What do breeding soundness classifications really mean? *A Barth*

Three Cardinal Principles of Breeding Soundness

1. Sex Drive
2. Physical soundness
3. Semen quality

WCABP **BREEDING SOUNDNESS EVALUATION** 247820

Owner _____ ☐ Ear Tag ☐ Tattoo ☐ Brand_____

Address _____ CFIA Tag _____ Breed _____

_____ Postal Code _____ Bull's Name _____

Phone (_____) _____ Birth Date (Y/M/D) _____ Age_____

HISTORY:

I **Sex Drive and Mating Ability** ☐ Unknown ☐ Recent Observations

Comments: (In most cases, the onus is on the producer to evaluate this important aspect of bull fertility.)

II **Physical Soundness** (Items checked off are normal unless otherwise indicated.)

Body Condition Score (1, 2, 3, 4, 5): _____ (A score of 1 is very thin, a score of 5 is very fat)

☐ Eyes ☐ Feet ☐ Legs ☐ Accessory Sex Glands ☐ Inguinal Rings ☐ Penis ☐ Prepuce

☐ Scrotum ☐ Scrotal Shape ☐ Testicles ☐ Epididymides

Comments:

Scrotal Circumference _____ cm

☐ Above Average ☐ Average ± 1 cm ☐ Below Average ☐ Below Minimum

Comments:

III **Semen Quality**

Collection Method: ☐ Massage ☐ EE ☐ AV

Response: ☐ Protrusion ☐ No Protrusion

Ejaculate #1 Ejaculate #2

Volume _____

Density _____

Gross Motility _____

Individual Motility (%) _____

Staining Alive (%) _____

Comments:

(%) Sperm Abnormalities

_____ Head_____

_____ Midpiece _____

_____ Principal Piece _____

_____ Detached Heads (normal/abnormal) _____

_____ Proximal Droplets _____

_____ Acrosome_____

_____ _____

_____ Normal_____

CLASSIFICATION: The results of this bull evaluation should in no way be used as a legal document certifying or condemning fertility. Rather, it is an evaluation guide to utilize the knowledge we currently have to discourage use of potentially inefficient sires. To the best of my knowledge, the results of this evaluation indicate that the potential breeding capacity of this bull is:

☐ **Satisfactory** (Satisfactory is not a guarantee; observe breeding, watch for returns to heat.)

☐ **Decision Deferred** ☐ **Questionable** ☐ **Unsatisfactory**

Comments:

Veterinarian's Signature Clinic Stamp/Address Date

Bull BREEDING SOUNDNESS EVALUATION

The Western Canadian Association of Bovine Practitioners, Box 6173, Stn D, Calgary

Owner _____ ☐Ear Tag ☐Tattoo ☐Brand _____
Address _____ CFIA tag _____ Breed _____
_____ Postal Code _____ Bull's Name
Telephone (____)_____ Birth Date (Y/M/D) _____ Age _____

I Sex Drive and Mating Ability Unknown Recent Observations
Comments: (In most cases, the onus is on the producer to evaluate this important aspect of bull fertility)

II Physical Soundness (Items checked off are normal unless otherwise indicated)
Body Condition Score (1,2,3,4,5) _____ (A score of 1 is very thin, a score of 5 is very fat)
☐Eyes ☐Feet ☐Legs ☐Accessory sex glands ☐Inguinal rings ☐Penis ☐Prepuce
☐Scrotum ☐Scrotal Shape ☐Testicles ☐Epididymides
Comments:

SCROTAL CIRCUMFERENCE _____ cm Above average Average ± 1cm Below average Below minimum
Comments:

III Semen Quality **(%) Sperm Abnormalities**

The fine print:

"… to the best of my knowledge …
... the potential breeding capacity of this bull is:"

☐Satisfactory ☐Questionable ☐Unsatisfactory
☐Decision deferred

Another way to state it would be:

"…Based on my findings today, the outlook for the upcoming breeding season is..."

