T-Snip™

a test for tolerance to toxicosis

Craig Roberts
University of Missouri

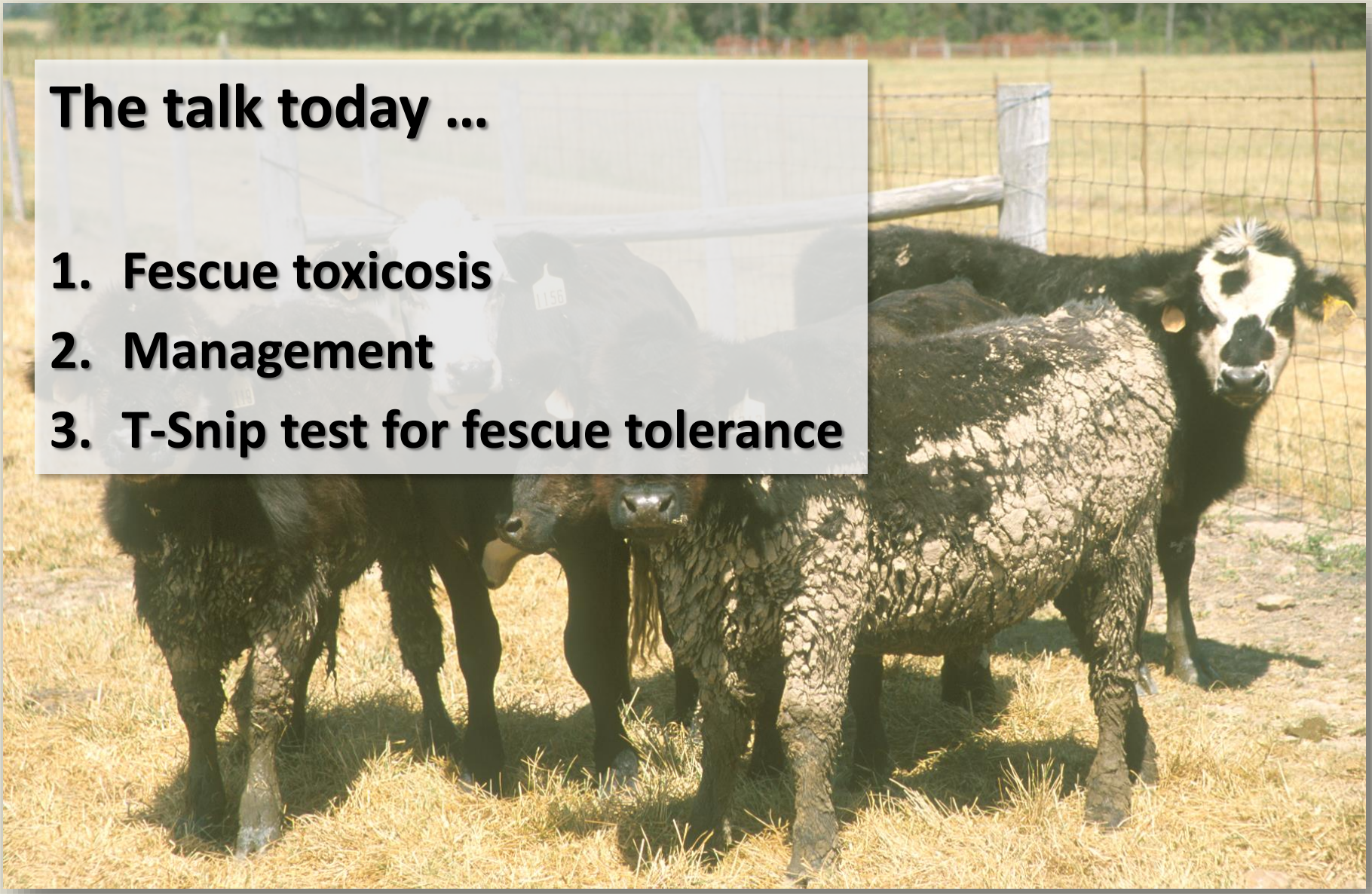
Disclosures

Dr. Roberts is partner with AgBotanica, LLC,
a faculty start-up company that owns T-Snip™ technology
and conducts for-profit genetic testing.

www.agbotanica.com

Dr. Roberts is Chair of the Alliance for Grassland Renewal,
an organization whose objectives include promotion
of novel endophyte technology.

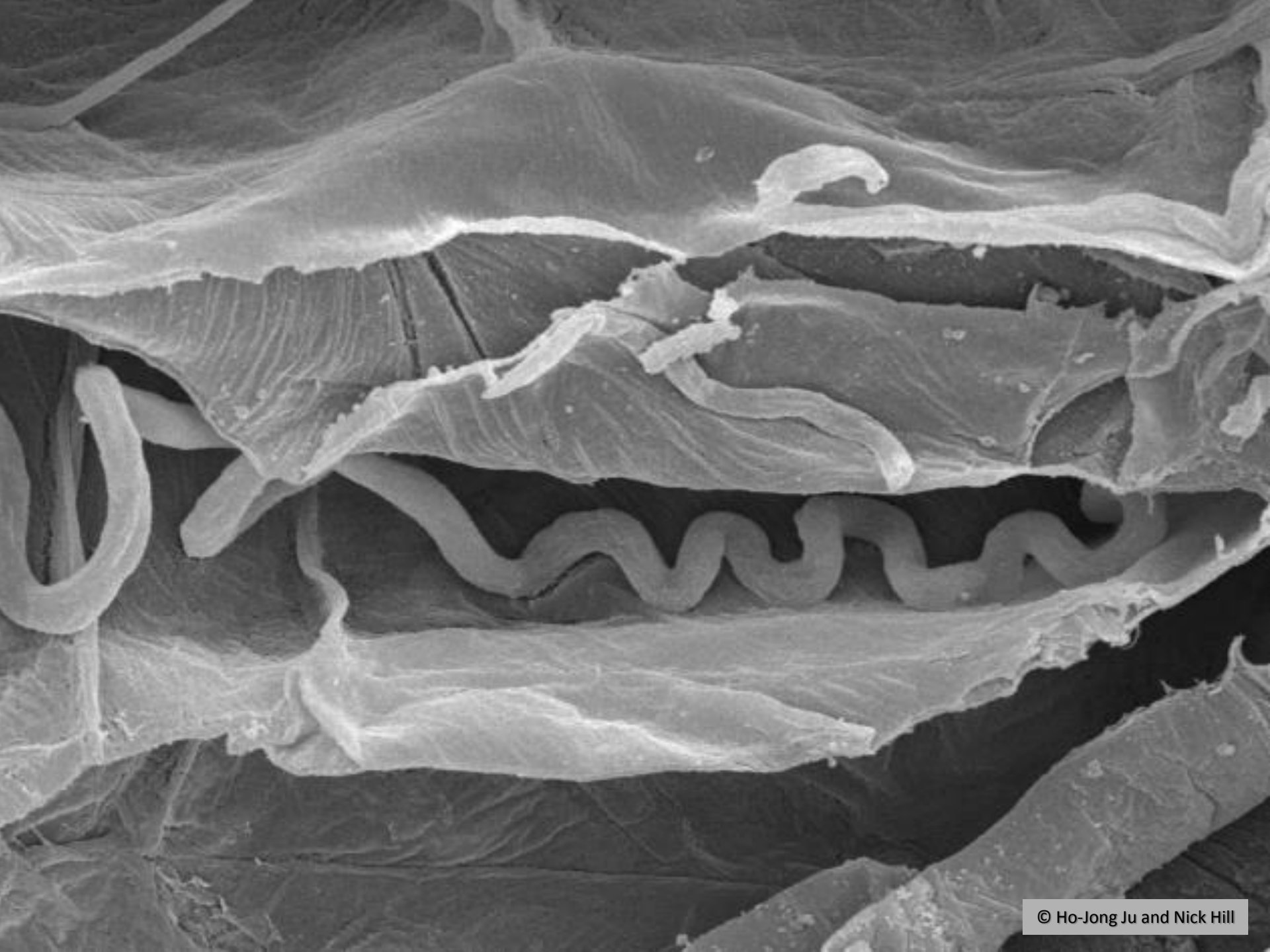
www.grasslandrenewal.org



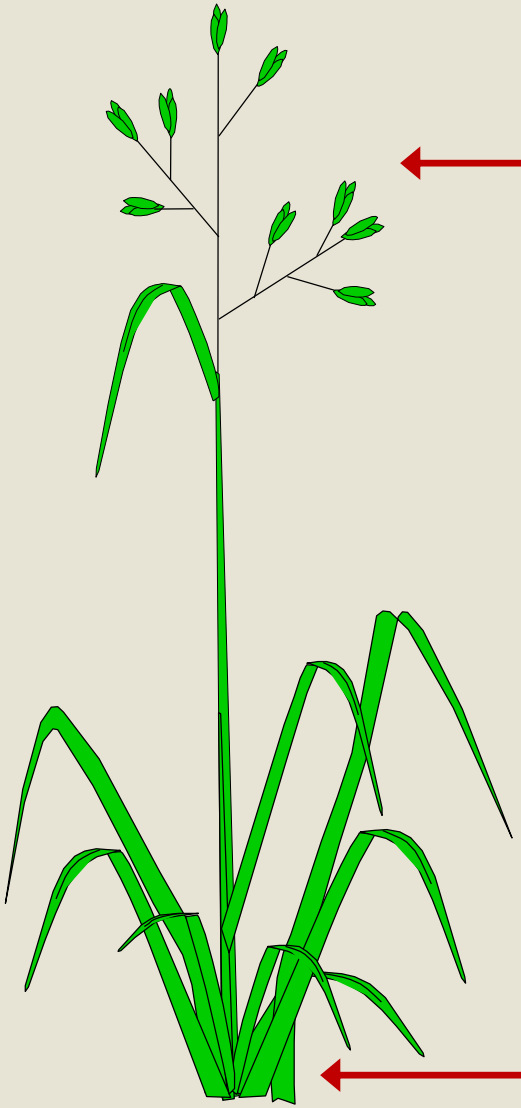
The talk today …

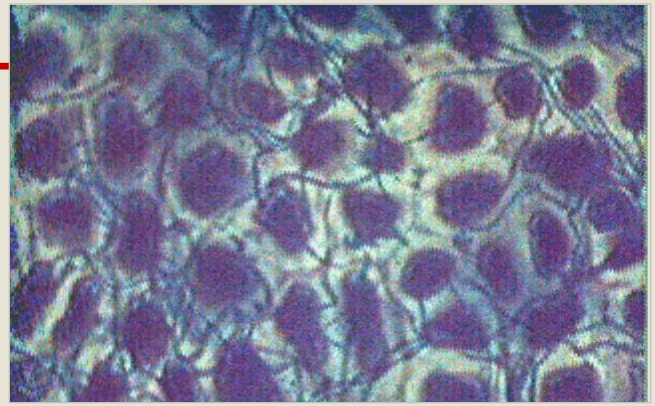
1. Fescue toxicosis
2. Management
3. T-Snip test for fescue tolerance

