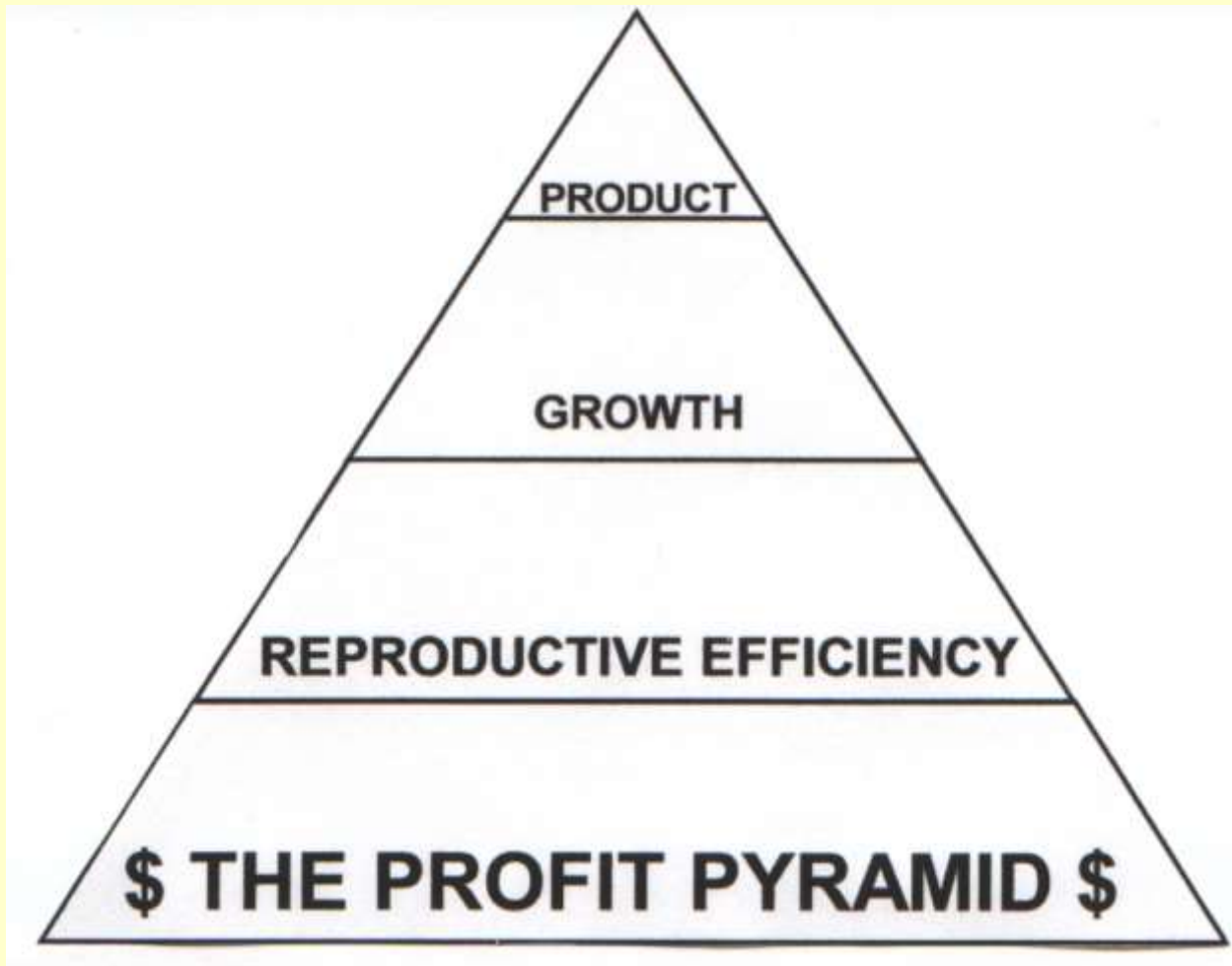


# Reproduction and the Bottom Line

**Dave Sparks D.V.M.**  
**Oklahoma State University**  
**Area Extension Food Animal**  
**Quality and Health Specialist**



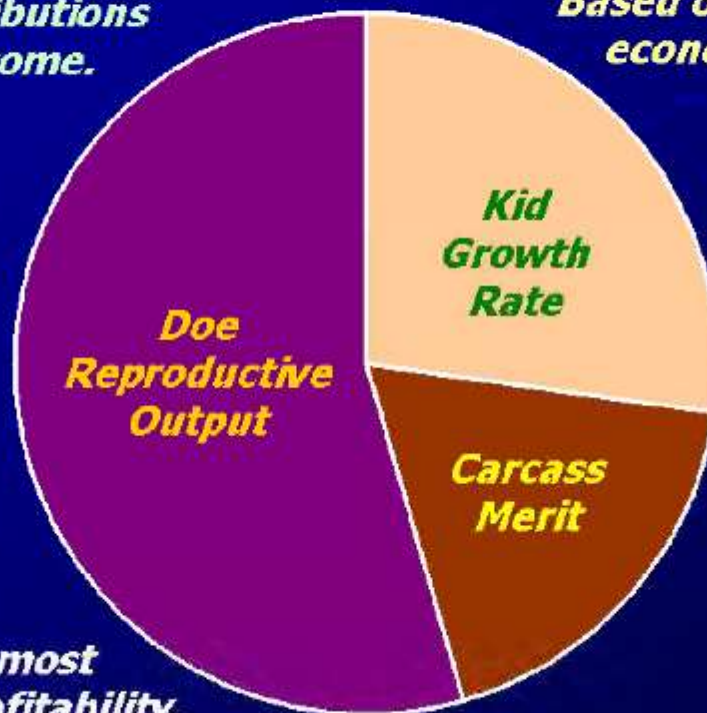
# Relative Economic Value of Traits



## Relative Economic Value of Traits in a Commercial Meat Goat Herd

*Estimated contributions  
to enterprise income.*

*Based on beef industry  
economic estimates.*



*Reproduction is most  
influential to profitability.*

# Goat Estrous Cycle

- Anestrus
  - The time between breeding seasons when the doe is not coming into heat
- Estrus
  - The time the doe is “in heat”
- Metestrus
  - The time between heat periods when the doe is trying to become pregnant

# Anestrus

- Goats are seasonal breeders. Anestrus is the part of the year when does are not cycling.
- All reproductive hormone levels are low.
- The onset and decline of the breeding season are controlled by day length and buck activities.
- Poorly influenced by drugs, but can be influenced by artificial lights and teaser bucks.