☐Satisfactory ☐Questionable ☐Unsatisfactory
☐Decision deferred

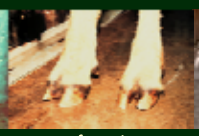
Essentially the breeding soundness evaluation is a risk assessment

Breeding soundness evaluations are screening tests

- they bring to your attention the majority of the problems
- we are limited by time and money
- 50 bulls may be examined in a day


Bulls presented are assumed to be healthy

Some things could be missed, e.g.:
- cork screw penis, short penis
- osteochondrosis causing joint pain
- foot abnormalities hidden by corrective trimming
- spinal spondylosis – sore back


pre-trim after trim

What is meant by the classifications of Satisfactory, Questionable, Unsatisfactory and Decision Deferred?

Satisfactory

- Expected to be highly fertile
- Able to impregnate 40 cows in 3 heat cycles (63 d)
  (They are physically normal and at least 70% of sperm are normal)

Short breeding seasons are very important

Short growing seasons and long winter feeding periods…

… we need
- short breeding seasons
- short calving seasons

Advantages of a short calving period

- Uniform calves at weaning
- Management efficiency of calves and cows

Uniform calves
Vaccination, castration, weighing, feeding, selling

Replacement heifer selection
All of similar age

Cow management
Vaccination, breeding observation, estrus synchronization, AI, pregnancy testing, culling on performance, nutritional management

Factors determining the number of cows showing estrus early and conceiving on first service *Wiltbank, 1987*

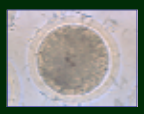
Estrus in 1st 21 days	Conception at 1st service
1. Time of calving	1. Time of calving
2. Body condition at calving	2. Weight change at breeding
3. Age (1st calf heifers)	3. Bull fertility

Cows in good condition average 45 days from calving to first estrus. Thin cows and those with uterine problems may take 60 to 90 days.

A survey of 2713 cow-calf producers in North-central Alberta *Basarab, 1987*

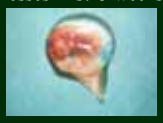
- Decreasing the length of the calving season was the best opportunity for increasing profit
- When the number of calves born in the first 21 days of the calving cycle increased from 29% to 49%:
  - Profits increased by $39/cow

With highly fertile bulls 95% of ova are fertilized (conception)



~ 30% of pregnancies are lost; first service pregnancy rate ~ 70%

>80% are early embryonic losses - 1st 3 weeks



3% called pregnant at 30-50 days come up open

What is meant by a "Questionable " classification?

- Expected to be subfertile
- % normal sperm = 50-69%
- may have an undesirable heritable trait

Bulls with poor semen cause

- more embryonic losses
- more repeat breeding
- younger, lighter calves next year at weaning
- more open cows at preg. checking

Hidden economic loss due to subfertile bulls

For every 21 day period of the breeding season that a cow remains open, there is a loss of ~60 lb of weaning weight the following year for the calf she finally conceives

Weaned weight of calves next year from 40 cows bred this year by "satisfactory" vs. subfertile bulls

	Satisfactory bull	Subfertile bull
1st service preg rate	70%	50%
Fall preg. rate	92%	85%
Preg 1st cycle	28 x 275 kg = 7700	20 x 275 kg = 5500
Preg 2nd cycle	8 x 250 kg = 2000	10 x 250 kg = 2500
Preg 3rd cycle	1 x 225 kg = 225	4 x 225 kg = 900
Total calf weight	9925	8900

Difference = 1025 kg (2250 lb) total weaning weight

A subfertile bull can lose you a "tonne" of money and often you won't even know it

What is meant by an "Unsatisfactory " classification?

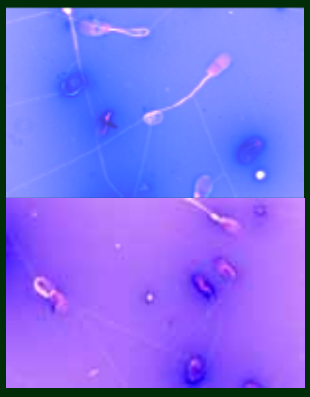
- low fertility is expected
- % normal sperm <50 %
- recovery not expected for this breeding season
- has an undesirable heritable trait – seed stock producers

What is meant by "Decision Deferred" ?