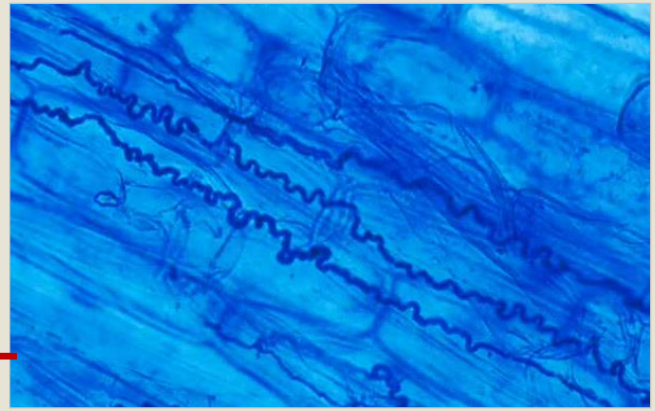
The talk today …
1. Fescue toxicosis

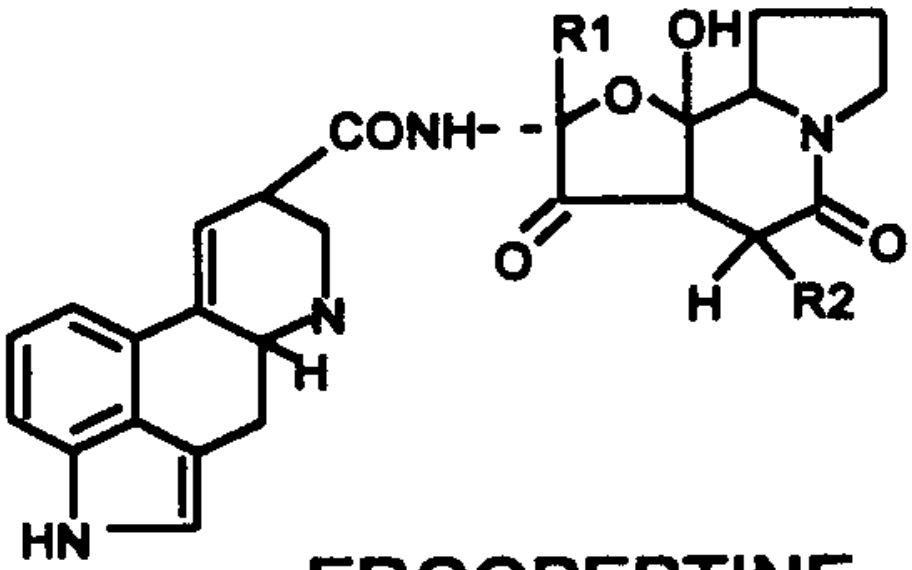


© Ho-Jong Ju and Nick Hill









ERGOPEPTINE STRUCTURE

R1 / R2	METHYL	ETHYL	ISOPROPYL
ISOPROPYL	ERGOVALINE	ERGONINE	ERGOCORNINE
ISOBUTYL	ERGOSINE	ERGOPTINE	ERGOCRYPTINE
ISOPHENYL	ERGOTAMINE	ERGOSTINE	ERGOCRISTINE

Health

- Vasoconstriction (narrowing of blood vessels)
- Poor thermoregulation
- Fescue foot, heat stress
- Immunosuppression

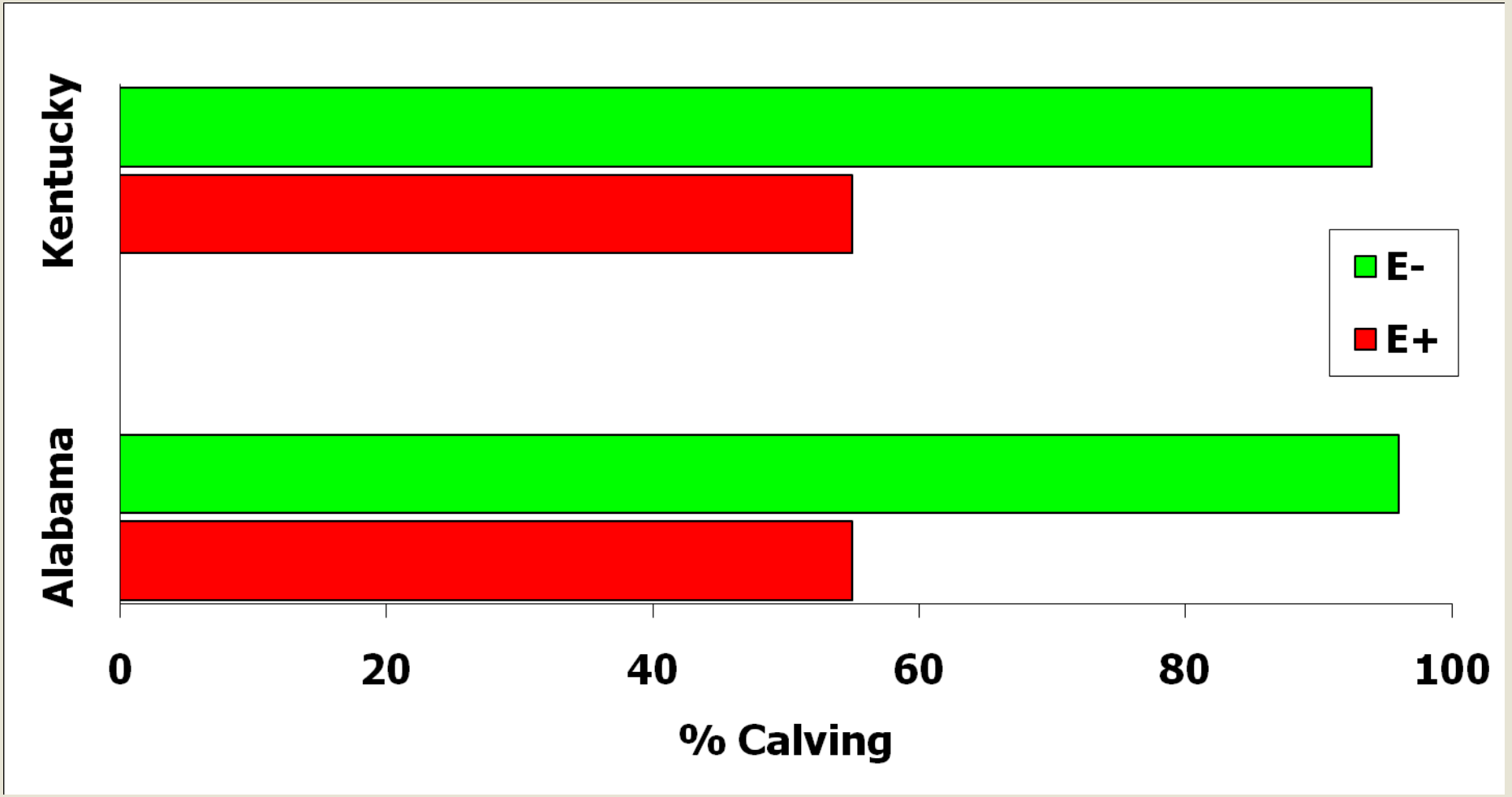
Production

- Low feed intake
- Low rate of gain
- Dystocia (birthing problems) and poor reproduction
- Aglactia (poor milk production)

© George Garner

© Matt Booher and Jon Benner, Virginia Tech

	E+ lb/day	E- lb/day
Texas	0.99	2.14
Alabama	1.41	2.18
Georgia	1.02	1.31
Alabama	1.00	1.83
Missouri	0.97	1.41
Alabama (seed)	0.44	2.12
Alabama (hay)	0.62	1.46



Schmidt, 1986; Gay, 1988

2004 Impact to Missouri Beef Industry

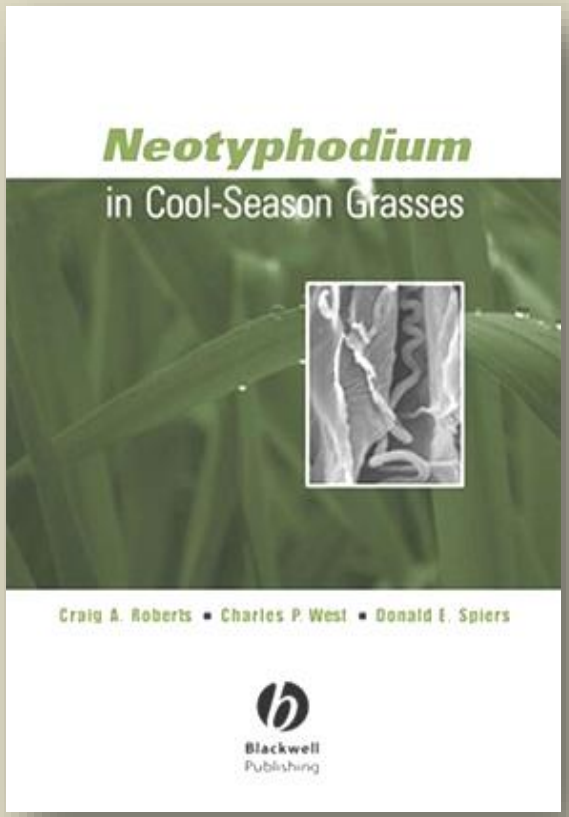
Stockers:

$30 million /year

Cow-calf:

$130 million /year

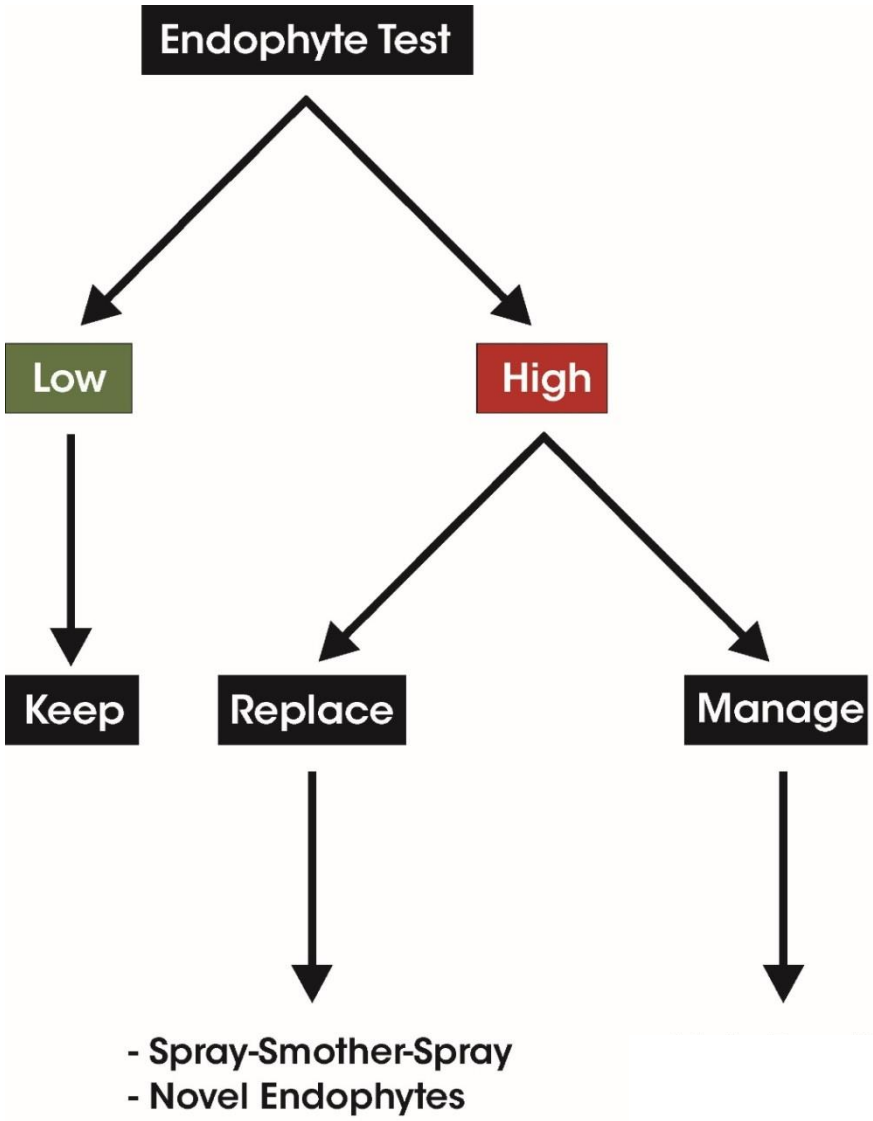
The talk today …
1. Fescue toxicosis
2. Management