# Estrus

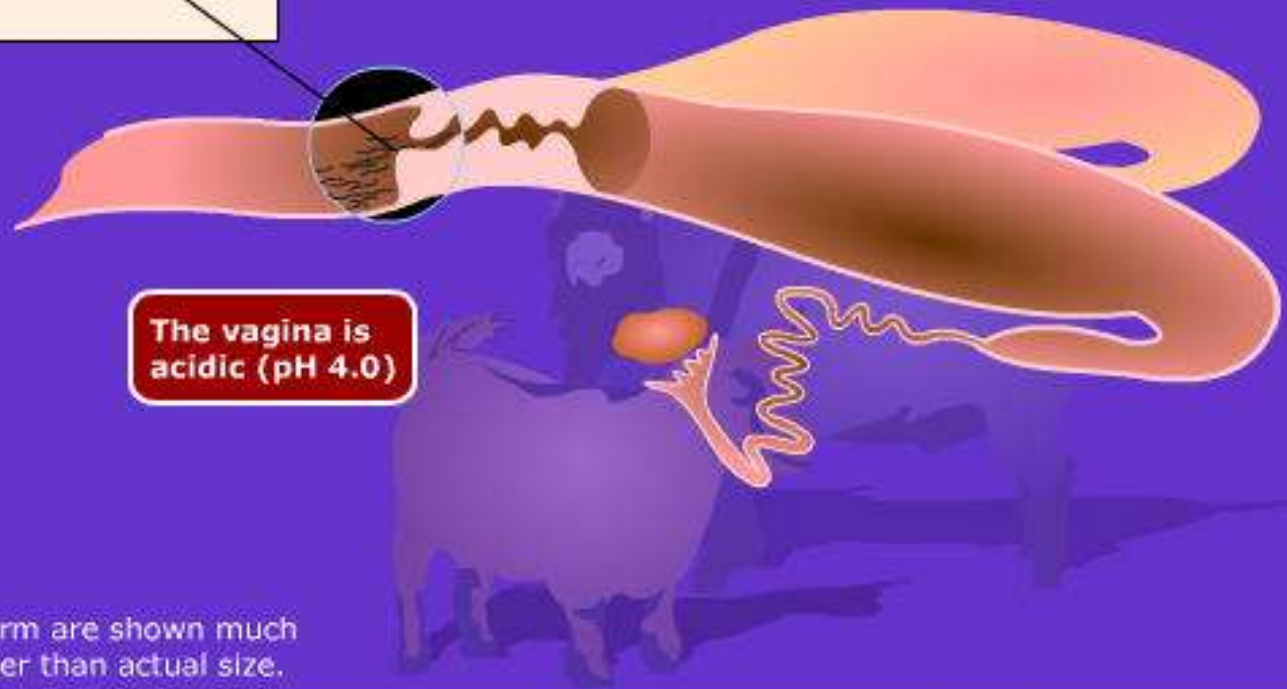
- This is the period just before, during and just after the egg is released in the ovary.
- The dominant structure on the ovary is the follicle which releases estrogen as the dominant hormone in the system.
- The estrogen causes the doe to be receptive to the male.

# Metestrus

- The part of the cycle between heat periods.
- The dominant structure on the ovary is the Corpus Luteum and the dominant hormone is progesterone.
- Under the influence of progesterone the doe rejects the buck and the reproductive tract undergoes changes to allow for attachment of the embryo and support of the pregnancy.

The buck deposits billions of sperm just at the opening of the cervical canal.

The vagina is a hostile environment for sperm so they must quickly enter the cervical canal to survive.



The vagina is acidic (pH 4.0)

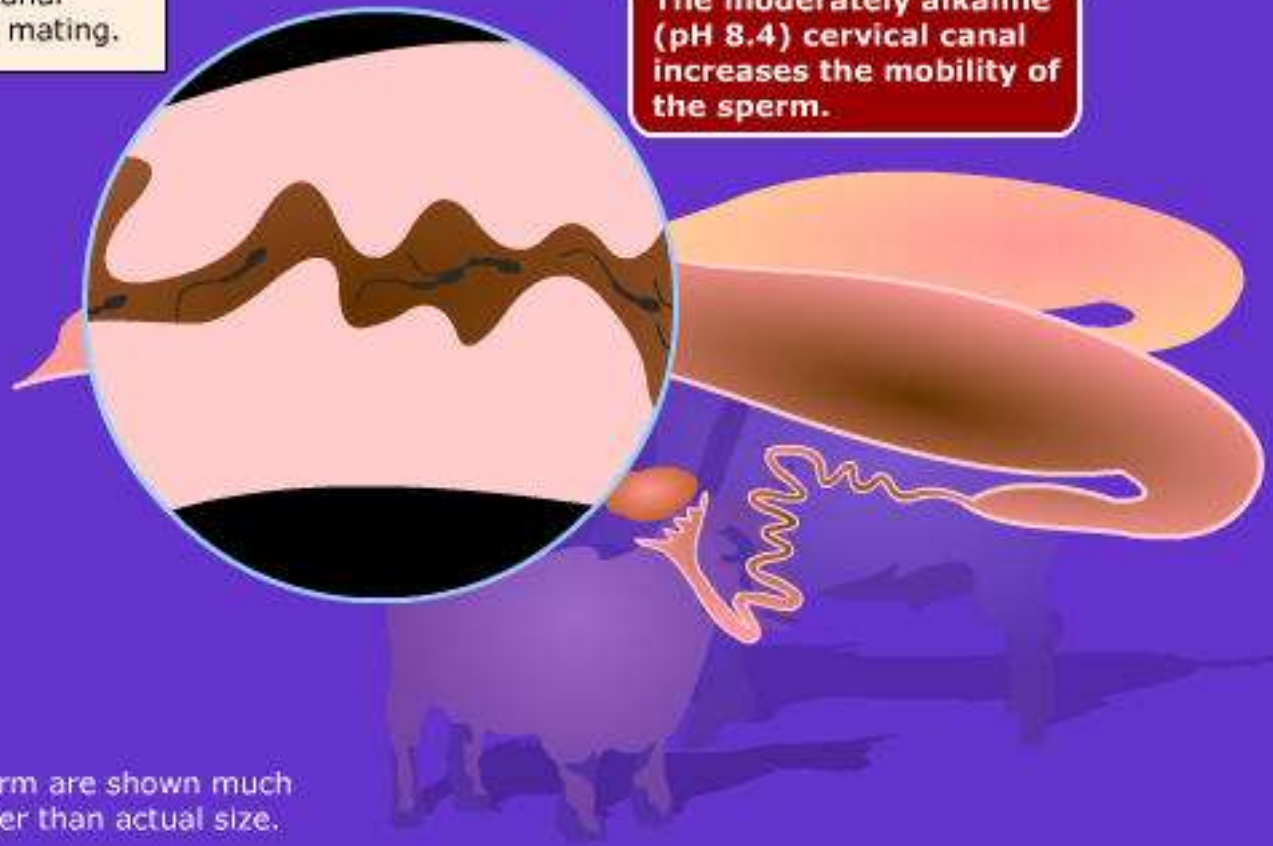
Sperm are shown much larger than actual size.

