



FOCUS ON DAIRY



A Guide to Successful AI

Artificial insemination (AI) provides the only means to obtain maximum genetic gain and to minimize reproductive disease. In addition, AI provides an economic alternative to natural service without the inherent dangers of maintaining breeding bulls.

However, AI requires a commitment to a highly skilled technique and the necessary management skills to obtain optimal success. Success in the breeding program is measured by calving interval which is mostly a function of days to first service.

All herds have open cows at any given time; however, cows not pregnant by 85 days after calving can constitute a real economic hardship even though average calving interval is ideal.

FOUR STEPS TO SUCCESS

A successful AI program demands:

1. Heat detection
2. Quality semen
3. Proper handling of semen
4. Correct placement of semen

HEAT DETECTION

Expertise in heat detection starts with cow identification and an adequate recordkeeping system. Records start with an estimated DUE date and calving date. Each heat date after calving should be recorded even if too early to breed--heat-not-bred (HNB).

A 21-day repro-calendar serves as an excellent system to record repro-events since a part of heat detection is "looking ahead" to anticipate the next heat period.

Since pregnancy rates to first service should be 50-60 percent, anticipating "repeats" increases the accuracy of heat detection by looking for subtle signs of heat such as:

1. Off feed
2. Sharp drop in milk flow
3. Changes in behavior--restlessness
4. Increased flow of clear mucus

Heat detection aids have been used with varying degrees of success. "Teaser" cows and bulls provide increased sexual activity that increases the probability of finding a cow in heat. However, such "gomer" animals also increase the chance of injury especially in confined, slippery lots and holding pens.

Rump patches and tail-head painting may be of benefit when interpreted properly. The biggest value of these devices may be that they call attention to the fact that the cows should be observed more closely for heat. While heat detection aids have a place in an AI program, the final decision to breed the cow still requires judgement.



Figure 1. Heat detection is the main management problem in the AI program. A heat expectancy chart will increase the number of animals detected in heat along with recognizing the subtle signs of heat.

QUALITY SEMEN

An AI program requires commitment, time and money. The basis of a successful program starts with a quality product from a reliable AI organization. While studies have shown that good quality semen does not deteriorate over time when stored properly, there is little need to store a majority of the semen for more than 6-7 months because sire summaries are published twice yearly.

Each new sire summary produces even better bulls that should become a part of the breeding program. Whenever the quality of semen is in doubt, a sample should be examined by the producing AI organization in order that it may be compared with the original quality evaluation.

SEMEN HANDLING

Once semen is delivered to the nitrogen refrigerator, it should be maintained at a constant -320°F. The nitrogen level in the tank should be monitored closely. If the nitrogen dissipates, then the semen is destroyed. NEVER refreeze semen.

Care should be exercised when removing an individual straw from the goblet. Using tweezers, keep the goblet at least two inches below the top of the neck for no longer than 10 seconds so that the remaining straws are not subjected to temperature fluctuations.

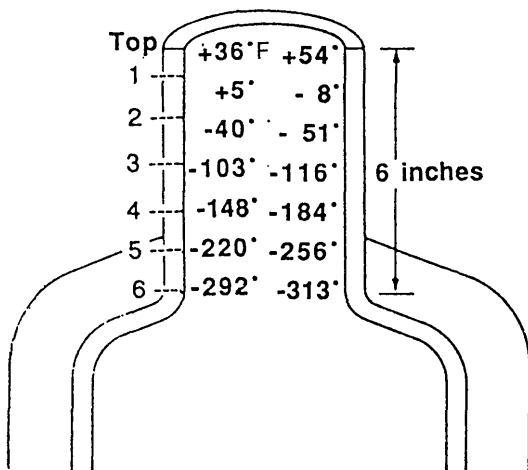


Figure 2. The drawing illustrates the temperature variation in the neck of the nitrogen refrigerator. Keep goblet at least two inches from the top when selecting straw.

Keep inventory current and bulls identified in the respective compartments to minimize the time required to remove a specific straw.

The universal thaw temperature for straws is 95°F for a minimum of 40 seconds and no longer than 15 minutes. Some organizations recommend different thaw procedures so it is best to ask for specific thaw recommendations when purchasing semen.

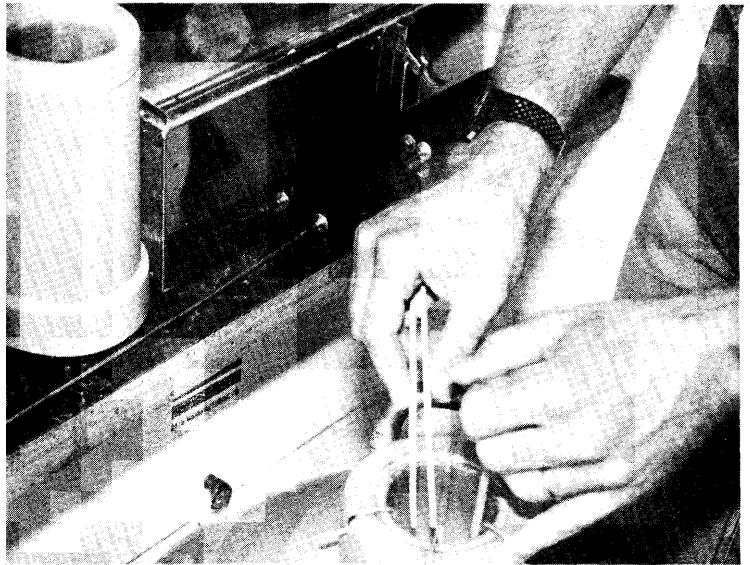


FIGURE 3. Tweezers should be used to remove straw from the goblet which should be kept at least two inches below the top of the tank.