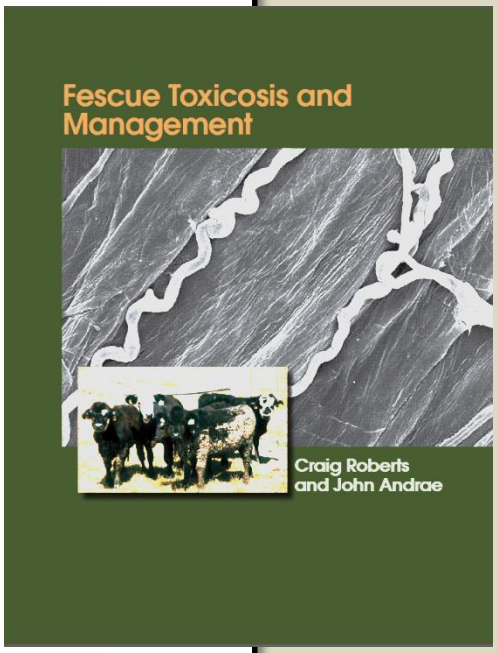


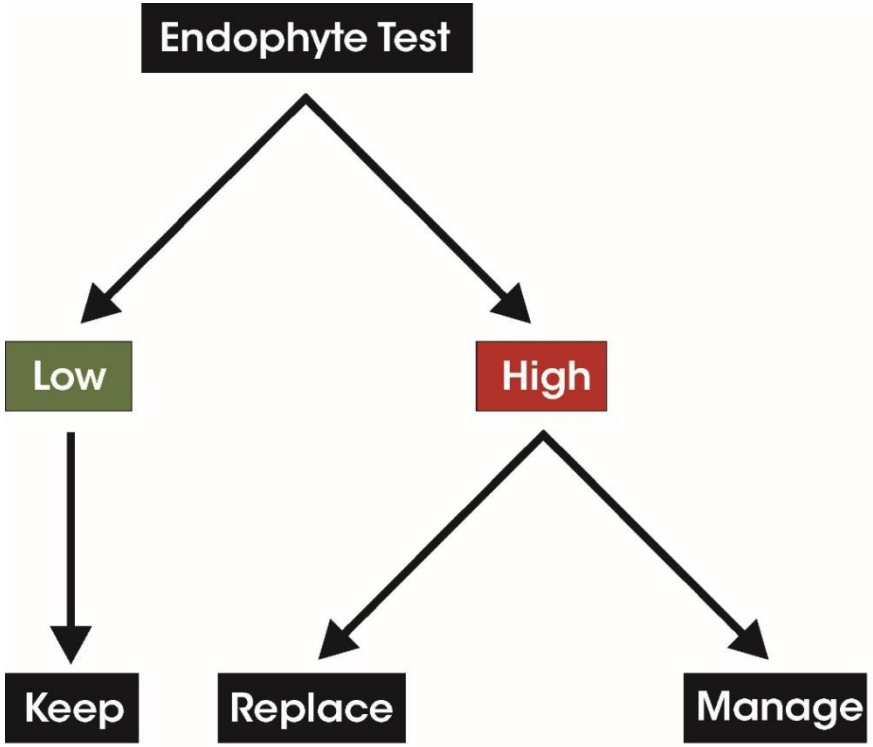
Eldon Cole's 97 Witches Brews

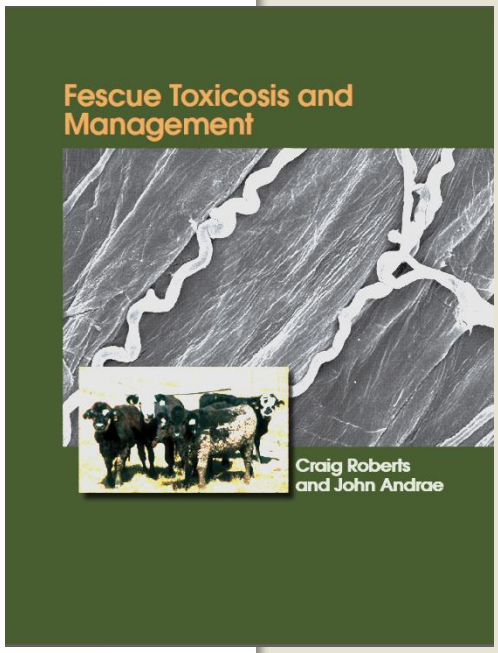
- Breed this
- Don't breed this
- Feed this
- Feed that
- Spices
- Pet milk
- Chase cattle

Roberts and Andrae, 2004


Endophyte Test
Low
High
Keep
Replace
Manage
- Spray-Smother-Spray
- Novel Endophytes