NEXT



Sperm enter the cervical canal within a few minutes after mating.

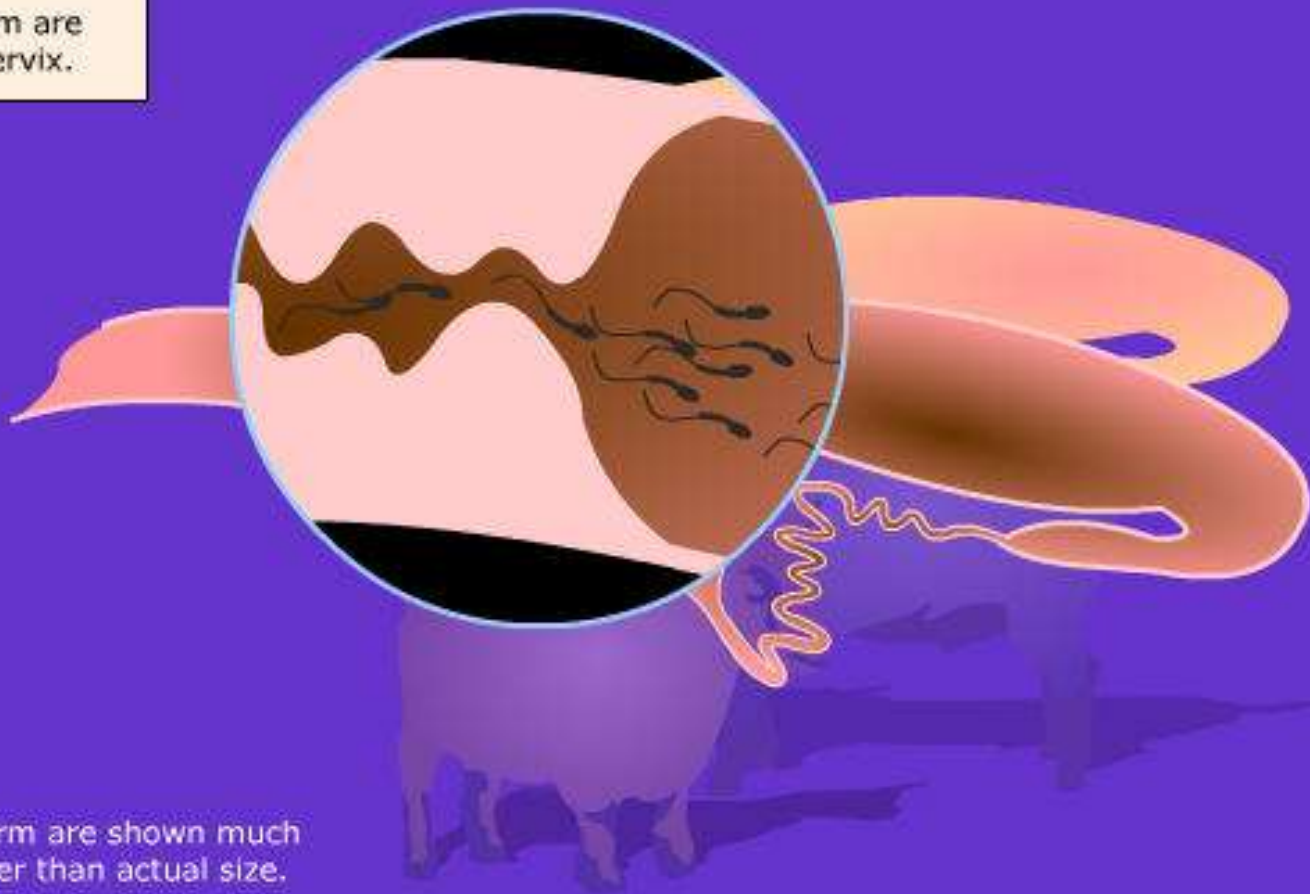
The moderately alkaline (pH 8.4) cervical canal increases the mobility of the sperm.



Sperm are shown much larger than actual size.

NEXT

Most defective sperm are filtered out in the cervix.



Sperm are shown much larger than actual size.

