

MAXIMIZE

Your Artificial Insemination Results

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Artificial insemination (AI) has been used as a production tool in the cattle industry since the 1950's as a powerful means of disseminating the genetics of select sires that have superior traits of economic importance.

Some of the traits that are of the most importance to cattle farmers (beef and dairy) are fertility, high carcass yield, maternal traits such as motherability and high milk yield (including percentage fat and protein), calving ease (low birth weights), fast growth rate, feed efficiency, correct body conformation, good temperament and environmental adaptability.

In elk, AI has been increasing in popularity since the development of reliable cervical techniques in New Zealand in 1988 (Wenkoff and Bringans). Until recently, frozen semen was used mainly as a means of introducing different strains of elk to new areas; for example, Manitoban bloodlines were introduced to New Zealand, Australia, U.S. and Alberta by way of frozen semen. Since then, the main reason for breeding cows with frozen semen is that bulls with superior antler traits can be used.

AI AS A PRODUCTION TOOL

As with any other species, the main criteria for an AI sire are:

- Must have superior traits of economic importance.
- Must have the ability to pass these traits on to progeny (male and/or female depending on the traits, or male through female).
- Must be able to produce adequate quantities of quality freezable semen (ie: must be fertile).
- Must not have any serious negative traits or genetic disorders that can be passed on.

The process of selection must include placement of equal or more emphasis on culling bad or inferior traits as it does on the selection of superior traits. The genetic pressure applied to positive traits by use of AI will be equal for



Dr. Wenkoff demonstrating cow in proper positioning for AI breeding.

negative traits if these are not culled. In nature, a male with a genetic defect that limits or prevents breeding will have few or no progeny. However, the use of AI can pass these same negative traits, depending on the degree of heritability, to hundreds or even thousands of offspring.

Nature provided elk with antlers as a defense against predators but more importantly as a means of establishing and maintaining harems by the healthiest and strongest males which would end up breeding most of the females, thereby producing fertile, adaptable and strong progeny to ensure survival of the species.

1. FEMALE SELECTION

A. Genetic Selection: The cow, of course, contributes 50% of the genes to the calf and in many cases more than 50% of the phenotypic expression (expression of a trait), depending on dominance and sex-linked traits. It

is important to select cows that have proven progeny on the ground or at least to select cows that come from sires or lines that have superior traits that are consistently passed on. Equally important is to exclude cows from the program that are known to produce poor progeny. A good bull can only do so much to help a bad cow and conversely, the genetics of a good cow should not be ignored and all the credit given to the bull.

B. Management Selection

Do not use cows that:

- Did not calve in the previous year
- Had a calving problem or dead-born calf
- Lost a calf and are overly-fat from not nursing a calf
- For whatever reason are in poor body condition (too thin)
- Were damaged or torn at calving (torn vulva, dribbling urine, etc.)
- Calved too late – if the post partum interval is too short (less than 60 days), fertility will be reduced. Cut-off date should be July 15th for September AI. First calf heifers are OK to use provided that they are in good body condition at AI time, which means they were fed supplements in addition to pasture during the nursing period. There is no point in trying to get a decent pregnancy rate in thin, first-calf heifers. However, you can get very good pregnancy rates in first-calvers that are in good condition.

C. Heifers (yearlings) can be used in AI programs:

- Heifers should be at least 465 lb. body weight at the time of AI. Remember that the onset of puberty is a function of body weight. If heifers are too light, they will not be cycling. Synchronizing drugs will not help pre-pubertal heifers to cycle. You will have no way of knowing that the heifers are not cycling at time of AI because the synchronizing drugs can produce certain signs that mimic estrus.
- If heifers are too small, it may not be possible to enter the rectum to do AI.
- If heifers are too fat, it is very difficult or even impossible to do the AI, even if the heifer is of good size.
- Know what your conception rate in heifers is on your farm for natural service. If the rates for natural service are low, expect AI rates to also be low.

