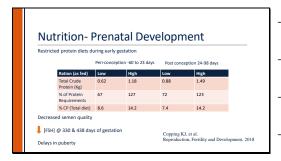
Bull Development Chance L. Armstrong, DVM, MS, DACT armstcl@auburn.edu AMERICAN COLLEGE AMERICAN CO

Slide 2

Cow-Calf Profitability Natural Service in US Beef industry * 76 SN of helders only bred by buils * 92 200 beaution. Build * 120 200 beaution. Build * 1820 beaution. Buil





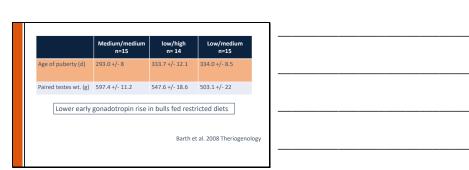
Slide 5

Developing Bulls

The effect of nutrition on Sexual Development

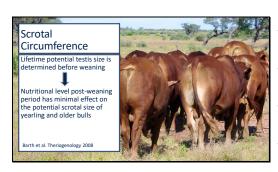
- 44 calves weaned @ 8 wks
- ❖ low or medium nutrition from 10-26 wks
- 27-70 weeks of age
- medium grp. continued at same plane of nutrition
- low grp. divided into low/medium & low/high

Barth AD, et al. 2008 Theriogenology





Slide 8



Slide 9

Laminitis

Common with high concentrate feeding practices

Yearling bulls

- rearing buils
 Sequella

 sub-solar
 hemorrhage
 bruising
 ulceration
 horizontal fissures ("stress lines")
 white line disease
 abnormal angles to joints of distal limb



Slide 10 **Nutrition-Yearling Bulls** Young bulls require more CPV on dry matter basis •example of supplement with good quality hay •238 CP •358 TDN •Desired rate of gain 21b_/day Desired rate of gain birth to 6 months: > 2.7 lb. /day Target 75% of mature weight at 24 months ◆2-2.5lb/day from 6 mo. until 3 years of age Low starch rations containing high energy by-product feedstuff combined with a high-quality forage provide adequate gains without depositing fat Balanced mineral program-year round Slide 11 **Body Condition** Well Muscled Athletes BCS: 6-7 (out of 9) Careful feeding concentrates Total ration protein ≥ 12% protein Consider an ionophore Vitamins & Minerals Slide 12 WEANLING BULL SELECTION Scrotal Circumference Minimum 23 cm at 200 days of age 95% probability of \geq 34 cm by 365 days Coe PH, Gibson CD Theriogenology 1993

Disease Prevention

Quarantine •4 weeks

◆4 weeks
Same protection as cowherd
◆8VD, IBR, BRSV, Pi3
◆5-way lepto
◆7-8 way Clostridial
◆/-Papilloma virus
◆/-Pinkeye
◆/-Footrot
◆/-Anaplasmosis
◆/-/ Campylobacter
◆+/- Tritrichomonas foetus



Slide 14

Internal/External Parasites

Nematodes

Horn Flies

Face Flies

Control:

Tags, rubs, sprays



Slide 15

Adverse Weather





Slide 16 **Disease Testing** Ideal to have been done prior to purchase Isolation period at the farm 30 days minimum Recommendations based on risk Johne's disease BUDV Anaplasmosis Trichomoniasis Campylobacter Slide 17 Male Pathogenesis- Trichomoniasis Asymptomatic carrier •gross lesions absent Localizes in secretions of penis, prepuce, & distal urethra Semen quality & libido •unaffected Slide 18 Male Pathogenesis- Trichomoniasis Chronic carriers ❖ ≥ 3 years old *rarely clear the disease No clear breed association Target for management strategies



Slide 20

RT-qPCR Direct Smegma

Se: 100% Sp: 100% (Ginter Summarell et al 2018)
Ship in tube containing 1.5 mL of PBS or sterile saline Samples must arrive at laboratory within 120 hours of collection

Samples must be chilled from collection until received at laboratory

4°C - 25°C (Loy et al 2023)

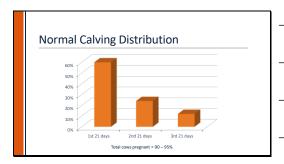


Slide 21

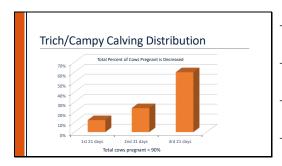
Bull Results

Dall Results											
		Days Post-Exposure									
Bull											
ID	1	2	3	4	5	6	7	14	19	22	25
В7	0/0	0/0	0/1	1/1	0/0	0/0	0/0	1/1	1/1	1/1	1/1
В8	0/0	0/0	0/0	0/1	0/0	1/1	1/0	0/1	1/1	1/1	1/1
В9	1/1	0/0	0/0	1/1	0/0	0/0	0/0	0/1	1/1	1/1	1/1

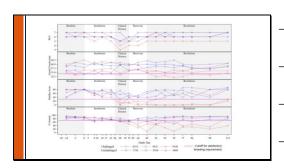
Ondrak et al.