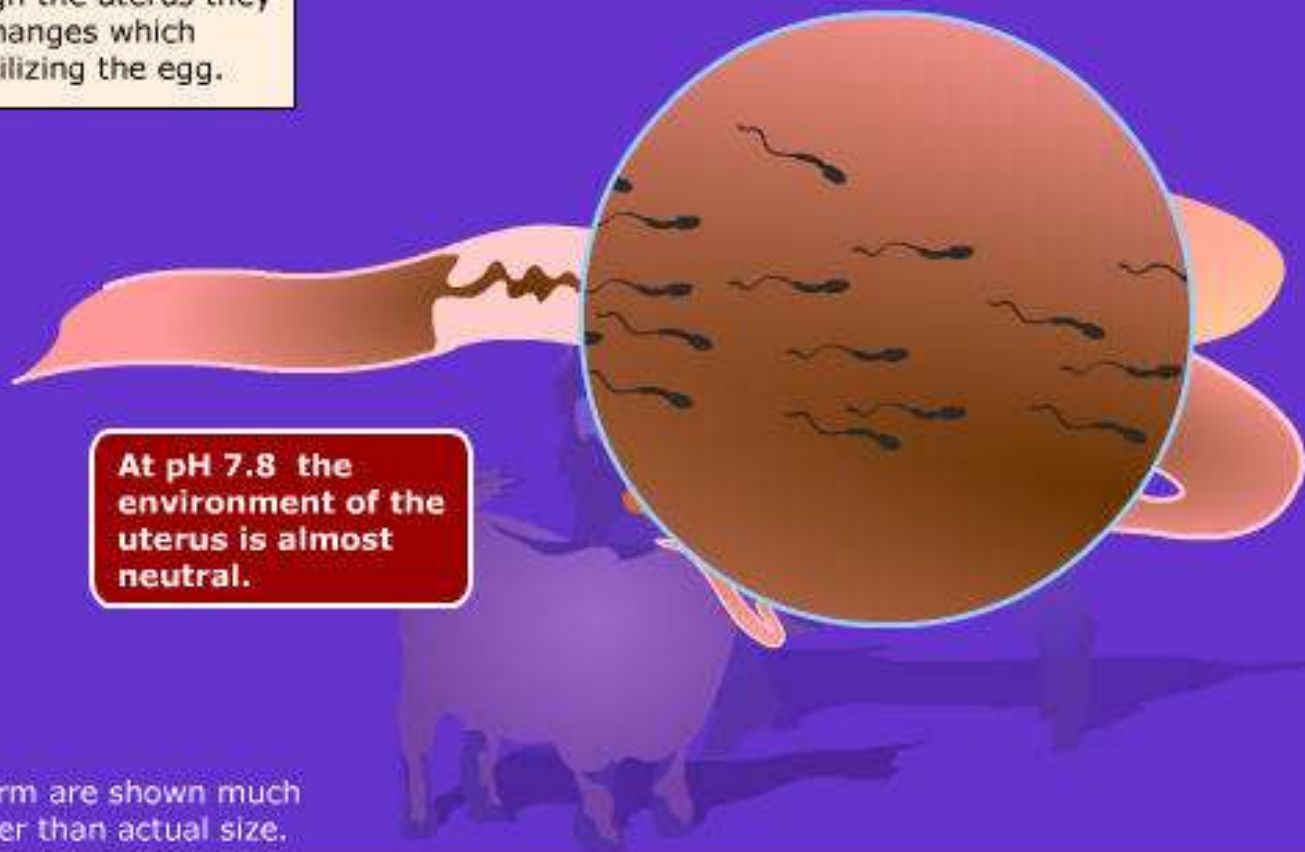
NEXT

As sperm move through the uterus they begin to go through changes which prepares them for fertilizing the egg.

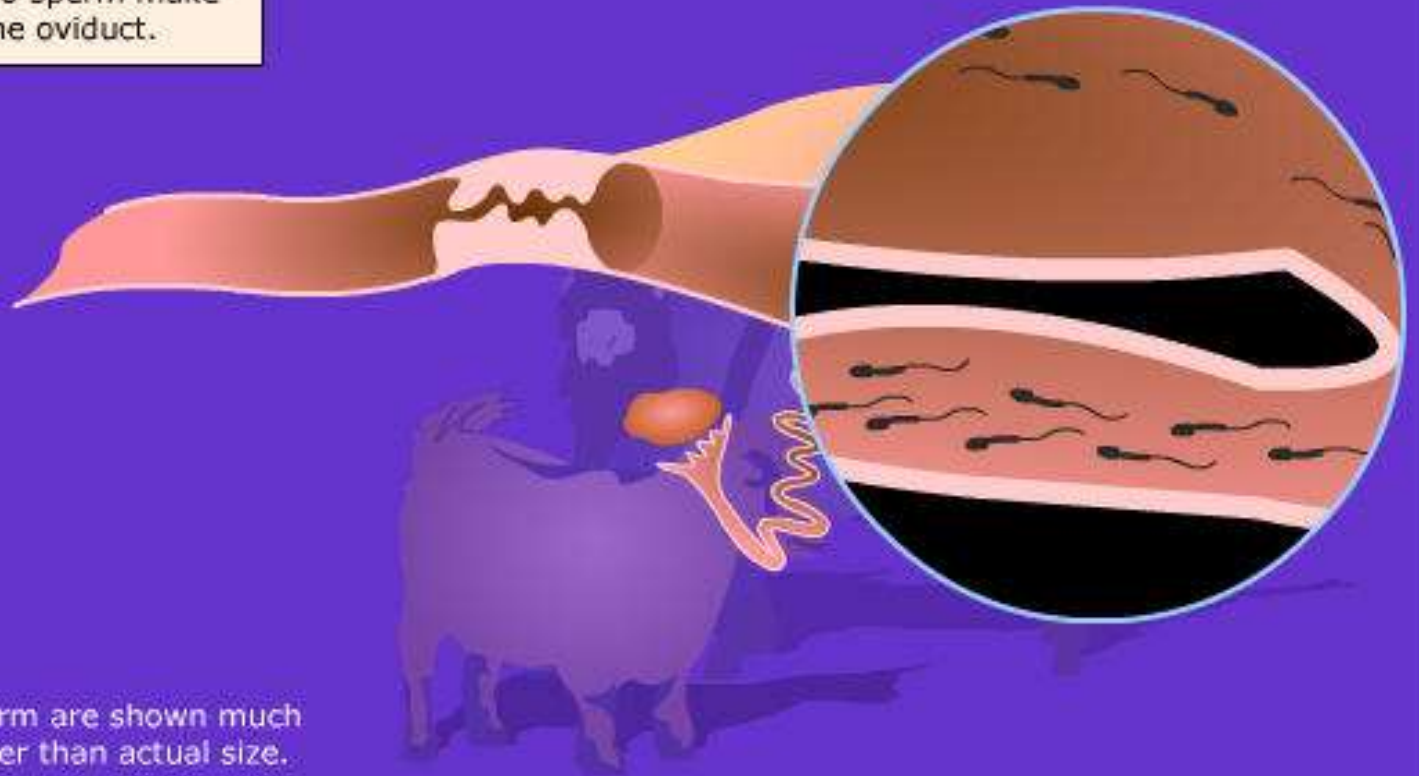
**At pH 7.8 the environment of the uterus is almost neutral.**

**NEXT**

Sperm are shown much larger than actual size.