Fescue Toxicosis and Management
Craig Roberts and John Andrae



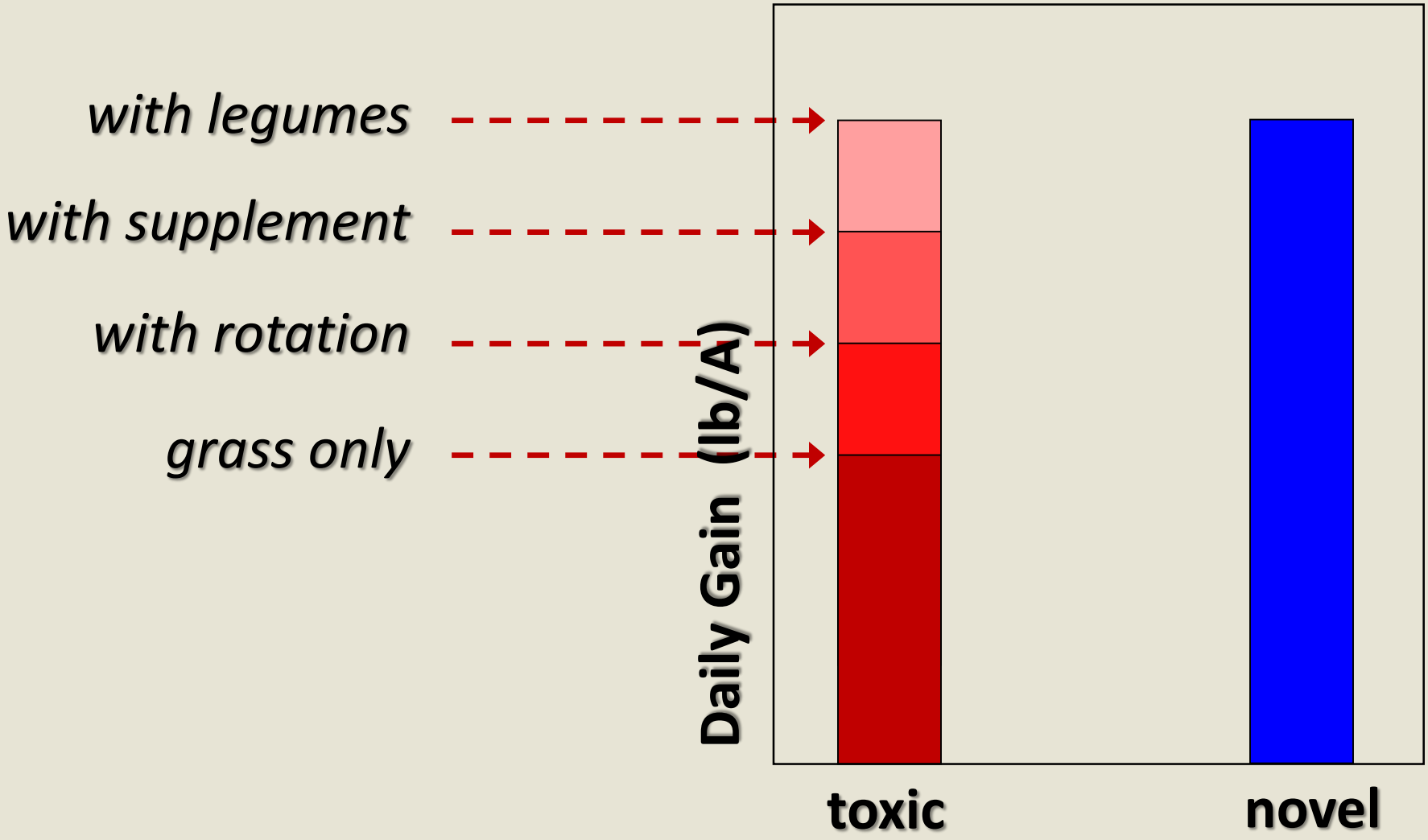


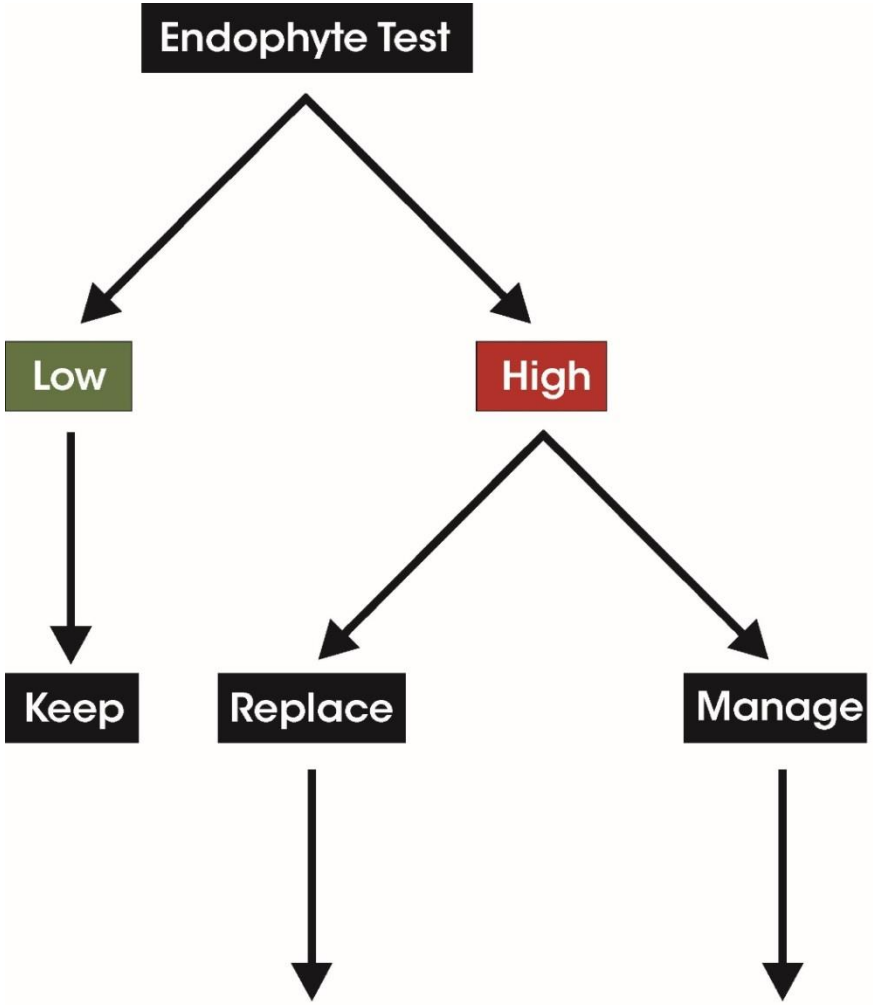
Alkaloid Management

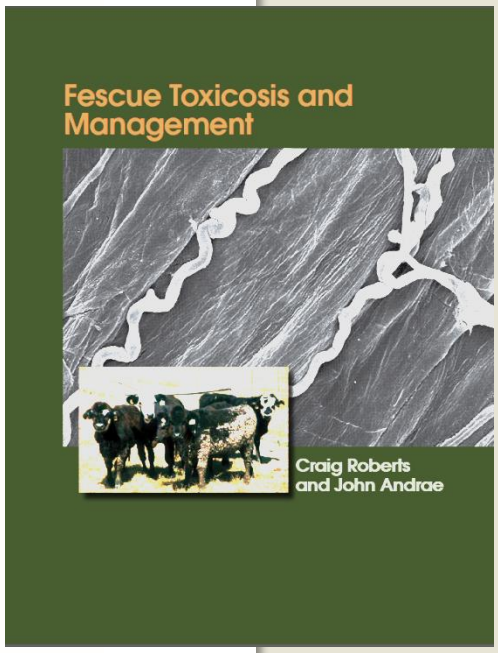
Incremental Alleviation

- Spray-Smother-Spray
- Novel Endophytes

- **Main Practices**
  - Summer grazing
  - Pasture dilution
  - Diet supplementation
- **Other Practices**
  - Local cattle
  - Low N fertilization
  - Hay ammoniation

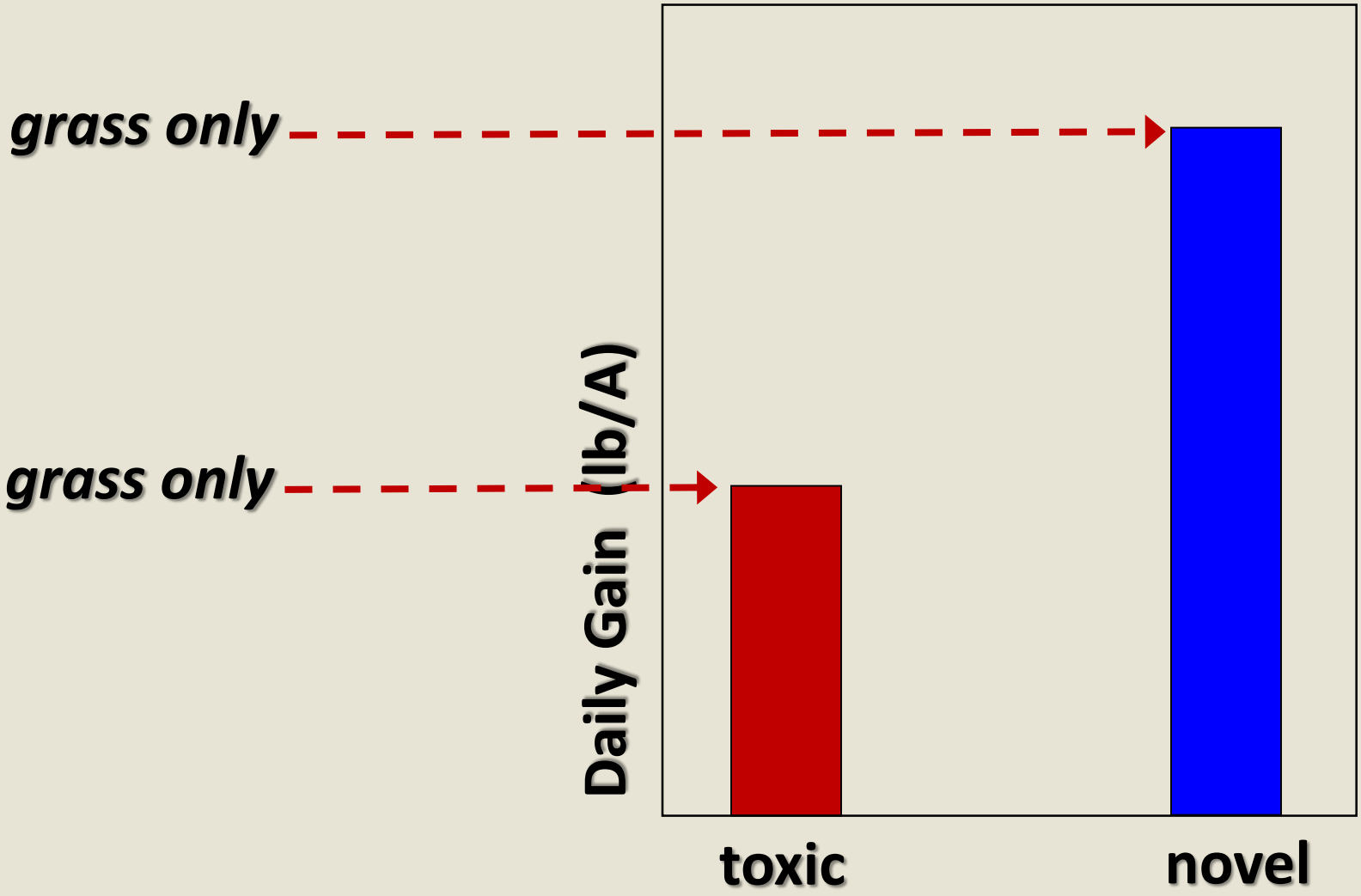

with legumes
with supplement
with rotation
grass only
Daily Gain (lb/A)
toxic
novel