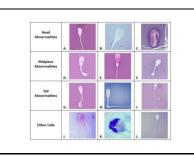
Slide 23







Slide 26



Slide 27

Conclusions

Results confirm that clinical anaplasmosis reduce breeding soundness especially in endemic areas

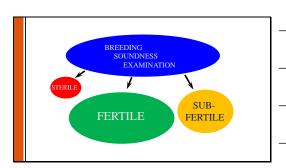
100% of infected bulls anemic & febrile at peak lost body condition during study

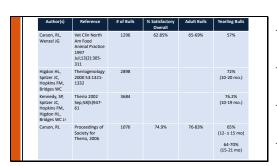
100% of infected bulls did not pass BSE after peak

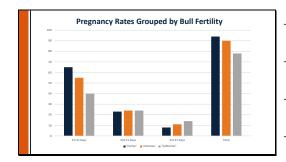
100% of infected bulls experienced reductions in scrotal circumference, sperm motility, and morphology

	NAH	IMS Da	ta	
	Small (1-49)	Medium (50-199)	Large (≥ 200)	All Operations
Procedure	%	%	%	%
Semen Evaluation (Resident bulls)	24.2	48.1	67.2	31.4
Semen Evaluation (Purchased/leased bulls)	51.6	87.2	96.4	66.8
Trich Testing (Resident bulls)	17.6	26.5	43.3	20.8
Trich Testing (Purchased/leased bulls)	46.9	62.2	67.3	53.6

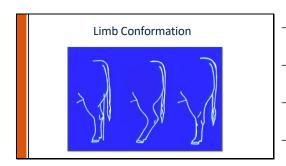
Slide 29







Slide 32



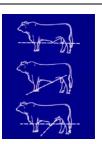
Slide 33



What is the longevity of this bull in the breeding pasture?

\sim	lid		\sim	Λ
•		$\boldsymbol{\Delta}$	< -	/1





Corkscrew Claw

All breeds
Prevalence 3-4%
Noticed in cattle > 3 years
Cause:

inherited
malalignment of the phalanx
nutritional factors?
Sequelae:

ankylosis of coffin joint
hemorrhage of the sole
white line disease
sole ulcers
manage by routine corrective trimming
Terminal Sire Only





_			

Scrotal Circumference

Measure in centimeters Scrotal circumference and semen production are highly correlated

AGE	SC (cm)
< 15 months	30
> 15 <u><</u> 18 months	31
> 18 <u><</u> 21 months	32
>21 <u><</u> 24 months	33
> 24 months	34

Slide 38

Physical Exam

Internal

Accessory Sex Glands

- bulbourethral glands
- prostate
- vesicular glands
- ampulla



Slide 39

Vesiculitis

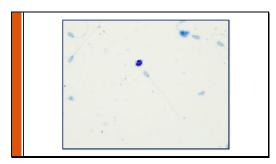
Common in young bulls in development lots

High Grain Diets

Lose lobulations

- +/- Pain upon palpation
- Fertility affected
 *WBC in the ejaculate





Slide 41



Slide 42

Juvenile Penile Abnormalities

Penile Warts

Slide 44

Surgical Resection

- towel clamp under apical ligament or 4x4
 surgical prep (betadine & saline)
 dorsal penile nerve (or Pudendal n.)
 2% lidocaine
- ID urethra
 8-10 French, male-dog catheter
- 8-10 French, male-dog cat
 sharp dissection
 scalpel or diode 60 laser
 ± 1° closure
 Immunotherapy
 Re√ 30 days post-op



Slide 45

45 days post surgical resection



Slide 46	Persistent Frenulum Photo Courtesy of Dr. Gary Greene	
Slide 47		
Slide 48	Persistent Frenulum Post-op	

Slide 49







Slide 52 Factors Affecting Bull Breeding Efficiency sire age terrain physical soundness size of pasture scrotal circumference libido social dominance sperm production bull-to-cow ratio Slide 53 **Bull:Cow Ratio** Long Yearling Bulls < 2 yrs 13.9 19.8 15.2 Mature Bulls > 2 yrs 20.3 26.5 27.7 22.0 NAHMS Data 2020 Slide 54 **Bull-to-Cow Ratio** $\label{eq:multiple-sire} \mbox{Multiple-sire groups are less efficient than single-sire units}$ Individual bulls in multiple-sire groups sire disproportionate numbers of calves Heifers in breeding groups of 1:20 were bred more times during each estrus by their single sire than were heifers in groups of 2:40 by the combined services of two bulls

Slide 55	Social Dominance Multi-sire pasture: 27 bulls (1-8 years old) 627 calves 5 bulls sired > 50% of the calves 10 sires produced zero calves • 9/10 were yearling bulls Van Eenennaam AL et al. J. Anim. Sci. 2007, 85:3159–3169	
Slide 56	Bull to Cow Ratio N = up to number of females Single-sire breeding group (1:N) < 36 months of age N = bulf sage in months > 36 months of age N = scrotal circumference in centimeters Wenzel J et al, J. Clin Therio, 2012	
Slide 57	Bull-to-Cow Ratio N = up to number of females each could sire (single sire) T = total females Multiple-sire breeding group: B = 1 + (T - N) = 0.5 N Each bull added to the first in a multiple-sire group expected to only dependably serve one-half his compliment of females • 100 females require 4 add th bulls if: • each bull had scrotal circumference 40 cm • 40 females 1 bull and 20 for each additional of the 3 bulls • 8 + (100 - 40) = 0.5 x 40 • 8 + 4 Wensel et al. Clin Therio, 2012	

Bull selection and use in northern Australia. Part 2. Semen traits.

rick LA¹, Fordyce G, McGowan MR, Bertram JD, Doogan VJ, De Faveri J, Miller RG, Holroyd RG.

- 235 bulls evaluated •58% sired 10% or fewer calves •6% sired no calves
- ■14% sired more than 30%

•repeatable across years

Reported in last of this series

1:40 ratio did not affect herd fertility compared with higher ratios

Slide 59

Managing Young Bulls

Divide bulls into management groups by age prevent injuries allows for nutritional management designed to meet needs of that group

Limited breeding season \$45-60 days

- *Is breeding season
 *allow acclimation period to forage prior to turn-out
 free choice balanced mineral (high Mg with winter annuals)
 *supplement for desired rate of gain after season (2-2.5 lb/day)



_			
	-		
1			
é			