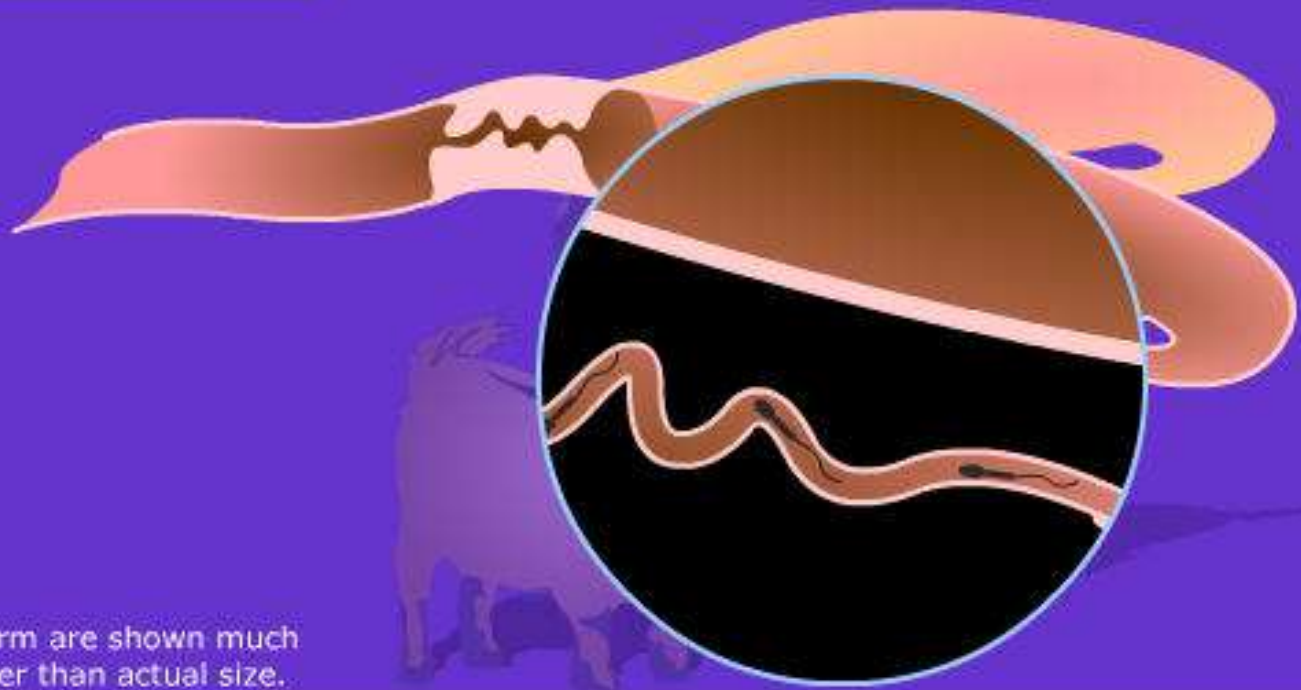
Once the sperm reach the oviduct their number is much reduced. Only about 1,000 to 10,000 sperm make it to the isthmus of the oviduct.



NEXT

Sperm are shown much larger than actual size.

In the oviduct the sperm go through further modification. This process is called capacitation and is necessary for the sperm to fertilize the egg.



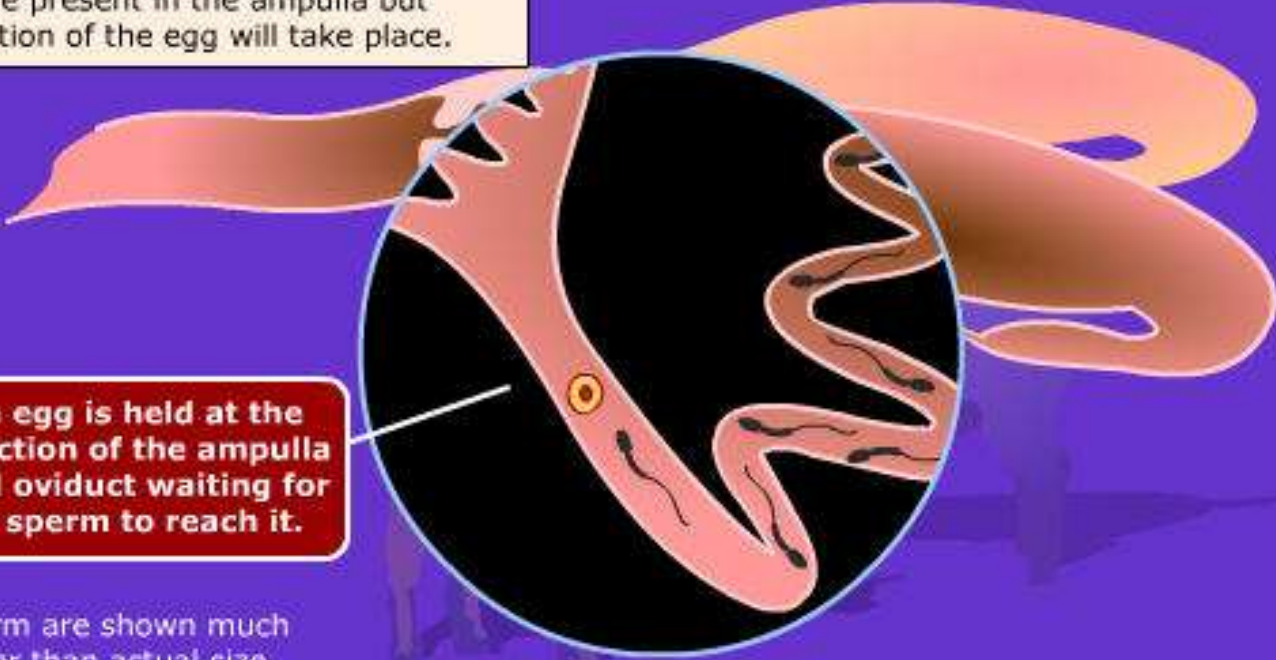
Sperm are shown much larger than actual size.

NEXT

The egg survives only about 24 hours after ovulation.

Sperm can survive as long as 48 hours after release into the female's reproductive tract.

Only 10 to 100 sperm are present in the ampulla but 90% of the time fertilization of the egg will take place.



The egg is held at the junction of the ampulla and oviduct waiting for the sperm to reach it.

Sperm are shown much larger than actual size.