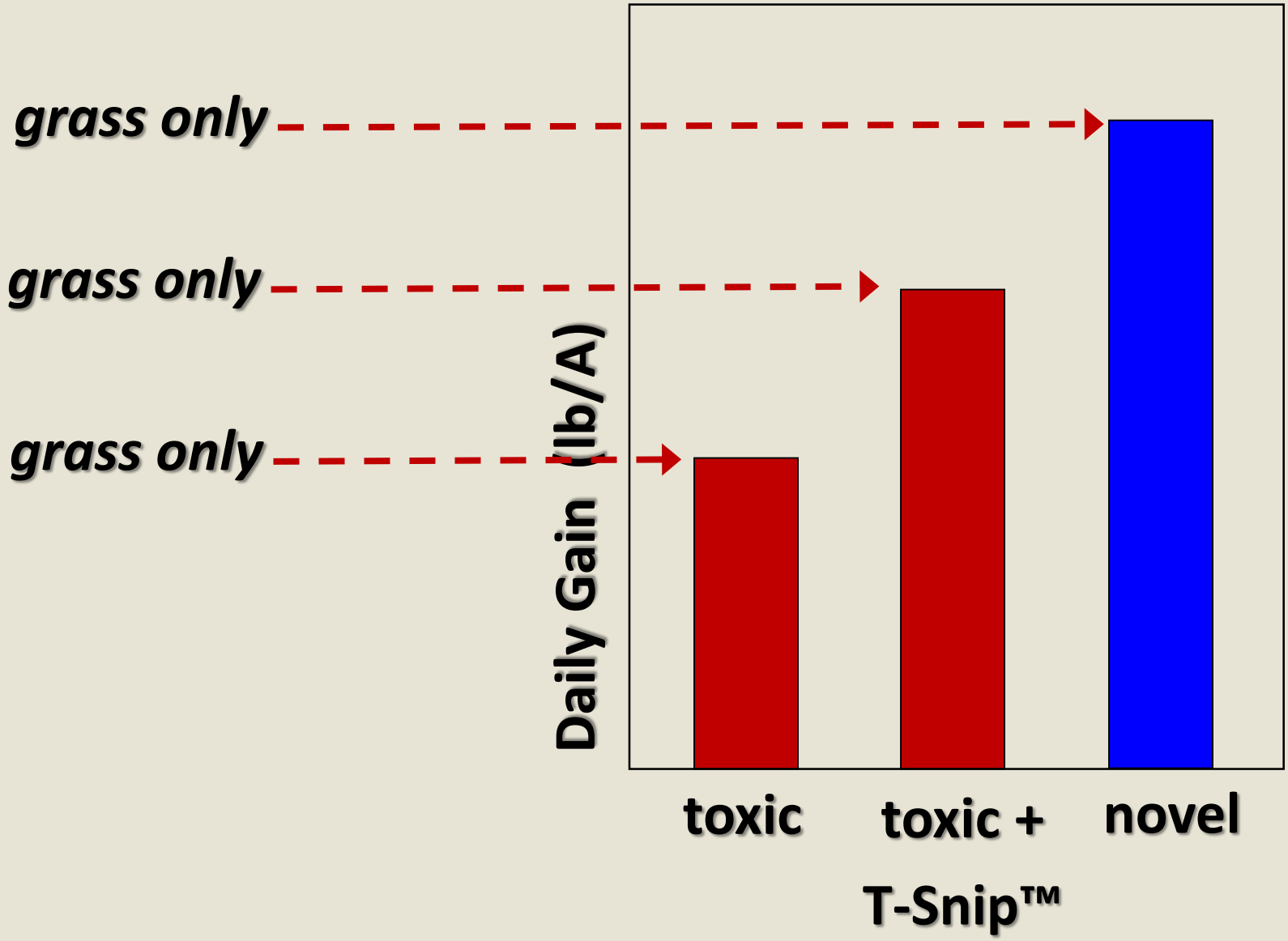


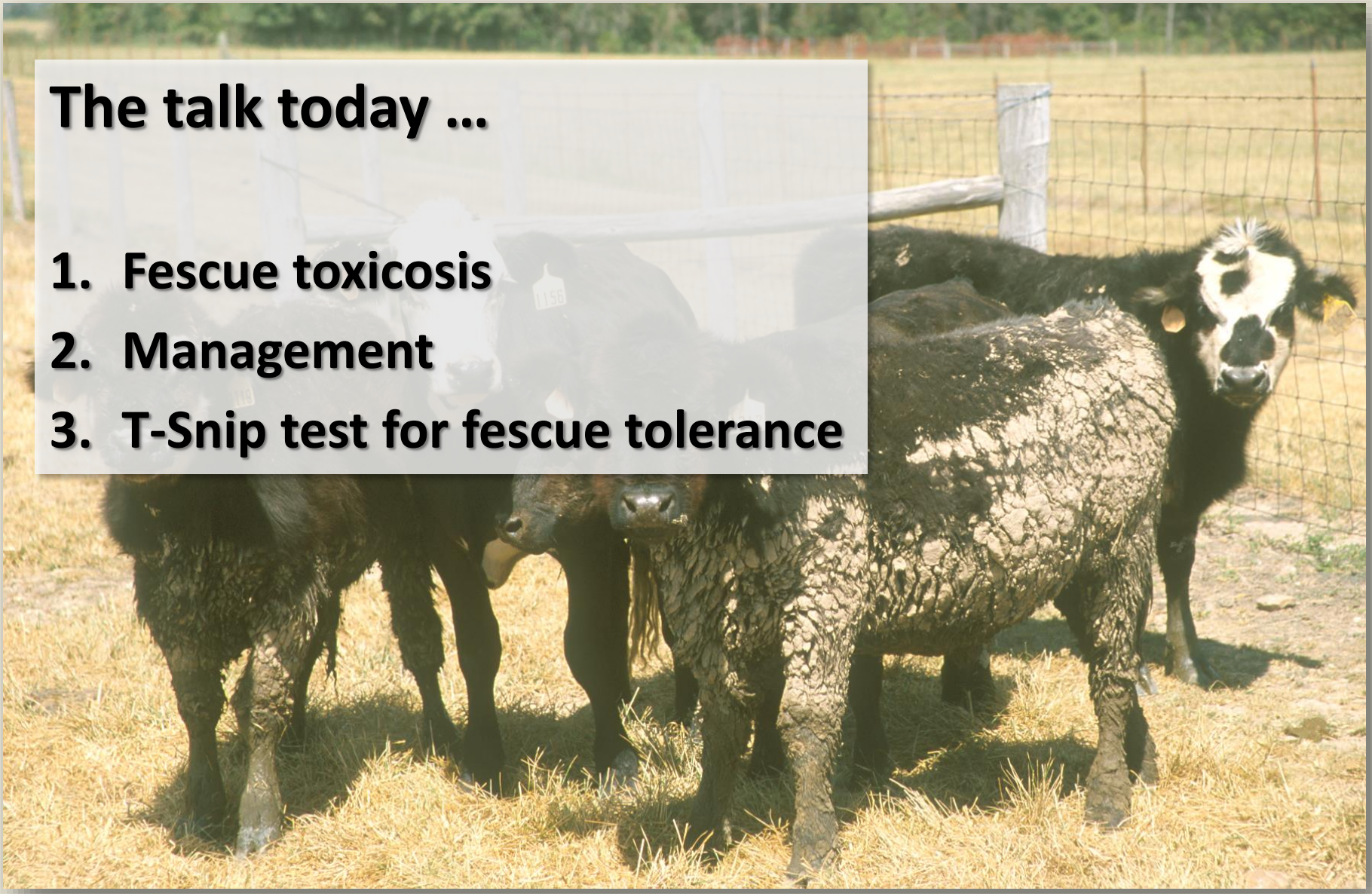


- Spray-Smother-Spray
- Novel Endophytes

- Main Practices
  - Summer grazing
  - Pasture dilution
  - Diet supplementation
- Other Practices
  - Local cattle
  - Low N fertilization
  - Hay ammoniation


grass only
grass only
Daily Gain (lb/A)
toxic
novel


grass only
grass only
grass only
Daily Gain (lb/A)
toxic
toxic + T-Snip™
novel



The talk today …

1. Fescue toxicosis
2. Management
3. T-Snip test for fescue tolerance

T-Snip™: a genetic test for fescue tolerance

www.agbotanica.com

T-Snip™ Test Results

Joe Customer
111 Route BB
Your Town, MO 12345
(573) 555-5555
JoeCustomer@email.net

June 11, 2016

Barcode	Animal ID	Tolerance Index	Rating
AG100744235	415118142864	4	
AG100744236	411318098597	10	★
AG100744237	410918038643	22	★★
AG100744238	414918212372	32	★★★
AG100744239	410118098594	44	★★★★
AG100744246	4G9218038638	48	★★★★★

