Agricultural Innovation Program (AIP) for Pakistan

AIP-Livestock Fact Sheet no: 04

DAIRY EXTENSION MATERIAL

OESTRUS CYCLE AND HEAT DETECTION

Introduction

As a result of Artificial Insemination and selection of bulls and cows during the past four decades, Pakistan dairy farmers have achieved significant increases in milk production. However, compared to some countries where the *average* production is 6000-8000 kg per cow per year, the Pakistan average milk production is much lower. A key factor in improving milk production (**after improved feeding**) is **timely reproduction**. Each oestrus which has not been identified **beyond 90 days** after the last calving causes economic losses:

- **in production of milk**
- **additional feed**
- **cost for labour**
- **loss of animals for replacement**

The heat cycle

What is heat? Heat is a period of acceptance for mating that normally occurs in pubescent heifers and non-pregnant cows. The period of receptivity may last from 6 to 30 hours and occurs on an average every 21 days (18-24 days).

Phase 1. Pro-heat – before the oestrus

This phase lasts one or two days, and its characteristics are development and growth of follicles on ovaries, producing small quantities of hormones. Concentration of hormones will determine behaviour of animals: cow is restless, it moos, and there is a clear, transparent excretion of oestrus mucus from the vulva.

Phase 2. Heat peak or oestrus

With maturing of so-called 'dominant' follicle on ovaries, relatively high quantities of oestrogen are being produced by cells from follicle walls. The cow stands still and allows other animals to mount her; there is more mucus which is clear and transparent.

Phase 3. After-heat and ovulation

Ovulation is bursting of follicles and release of ovum. Release of ovum from follicles occurs approximately 24-30 hours after oestrus. **Cows or heifers should be inseminated 12-30 hours after the beginning of oestrus**.

Identifying oestrus

Identifying oestrus, especially in larger breeding stock, is not a simple job, and it is one of the main obstacles for achieving inter-calving interval of 12 months. Facilities with cows that are to be inseminated should be visited many times, and there are also some cows that do not show obvious external symptoms of heat (so-called «silent oestrus»).

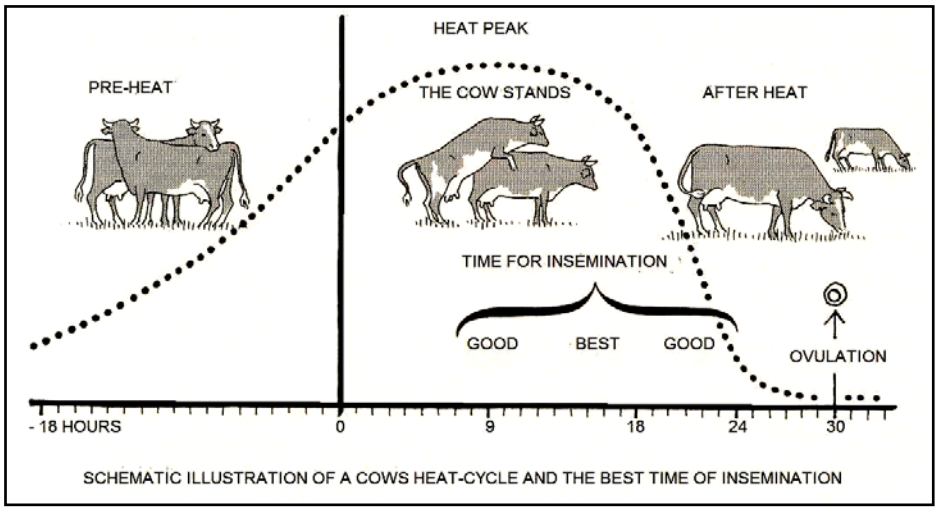
Every missed oestrus means an economic loss, because it is directly related to long service period (period from calving until the next diagnosed pregnancy), that is, to inter-calving period. Definitely, each oestrus which had not been identified, and it has been more than 100 days from the last calving, would cause economic losses in production of milk, additional feed, cost for workers, loss of animals for replacement, etc.

There could be some mucus even after oestrus. In most of the cases, this mucus contains more or less blood.

Cow in oestrus is characterized with the so-called **standing reflex**. It allows other animals to mount it, and in the process, pressure in sacral area affects group of nerves (in spinal cord) which innervate also reproduction system and transmit sensitive stimuli. In that way, typical coital behaviour of cow can be detected.

This factsheet is made possible by the support of the American people through the United States Agency for International Development (USAID). The contents are sole responsibility of the International Maize and Wheat Improvement Centre (CIMMYT) and its partners, do not necessarily reflect the views of USAID or the United States Government.

Heat Signs and Heat Detection



SCHEMATIC ILLUSTRATION OF A COWS HEAT-CYCLE AND THE BEST TIME OF INSEMINATION

Signs of Heat

Detection of heat needs careful observation. Cows have a pattern of behaviour that changes gradually from the start to the end of heat.

Onset of heat activity follows a distinct pattern, with most activity happening in the **late evening**, through the **night**, and late into the **early hours of the morning**. As such, in order to detect heat cows should be observed carefully in the earlier hours of the morning, and late hours in the evening.

Characteristic signs of heat (cattle) are:

- **Standing to be mounted by other cattle**
- **Cow may attempt to mount on others**
- Vulva – reddened, swollen and moist
- **Watery mucous hanging from the vulva & adhering to the tail & legs.**
- **Restless**
- **Bellowing**
- **Frequent urination**
- **'Raised tail' is the best sign "for Heifers"**
- **Drop in milk production - milking Animals**
- **Loss of appetite**

Characteristic signs of heat in buffaloes			
	Early heat	Mid-heat	Late Heat
	8 hrs	*12-18 hrs*	*18-24 hrs*
Urination frequency	*Least*	*More*	*Less*
Bellowing	*sometimes*	*Very common*	*No*
Excitement	*More*	*less*	*Normal*
Mounting by teaser	*less*	*more*	*Least*
Appetite	*Normal*	*Less*	*Normal*
Milk yield	*Normal*	*Less*	*Normal*
Cervix open	*Partial*	*Full*	*Closed*

Remember!!! …. **In Buffaloes**
Much of noticeable signs of heat are shown clearly during mid-heat, so the chance of missing is also HIGH

Time for service or insemination

Artificial insemination (AI) or natural service can lead to pregnancy only if the spermatozoa are at the right place at the right time. The egg is released from the ovary about 10 to 14 hours after the end of heat, and can survive unfertilized for 6-12 hours. While the spermatozoa can live up to 24 hours in the reproductive tract of the cow.

Best timing of AI

Morning-Evening Rule*:*

- cows observed in heat in the morning are inseminated in the afternoon
- cows observed in heat in the afternoon are inseminated the next morning

Causes of low conception rates

- **Problems related to heat detection** (not servicing, improper timing)
- **Problems related to AI or natural service** (improper AI technique, a bull with low fertility)
- **Cow factors** (infections of reproductive duct, hormonal disorders, early embryonic death)
- **Problems related to nutrition** (poor nutrition or over feeding resulting in obesity.

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