REPLAY

# How Big is Big Enough?

<b>Kid doe body weight at mating (lb)</b>	<b>First kidding%</b>	<b>Average lifetime kidding%</b>
Below 40	2	48
40 – 44	21	70
44 – 51	32	72
51 – 55	55	79
55 – 60	78	82
60 – 70	81	86
Above 70	88	89

# Weaning Traits of Boer Does (3 Matings)

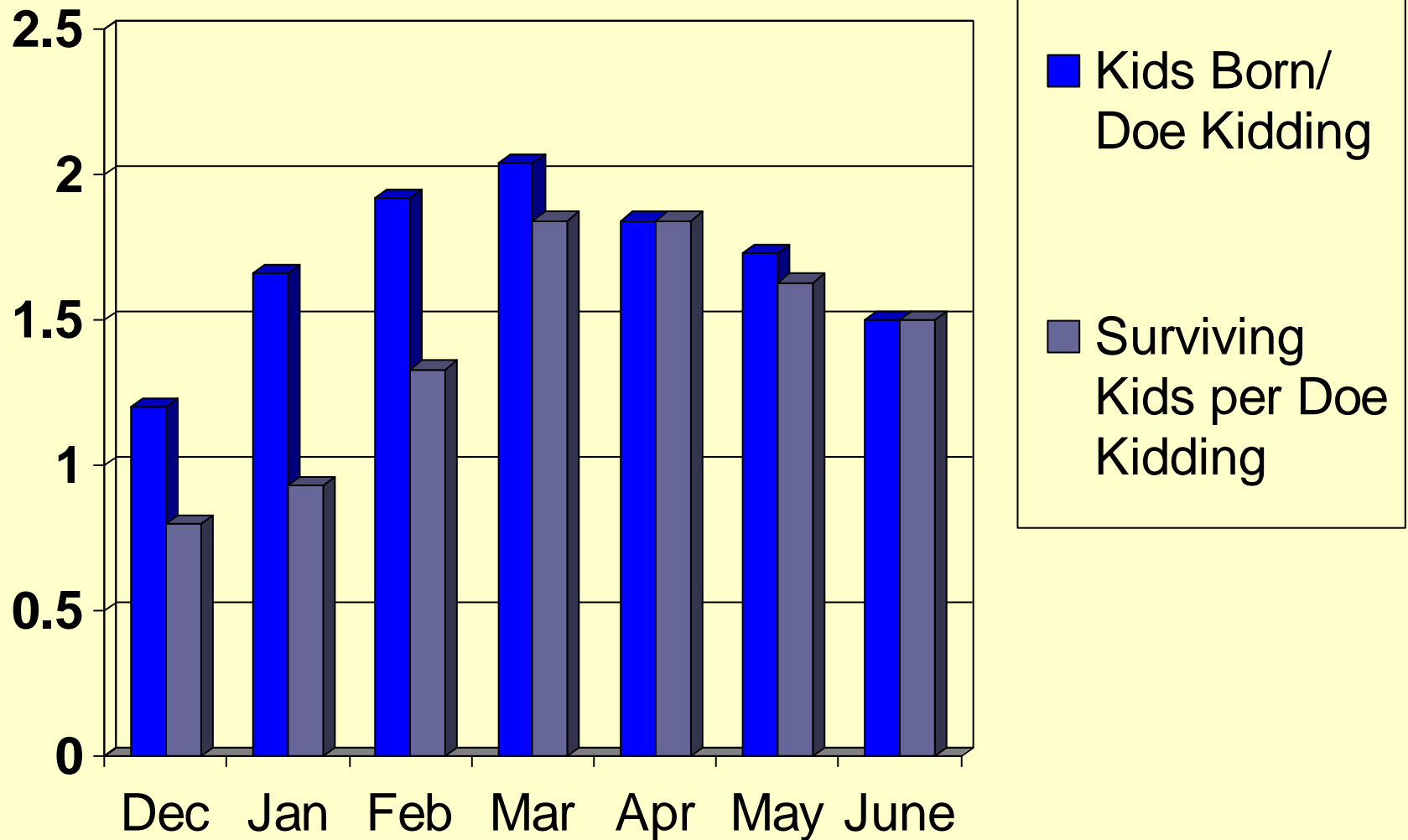
<b>Dam ID</b>	<b>Litter Size, n</b>	<b>Litter Wt, lbs</b>
<b>220</b>	<b>2.33</b>	<b>100.27</b>
<b>217</b>	<b>2.00</b>	<b>90.93</b>
<b><i>Herd Avg</i></b>	<b><i>1.48</i></b>	<b><i>58.00</i></b>
<b><i>Boer Avg</i></b>	<b><i>1.19</i></b>	<b><i>47.57</i></b>
<b>247</b>	<b>1.00</b>	<b>35.48</b>
<b>207</b>	<b>1.00</b>	<b>34.20</b>