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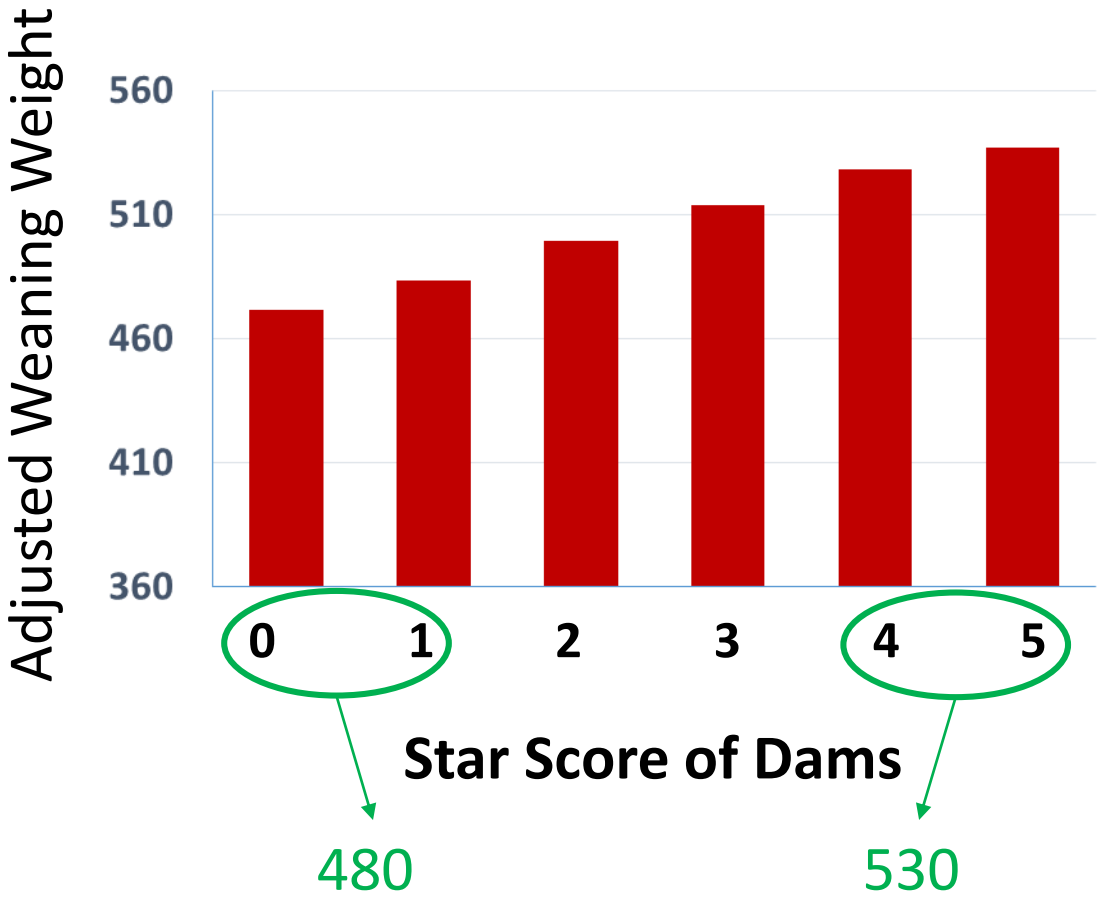
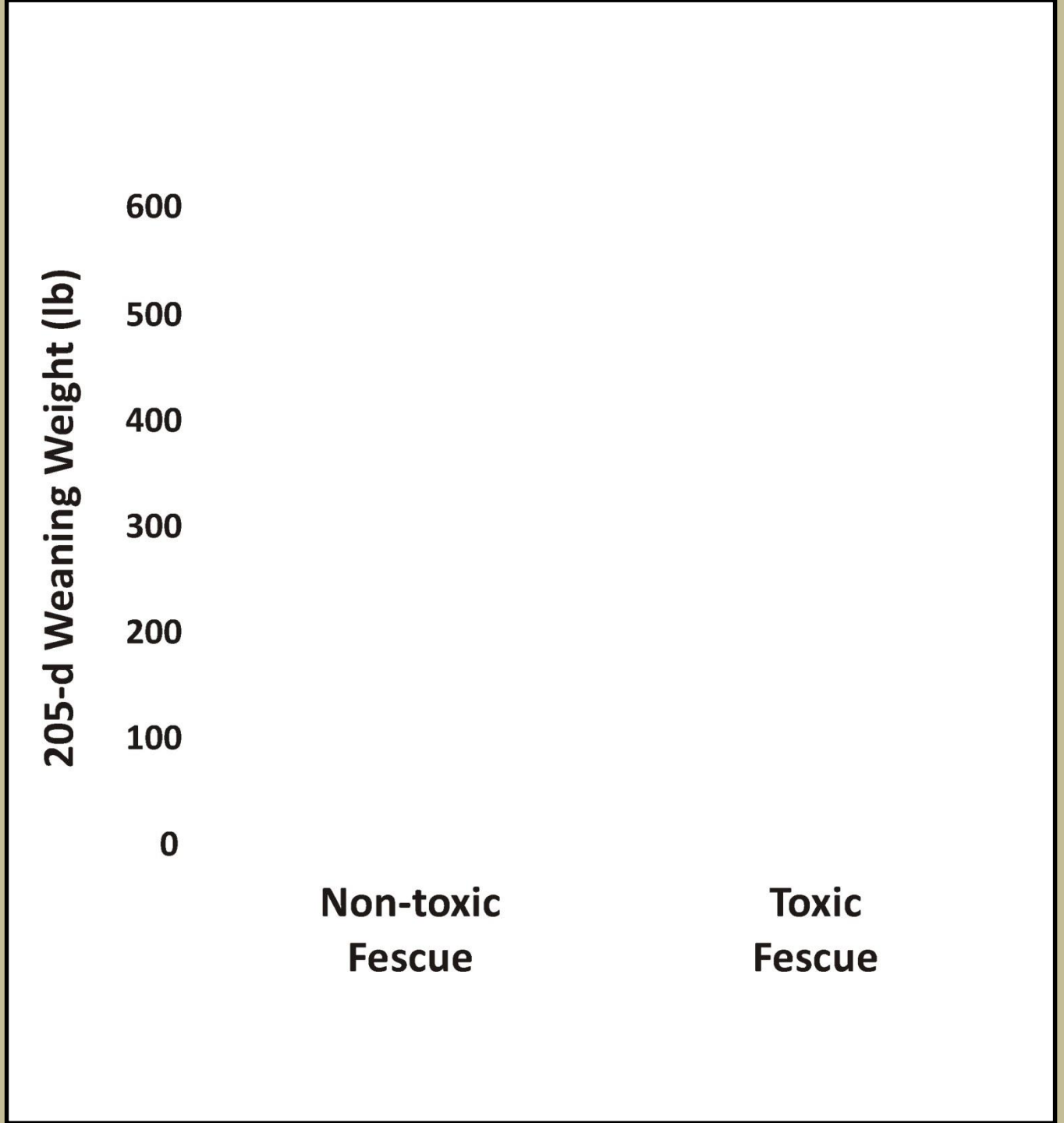
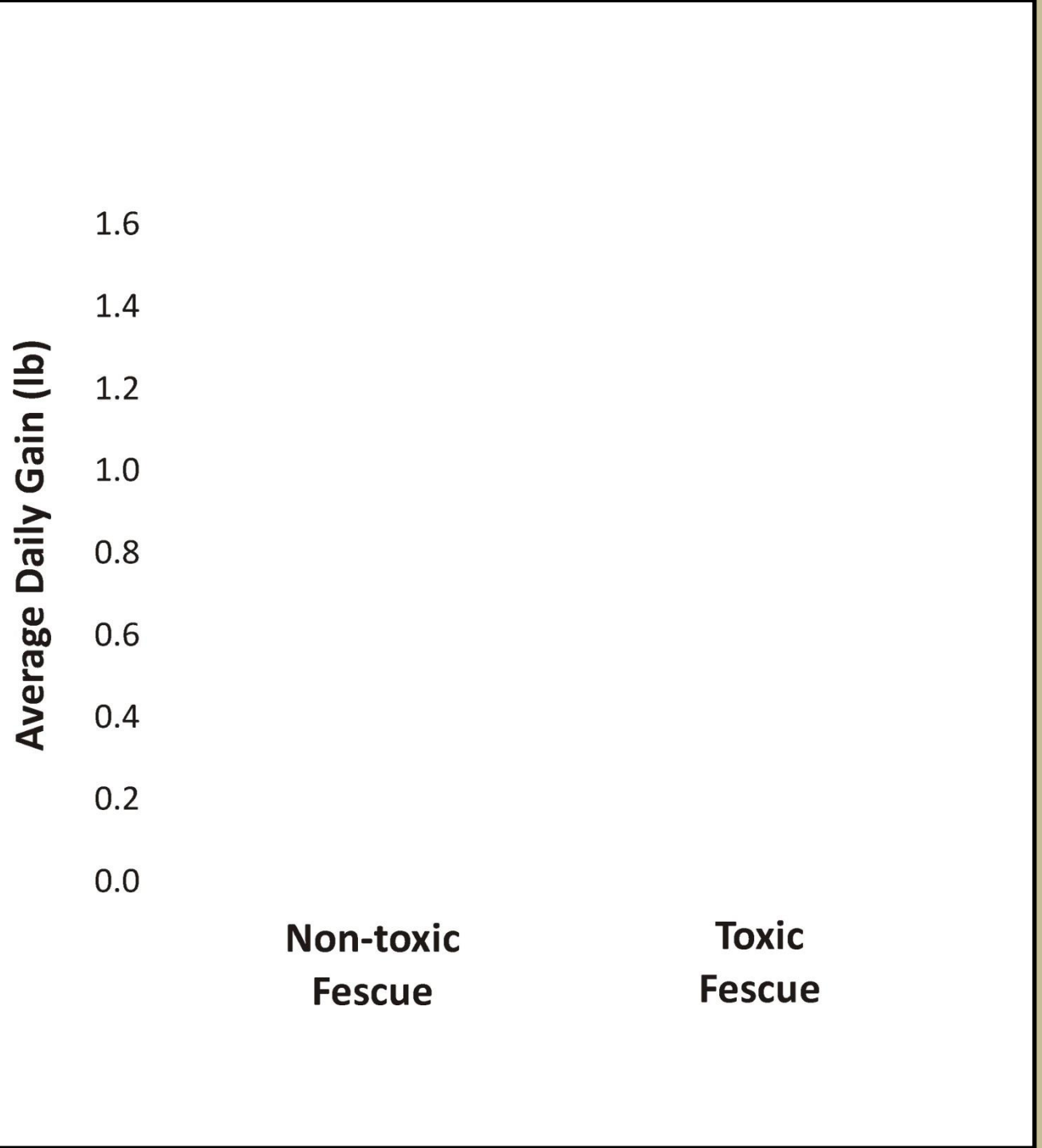
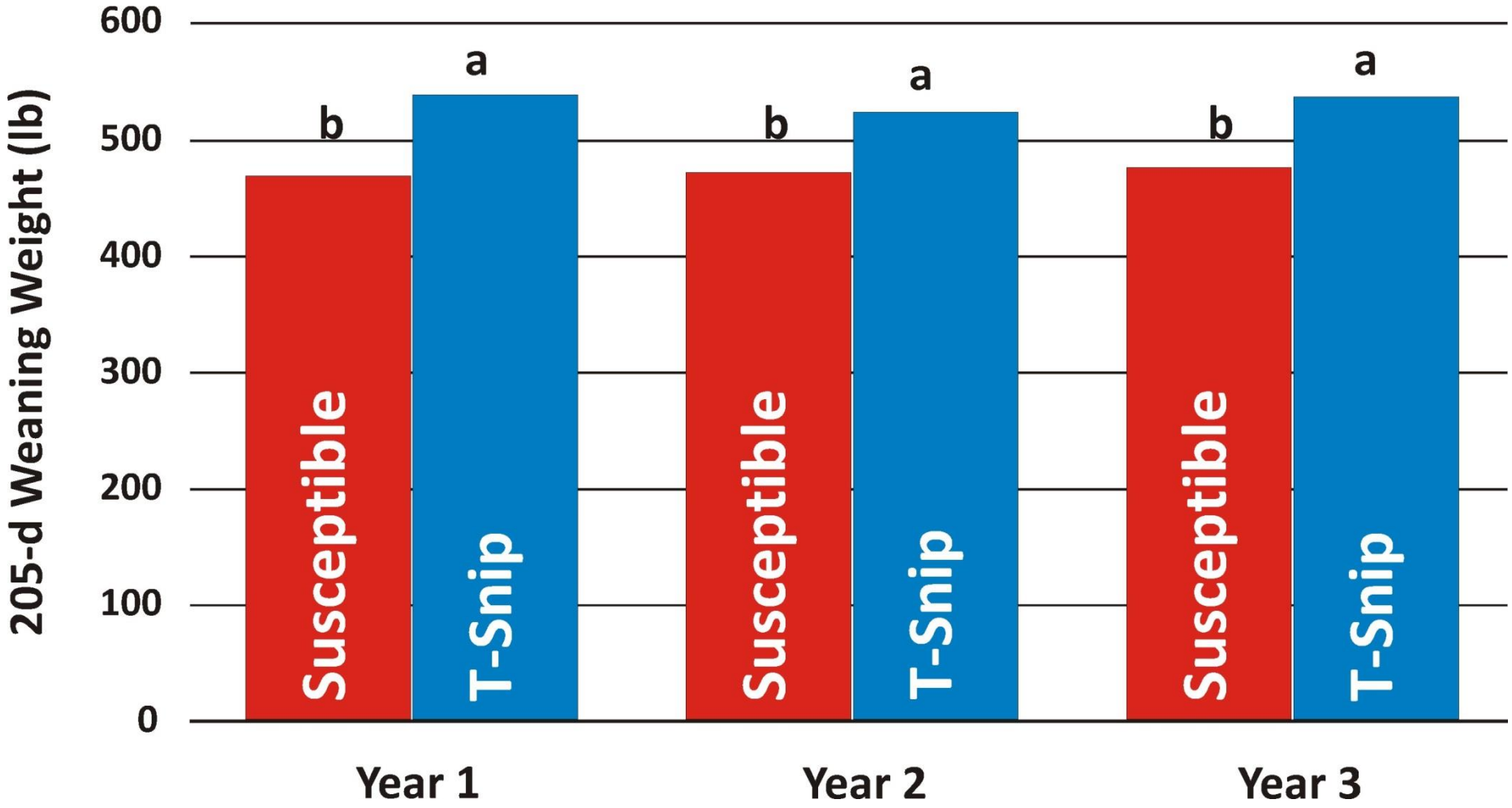
Relationship of Dam Star Score to Calf Adjusted Weaning Weight (*N=2,260*)

