd

- Offsprings are usually more productive and profitable
- Disease control is taken care of e.g. Brucellosis, Epivaginitis, Vbriosis, Trichomoniasis etc
- Better record keeping



### **12.3 Disadvantages of Artificial Insemination**

- Labour intensive
- Shortages of A.I. Technicians
- Possibility of inbreeding – if records are not used
- High standard of hygiene.



### **13. Heat Detection in Dairy Cattle**

- It is an important tool for a successful breeding programme.
- The best time to do heat sporting is at Dawn and at Dusk.
- Ideal heat period last for 12 to 20 hours
- Cows seen on heat in the morning are inseminated in the afternoon and those seen the afternoon are inseminated the following morning.

#### **13.1 Signs of Heat**

They are divided into three stages

- Pre-heat (before Heat) 1-2 days
- Standing Heat (+18 hrs)  
Met- Estrous (after heat)

##### **13.1.1 Pre – Heat (Before Heat)**

- Signs of restlessness
- Head butting
- Urinate regularly
- Bellowing
- Smell other cows
- Separate from the herd
- Vulva swells up – mucus membrane becomes more pink or red
- Alert tears
- Attempt to mount other cows
- Licking other cows
- Reduced feed intake
- Too early to breed
- Expected conception rate is between 40% and 55%



An Angus Cow Bellowing

### 13.1.2 Standing Heat (Estrous)

- Stand to be mounted by other cows
- Bulling string
- Glancing over her shoulders
- Vulva lips swollen and pink or red
- Reduced appetite
- Stand in groups
- Twitching of vulva muscles
- Hair on tail head stand ruffled
- Wet or dry saliva on back and neck
- Reduced milk production

This is the best time to breed

Expected conception rate is between 65% and 78%



A Friesian Cow on Standing Heat

### 13.1.3 After Heat (Met – Estrous)

- Animal will not stand to be mounted
- Cows and bulls may still be following her
- Hungry and eager to eat
- Cloudy bulling string
- Hair on tail head, saliva and soiled hoof marks indicate that she has been mounted
- Chafe marks on pin bones and tail heads
- Bloody bulling string (1-2 days after)

Late to breed

Expected conception rate is between 55% and 10%

## 14. Synchronisation of Estrous

This is the application of hormonal treatment to a small or large number of female animals (cows and heifers) with a view of changing the oestrous cycles so that they all come into oestrous more or less simultaneously. This is done to minimise the task of constant observation for oestrous and to reduce the insemination and partition activities to a very short period.

The physiological basis on which this method of breeding depends is the fact that the administration of progesterone to normally cycling females will inhibit the growth and maturation of graafian follicles and so suppress oestrous for as long as the influence of this hormone is maintained in the body.

#### **14.1 Advantages of Synchronisation**

- It eliminates the necessity of keeping the females to be inseminated under observation for long periods in order to detect those showing heat signs.
- All the new born calves can be subjected simultaneously to the various treatment and operations like immunisation against diseases, dehorning, ear marking, castration and weaning.
- Record keeping is also greatly facilitated.
- The ability to market a lot of young animals of the same age will ensure higher prices than are obtained for groups of varying ages and sizes
- Infertile and poor breeders are exposed and can be culled

#### **14.2 Disadvantages**

- High nutritional level for the animals to be used, and the females must be normal breeders showing regular oestrous cycles.
- Environmental factors like seasons, climate and management can profoundly influence results.
- Some farmers may find that the birth of a large number of young calves within a week or two is more than the labour and other facilities available for their proper care.

### **15. Factors that Favour a High Conception Rate**

These are

- a. The cow
- b. The owner
- c. The inseminator

#### **15.1 The Cow Must**

- Be free from diseases and anatomical abnormalities especially of the genital organs
- Be on heat and on later end of oestrus
- Be well fed and good feeding and management
- Be kept calm preferably with other cows

- Be kept a t least 15 minutes after insemination in order to give the sperm a fair chance in their trek into the fallopian tube.

### **15.2 The Owner Must**

- Be a person who displays a keen and intelligent interest in his animals or a herdman with these qualities in charge of the breeding animals.
- Keep proper records reflecting
  - (i) birth
  - (ii) Oestrus
  - (iii) Inseminations
  - (iv) Last calving as well as illness, injections or treatments
- Arrange for periodic veterinary examination of his herd in order to eliminate sterile animals, detect pregnancy at an early sage in those that were recently inseminated and apply treatment where necessary.
- Ensure good management and hygienic conditions in the stable and camps
- Provide well balanced ration
- Do not allow any natural service in his herd
- Ensure the farm and camps are well fenced to prevent stray bulls to get to the cows or heifers.
- Keep good observation over the animals to be bred in order to detect those that come into oeastrus
- Notify the inseminator immediately of animas that show signs of oestrus.
- Ensure that all animals are easily identifiable

### **15.3 The Inseminator Must**

- Be properly trained and competent
- Make sure that the semen is fertile store and transported in a correct manner
- Prevent semen against shock and contamination
- Make sure that the insemination kit is clean and sterile
- Satisfy himself that the cow is on heat.
- Exercise patience and tolerance especially when the cow is nervous or excited
- Take his time and not try to create records for rapid insemination
- Ensure that the semen is deposited at the proper place in the genital canal.
- Avoid unnecessary or rough manipulation of the genital organs when inseminating
- Inform owner of any abnormality that he may detect in the genital organs
- Keep proper records of insemination done and the semen used.
- Do not act as a mechanical inseminator, but display a lively interest in the welfare of the herd
- Bring to the notice of the owner any environmental or managerial defects which may have an adverse influence on his results.