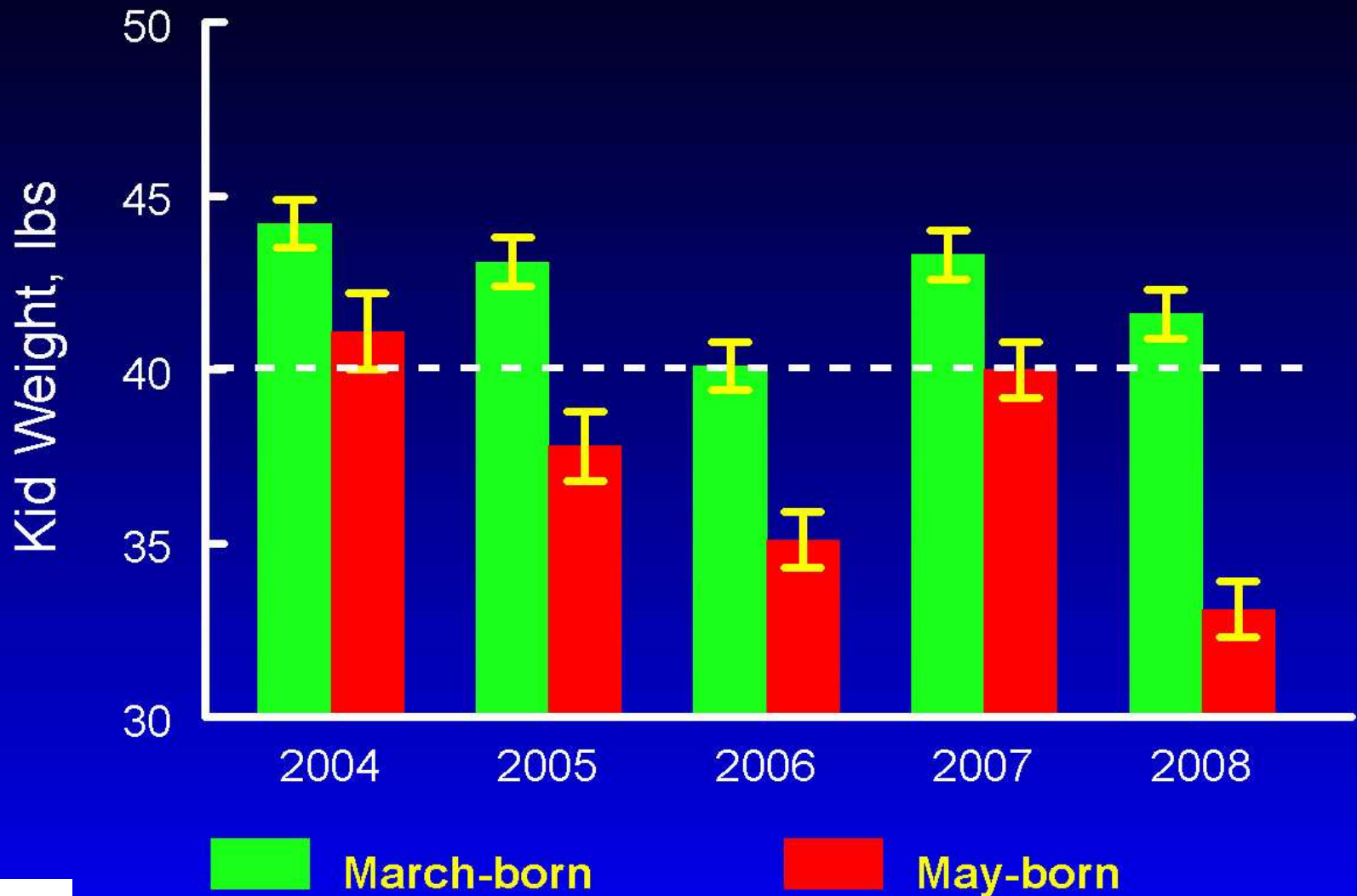
# You Can't Afford Singles

- The average meat goat doe eats about 1 ton of “something” per year!!
- First time does have a higher percentage of singles.
- Second pregnancies tend to be singles if first time was twins.
- Higher percentage of singles in mature does following triplets in prior year.
- Does above the age of 6 years have a higher percentage of singles.

# Does Bred Early or Late Have More Singles



# 90-Day Adjusted Kid Weaning Weights



# Teaser Bucks Can Help!

- Teasers are intact vasectomized males used to stimulate the does.
- Teasers stimulate does to cycle but cannot cause a pregnancy.
- When herd sires are introduced the doe is more fertile than on her first cycle of the season.
- Quality or size is not a concern but teasers should be tough, vigorous and trouble free.

# Nutrition and Reproduction

- **Flushing – Increasing nutritional plane by adding .5 lbs of corn or protein supplement for 2 weeks before and 2 weeks after breeding increases pregnancy rate and litter size at birth.**
- **Does in good body condition at breeding deliver more kids and have better kid survival rates.**
- **Pregnancy toxemia**

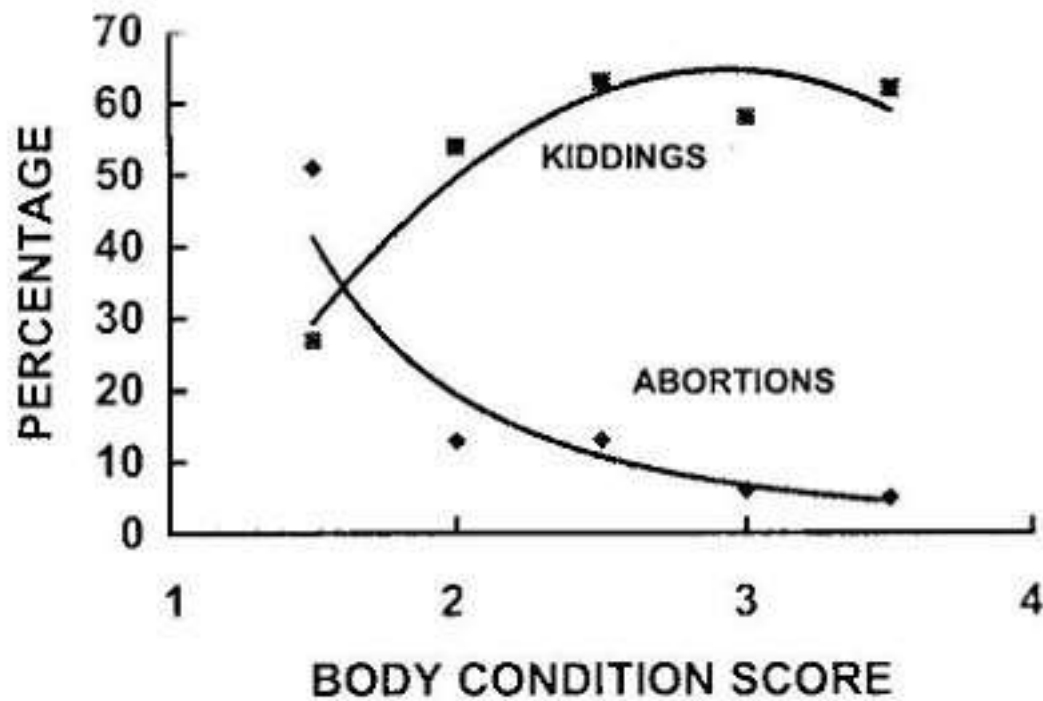


Fig. 1. Relationship between body condition score of goats at mating and abortion and kidding rates.

# Pregnancy Toxemia

- Inadequate carbohydrates in diet in last trimester causes mother to metabolize her body fat.
- By product is ketones which build up to toxic levels.
- Doe carrying twins, carbo requirement increases to 180%, with triplets 240%.
- Doe should gain  $\frac{1}{2}$  lb. day last trimester.