Both thermos-type bottles and electrified thaw units (CITO) are adequate. However, thaw temperature should be monitored closely, especially when a number of units are being thawed.

Once thawed, the straw should be wiped DRY, clipped and inserted into a pre-warmed French gun. Avoid any exposure to direct sunlight during the thaw procedure. Place the French gun under clothing to protect from cold shock and inseminate the cow as quickly as possible. Do not thaw more straws than you can use in 5 minutes.

CORRECT PLACEMENT

All other factors being controlled, semen placement is the primary source of variation among AI technicians. The body of the uterus--an area one-half inch to 1 inch beyond the cervix--is the proper site for semen placement.

There is a strong tendency among low conception rate technicians to deposit semen too far forward in one horn or the other (Table 1).



FIGURE 4. Strict sanitation procedures and correct semen placement are necessary to obtain satisfactory results with AI.

3. Load pre-warmed French gun.
4. Protect semen in French gun from cold shock.
5. Using plastic sleeve, clean out rectum, if necessary, and grasp cervix.
6. Wipe vulva clean.
7. Part vulva and insert French gun.
8. Pass catheter through cervix.
9. Identify tip barely through the last ring with index finger.
10. Remove finger and deposit semen s-l-o-w-l-y (5 seconds). (Avoid movement of catheter when depressing plunger).
11. Remove catheter and massage cervix.
12. Complete breeding records.

TIMING OF AI

The traditional method of inseminating cattle has been by the AM-PM:PM-AM rule. Cows detected in heat this AM are bred later in the afternoon and cows noticed in the afternoon are bred tomorrow morning.

Whereas some recent research indicates no differences in relation to breeding compared to first detected heat, the AM/PM rule fits most management situations since heat detection should be at least twice daily.

The endpoint of AI is conception. Once semen is deposited, then the process of fertilization is cow-dependent. While cows ovulate on the average 12 hours or so after the end of heat, rarely is it known exactly when the cow comes into or goes out of heat.

Sperm cells are able to fertilize the egg within a few hours after being deposited.

SANITATION

Sperm cells are living organisms and are sensitive to foreign material, including water and lubricants. Disposable plastics--gloves and catheters--should never be re-used. Dry the straw completely before clipping and avoid contamination of the catheter as it is passed through the vulva.

Disposable protective sheaths are recommended whenever there is a repeat breeder problem associated with vulvitis or vaginitis.

Step-wise procedure for insemination:

1. Identify cow in heat.
2. Identify sire and thaw semen 95°F for 40 seconds.

Table 1. Site of semen placement by professional AI technicians ranked above or below AI stud average first service conception rate.

Site of semen placement	Technicians' Ability	
	Below Average (%)	Above Average (%)
Vagina-cervix	23.5	0
Body of uterus	29.7	85.7
Right horn	42.4	14.3
Left horn	4.4	0

Adapted from E.F. Graham, 1966. 1st Technical Conference. N. A. A. B., Milwaukee, WI.

However, length of sperm viability in the oviducts is unknown, but generally no longer than 12 hr.

4. DHIA 212--Management Guidelines (cow and heifers to breed, dry-off, challenge feed, pregnancy check).
5. Flexible Management Reports (FMR)
6. EBS-MORE; UDR Reports

RECORDS

Breeding records may be simple or complex. The important point is that they are adequate and usable. A minimal record system will include:

1. Cow ID--birth date
2. Calving date
3. Calving problems and treatments
4. Heats-not-bred
5. Service date
6. Pregnancy check
7. Due date
8. 21-day Repro-calendar

The following forms are available to help with the record program:

1. Repro-cards (5" x 8")
2. DHIA 211 --21-day calendar
3. Breeding date calendar

PREVENTIVE HERD HEALTH PROGRAM (PHHP)

The basis of a healthy herd for production or reproduction is a preventive program to minimize the effect of disease.

Each herd should establish a PHHP that will provide a high level immunity against known diseases.

Since many reproductive problems are unseen, periodic visits by a competent veterinarian will minimize the losses due to cystic ovaries, cows not yet bred, cows open at pregnancy exam, uterine infections and anatomical abnormalities.

The economic benefits of a PHHP are most easily seen in the reproductive area.

REPRODUCTIVE SUMMARY																	
Group	Replace-ment Females	Producing Females			Number of Animals Open			Average Days Open	Number of Animals Bred			Age / Days to First Bred			Days Minimum Freshening Interval		
		Number	Avg Days Since Fresh	< 60 Days	60 - 120 Days	> 120 Days	Once		Twice	3 + Times	< 18 Days	18 - 24 Days	> 24 Days				
Pregnant	9	73	275	12	32	10	96	9	46	20	7	1-04	74	1	10	11	376
Possibly Pregnant	5	47	141	7	26	12	98	4	1	1	4	1-07	78	1	2	13	378
Open	64	31	46	24	4	2	46	Total Animals: 134			Average Services Per Conception			Replacements	Producing Females	Total	
								Total Services: 195						1.1	1.5	1.5	

21-Day Reproduction Record					DHIA 211 1
AUGUST 199	AUGUST 199	SEPTEMBER 199	OCTOBER 199	OCTOBER 199	
7	28	18	9	30	

FIGURE 5. Records are an essential part of the AI program. Illustrated are some of the records available through the Dairy Herd Improvement (DHIA) program.

Edward P. Call
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