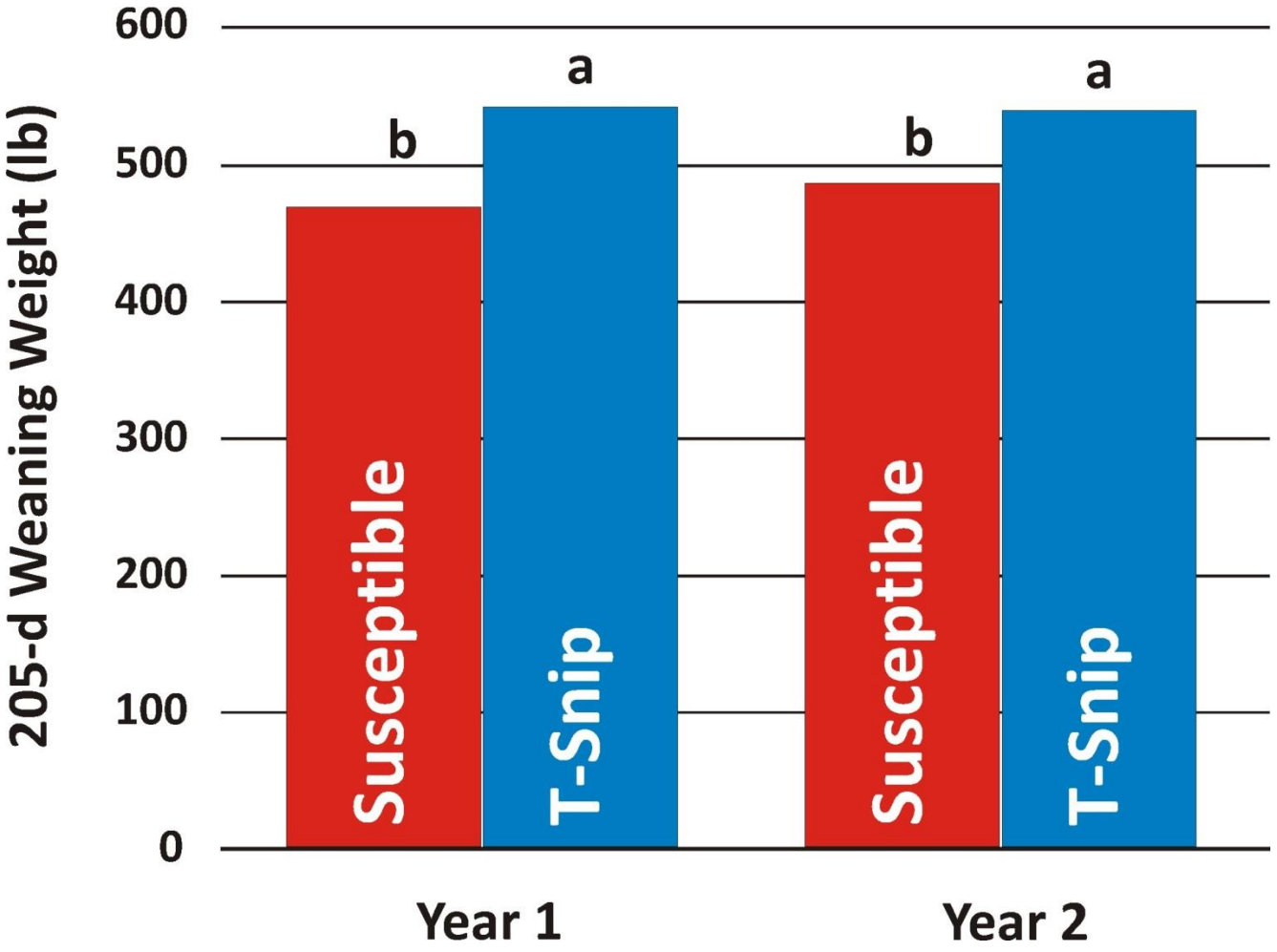


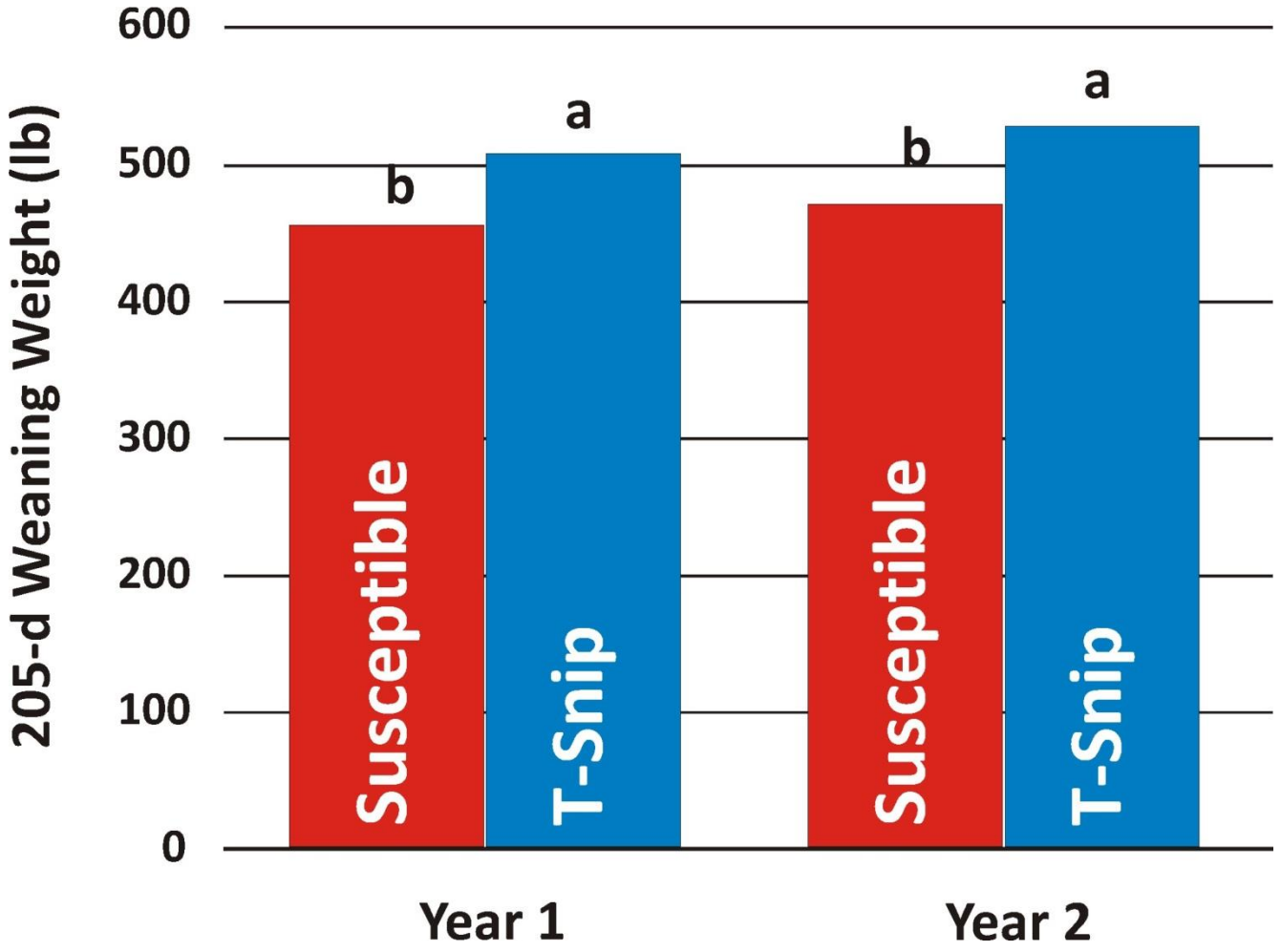
= 50 pound difference

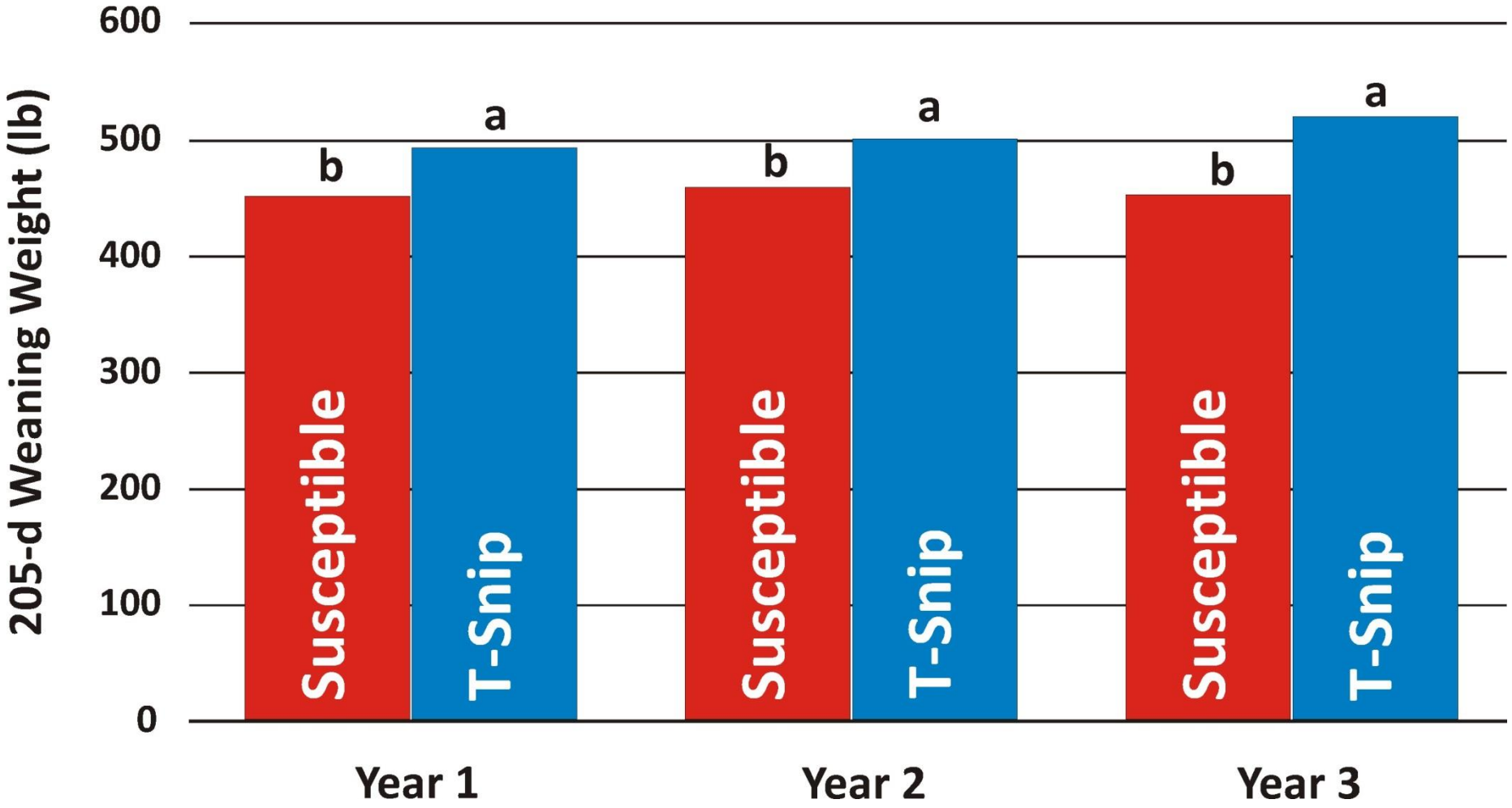

205-d Weaning Weight (lb)
600
500
400
300
200
100
0
Non-toxic Fescue
Toxic Fescue