- Yearling bulls that need time to mature
- Older bulls expected to recover in time for the breeding season (re-test recommended)

Poor sperm morphology at onset of puberty

The first sperm can be collected at 10-11 mo old



~ 3 months later

The dilemma of Decision Deferred bulls

- 1/3 are mature at 12 mo, 2/3 are mature at 14 mo
- Average age at sale time is 13.5 months
- "DD" bulls don't sell well
- Some veterinarians over whelmed by the "desire to please" may pass immature bulls believing they'll soon be OK
- Of 32 DD bulls at 13.5 mo - 28% were satisfactory at 15 mo

Retest all yearlings as soon as possible after purchase

Effect of season on semen quality

Percent of physically normal, mature bulls with Satisfactory Semen (n=1634)

January	66 %
February	58
March	76
April	82
May	87
June	88
July	91

Let's return to the 3 cardinal principles

- Libido
- Physical Soundness
- Semen Quality

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Comments:

III Semen Quality (%) Sperm Abnormalities

Some bulls have no desire to breed at all

Some have physical impediments to breeding

I Service Capacity (Sex drive and mating ability)

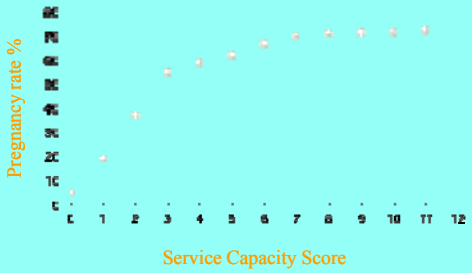
Definition: The number of services completed in a given period of time

- Assesses sex drive
- Physical ability to serve
- Social dominance

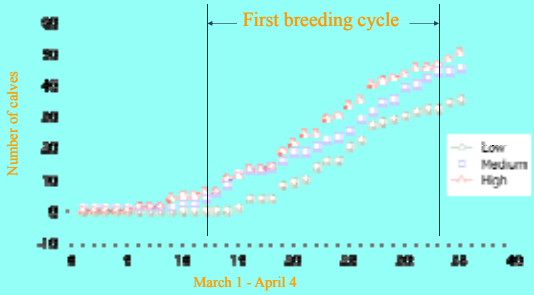
Service Capacity Scoring for a 40 minute test

Number Services	Score
0 - 2	low
3 - 6	medium
≥7	high

Effect of Service Capacity on 21 day pregnancy rate
(23 bulls, 40 heifers each) *Blockey*



Calving rates for low, medium, and high SC bulls
(Physically able, but low libido) Simpson Ranch, Alberta



~10% of bulls have low serving capacity
Blockey, Coulter, Barth

3.6% of bulls (n = 166) that had passed a conventional BSE a week earlier were physically unable to serve cows
Barth

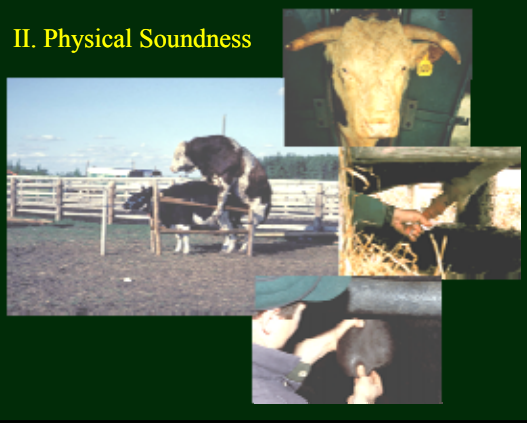
Service capacity testing and semen collection with an internal artificial vagina (IAV)

Bulls that failed to serve cows with the IAV had significantly fewer mounts, attempts to mount, and completed services at pasture than those that did serve cows with IAVs

The method is as fast as electroejaculation
The main disadvantage is the need for restrained cows

Collection of semen with an artificial vagina using a blind

II. Physical Soundness



Scrotal Circumference is highly correlated to:

- Onset of puberty in bulls 0.75
- Onset of puberty in heifers 0.71 - 0.98
- Paired testes weight 0.95
- Daily sperm production 0.62-0.75
- High semen quality 0.47-0.64
- Pregnancy rate 0.58 -0.66
- Female lifetime productivity 0.66 - 0.97

III. Semen quality

While it appears to be true that bulls that have 70% normal sperm do as well as those that have ± 85% normal sperm, I would rather have the latter because he is more likely to maintain his production of high quality semen over the long run