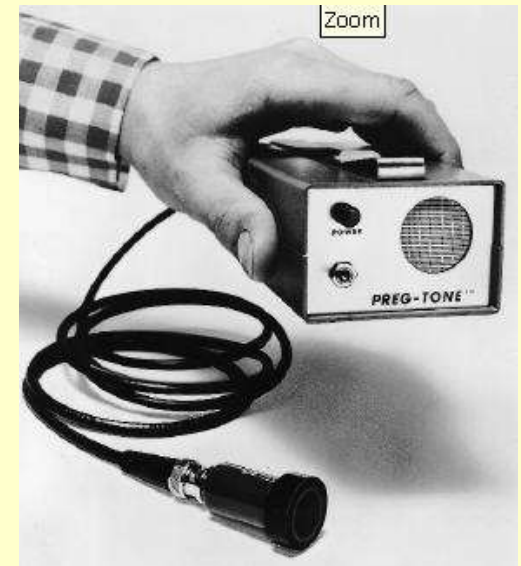
# Pregnancy Diagnosis

- **Can reduce costs, increase income, and maximize returns on available inputs.**
- **Several possibilities, each with advantages and disadvantages.**
  - Doppler Ultrasound
  - “A Mode” Ultrasound
  - Blood Hormone Assay



# “A Mode” Ultrasound

- Inexpensive to purchase and operate
- Purchase preset for one type of animal.
- Quickly operate successfully.
- Accurate at 30 to 40 days.
- Audio tones. Can not tell how many kids are present.
- Tough and easily portable.



# Doppler Ultrasound

- Expensive to purchase.
- Delicate and only somewhat portable.
- Requires extensive training and practice to use accurately.
- Accurate and early results.
- Use with multiple species and multiple functions.
- May show number of fetuses.
- Slower to operate accurately.



# Real Time Ultrasound

- Takes practice to use efficiently but can be operated by breeders.
- Can detect number of fetuses and abnormal conditions (false pregnancy).
- Portable and barn environment friendly.
- Some units for multiple species.
- Modest price.



# Ultrasound of 55 day Pregnancy



# Blood Chemical Assay

- BioPRYN – Measures the amount of a very specific protein, released from the placenta, present in the maternal blood.
- Accurate at 26 days
- 95% accurate
- Samples received in lab by Wednesday are reported Friday
- Cost is \$7.50/test + supplies and shipping
- [www.biotracking.com](http://www.biotracking.com)
- 208-882-9736



# Assisted Reproduction

- Artificial Insemination
- Embryo Transfer

Valuable tools for increasing the impact of outstanding genetics, but also require increased management, cost, and risk.



# Artificial Insemination

- Bucks are collected via;
  - Artificial Vagina and estrus doe
  - Electro-ejaculator
- Semen is examined, extended, and frozen.



- Semen is placed inside the cervix by means of a glass speculum and pipette.
- Typical conception rates are 30-50% for one insemination or 60-80% with 2 or three inseminations.
  - May get 2 or 3 straws with one certificate.
- Laparoscopic AI increases the success rate but also the danger to doe and the cost.

# Heat Detection

- CIDRs used in sheep for heat synchronization but not yet legal in goats.
- Teaser buck with marker harness widely used.
- Estroprotect patches indicate if does are riding each other.



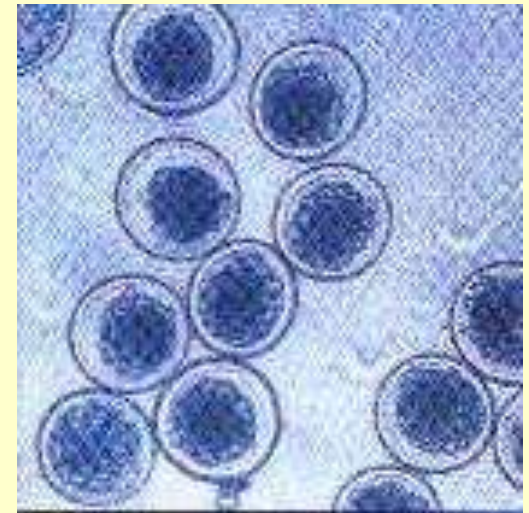


# Embryo Transfer



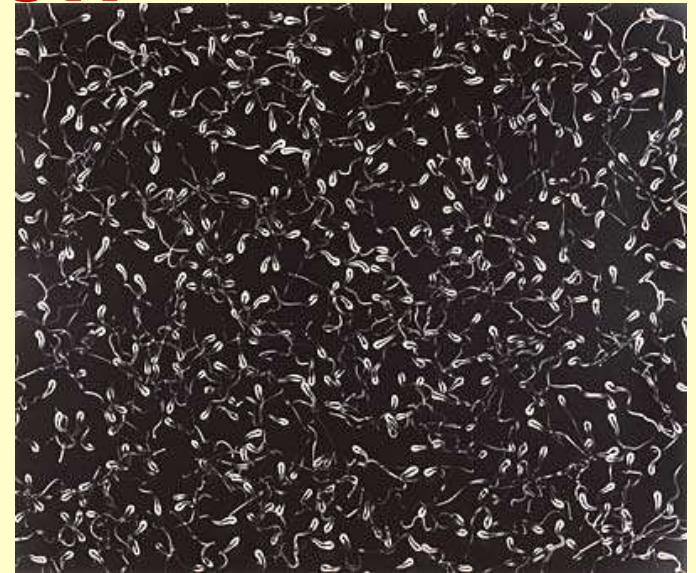
High value doe is synchronized with lower value does, super-ovulated, and bred to high value buck. At about 1 week of pregnancy the fertile embryos are flushed from the donor doe and introduced surgically into heat synchronized recipient does.

- Typically harvest from 0 to 20 fertile embryos from donor.
- Very expensive and management intensive, must have strong market for high value kids.
- Difficult to do legally in goats due to restrictions on drugs used in the procedure.



# Buck Breeding Soundness Examination

- Not so much to identify sterile males as to identify marginally fertile males.
- Late kidding, low conception rates and small litter sizes cost big dollars. (Especially since goats are seasonal breeders and goat markets are seasonal)



# Breeding Soundness Exam

- **Evaluation of semen sample**
  - Semen volume and concentration
  - Correct morphology
  - Motility
- **Physical examination for ability to breed**
  - Reproductive system
  - Musculoskeletal system
- **Libido determination must be made from observations over time.**

**Your local veterinarian can  
help you identify problems  
before they are problems.**

**Oklahoma Veterinary Medical Association**

**[www.okvma.org](http://www.okvma.org)**

**American Association of Small Ruminant  
Practitioners**

**[www.aasrp.org](http://www.aasrp.org)**



**Questions?**