2. SEMEN

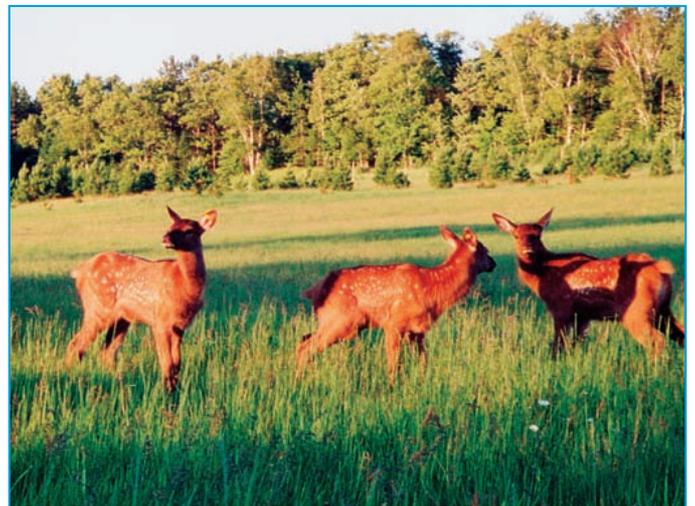
Semen that is not properly collected, handled, processed, frozen, stored and shipped is not likely to produce high pregnancy rates. If more than 50% of the pre-freeze live sperm cells are killed by the freezing process, or if more than one out of five sperm cells has a serious defect, fertilization rates cannot be increased by “packing” the straws with larger numbers of sperm cells. Although the final count of “live” sperm cells may be within the acceptable range of an “insemination dose”, fertility is still likely to be depressed. Make sure that elk semen is collected and processed by experienced operators. Frozen semen should be handled by experienced persons as well. Straws should be sorted, identified, etc. only when totally submerged in nitrogen. There are many cases where good semen is seriously damaged during handling, shipping and by inadequate tank maintenance.

A. Genetic Selection

The bull must, of course, have superior genetic traits and must have shown the ability to pass these traits on or at least have a solid genetic history of propagation of these traits. With elk, we are mainly concerned with antler traits; pounds of velvet produced or B&C score. It has been said that it may be possible to “force” these traits to or even beyond maximum genetic potential with force-feeding, drugs, hormones, etc. However, the “forced maximums” are not passed on and/or will not be expressed under normal farm practice. Bulls with superior production under “natural” conditions are the best choice.

B. Quality Selection

Each unit that freezes semen is responsible for their own quality control to ensure high quality, fertile semen. Motility



Calves, resulting from AI usage, enjoying a summer day.



A group of cows that have been AI'd.

of frozen-thawed sperm cells does NOT equal fertility; just because a sample of semen has good motility does not necessarily mean the fertility is good.

As a buyer of semen, you will not know what quality-control standards, if any, were practiced by the unit drawing the bull.

You should, however, be aware of what semen-freezing quality control is. I will therefore give a brief explanation of the quality control areas monitored in my particular freezing unit Livestock Reproductive Technologies Inc.:

Collection – collect only pure semen; avoid urine, seminal fluid, gel, water, dirt.

Glassware – when cleaning glassware, avoid chemical contamination by using de-ionized distilled water only and avoid biological contamination by sterilizing glassware in an autoclave.

Extender – filter properly and adjust pH. Avoid egg white and use fresh eggs.

Cooling rate – monitor with a thermometer. Too fast or too slow can damage fertility.

Glycerol equilibration time – if there is too much time between collection and freezing, the fertility of the semen can be low but the motility post-freeze will not be affected. To avoid this, we freeze on-farm in a mobile laboratory.

Freezing rate – the freeze curve for elk is different from that for cattle and is monitored with a thermocouple.

3. PROGRAM MANAGEMENT

A. Female Care: Cows should be supplemental fed starting about 3-4 weeks before the AI date. Calves should be given “creep” feed to further help the cow attain a “positive energy” state. Cows could be

dewormed at about this time. Calves should be weaned on the day the CIDRs are put in. The most important nutritional factor that affects reproduction is energy. Female nutritional management for reproduction therefore revolves around energy supplement. Protein, calcium, phosphorus ratio, vitamins, trace minerals and elements are important too, but usually do not cause low fertility (like low energy levels can) before other clinical signs of imbalance or shortage are obvious.

B. Facilities: Facilities should be designed so that cows can be put through the system with the least amount of stress and excitement. The AI can be done in a crush or a calving box. What works best on a farm depends on the handler and the behavior and temperament of the cows. Avoid systems where cows can crawl ahead, back out or go down. There should be some sort of draft-free (and/or heated) room or place near the squeeze where semen can be thawed without danger of cold-shock.

C. Synchronization: Synchronization is best done by an experienced operator. Strict hygiene during CIDR application and withdrawal is necessary. Latex gloves must be changed between cows and the CIDR gun properly disinfected after each cow. Wash CIDR gun with Vikkon and rinse with distilled water. To lubricate the CIDR gun, use chlorhexadine cream or lubricant. The dose of PMSG must be exact as is the timing of CIDR removal (60-65 hours prior to the arrival of the AI technician).

A properly executed AI program can be your most important production tool.

4. EXPECTATIONS

Pregnancy rates vary from 35% to 100% using the same semen. With proper management, it should not be difficult to average 72%.

The best way to identify AI calves is to use DNA testing. However, most calves are born from 240 to 255 days after the AI date with the odd one being as far out as 260 days. Any calf born around 260 days post-AI is not too likely to be an AI calf as that would coincide with the “clean-up” cycle.

BOTTOM LINE:

Pay attention to management and nutrition, be clean during CIDR insertion/removal, use semen from a reputable firm, and make the best effort to handle the semen properly and to inseminate it correctly and at the right time.