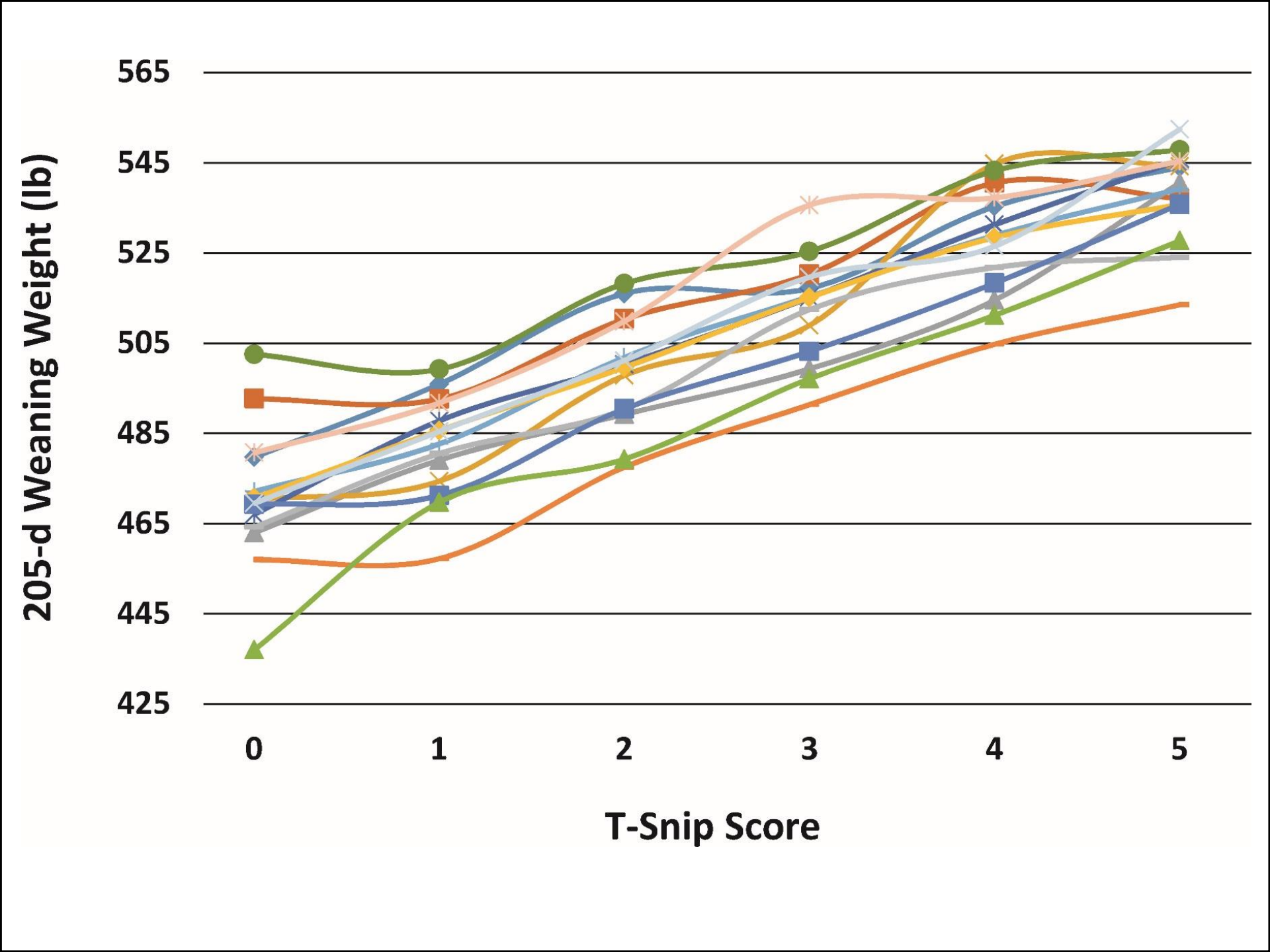

Average Daily Gain (lb)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Non-toxic Fescue
Toxic Fescue


205-d Weaning Weight (lb)
600
500
400
300
200
100
0
b
a
b
a
b
a
Susceptible
T-Snip
Susceptible
T-Snip
Susceptible
T-Snip
Year 1
Year 2
Year 3

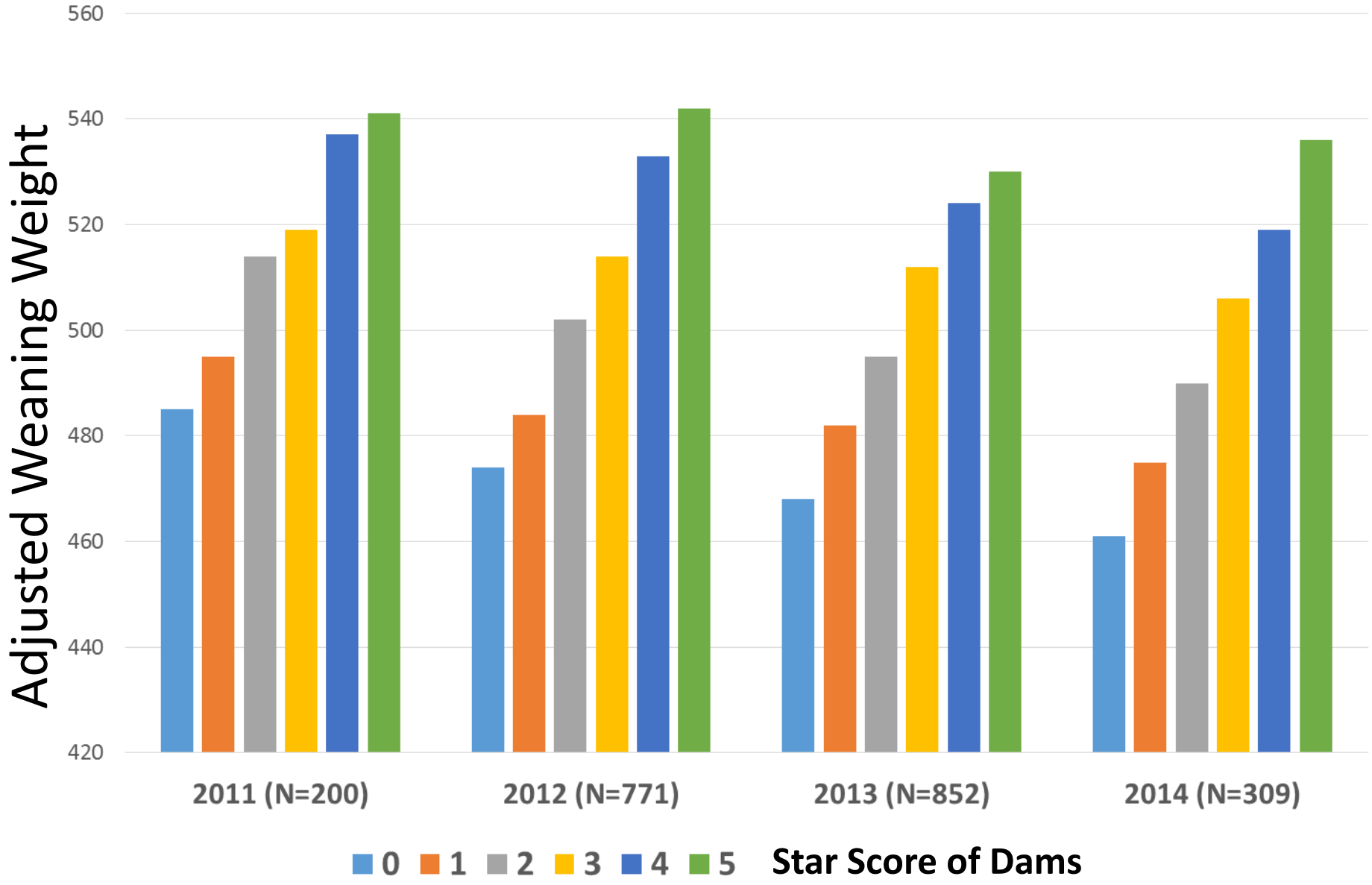

205-d Weaning Weight (lb)
600
500
400
300
200
100
0
b
a
b
a
Susceptible
T-Snip
Susceptible
T-Snip
Year 1
Year 2


205-d Weaning Weight (lb)
600
500
400
300
200
100
0
b
a
b
a
Susceptible
T-Snip
Susceptible
T-Snip
Year 1
Year 2

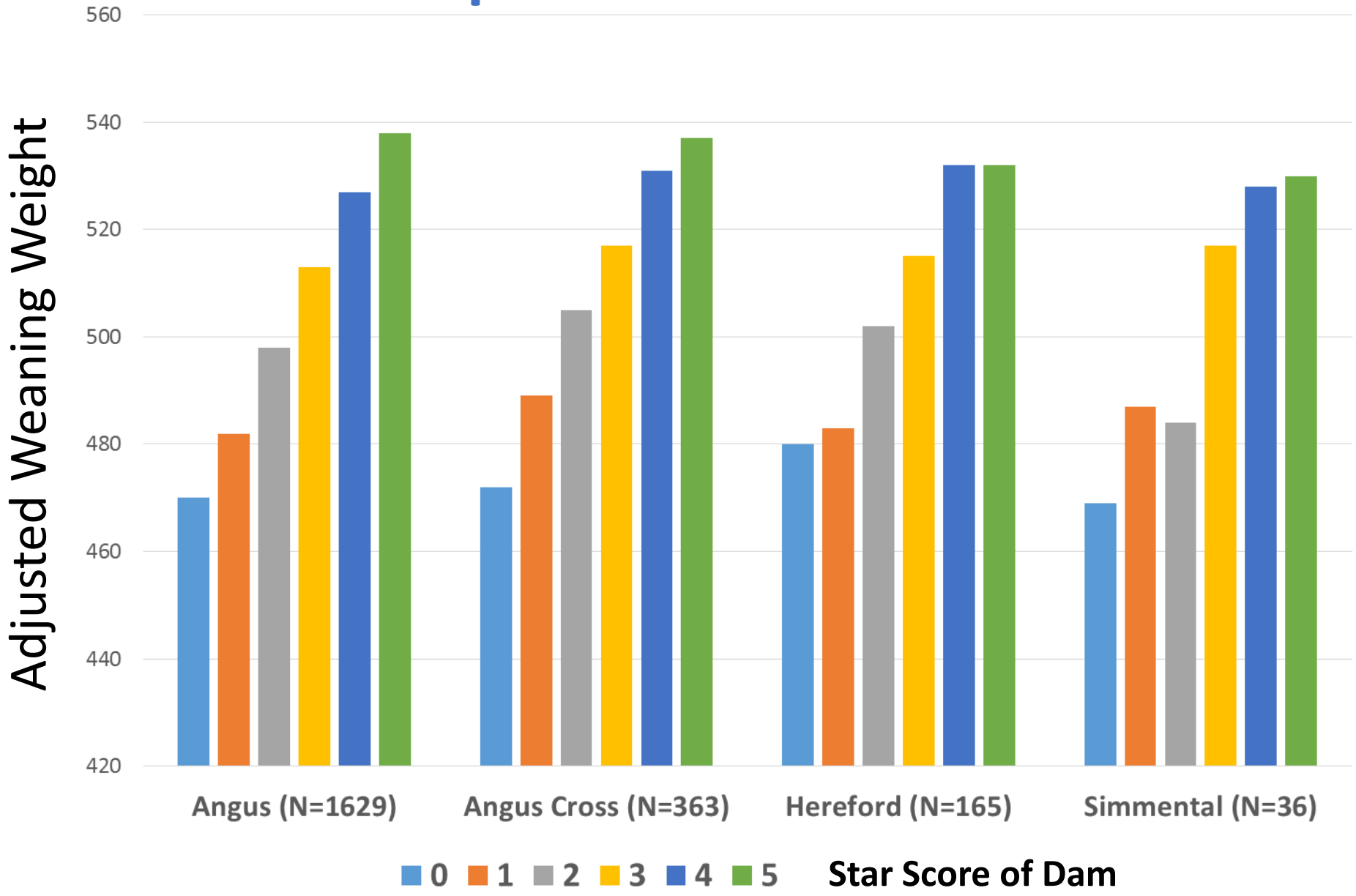

205-d Weaning Weight (lb)
600
500
400
300
200
100
0
b
a
b
a
b
a
Susceptible
T-Snip
Susceptible
T-Snip
Susceptible
T-Snip
Year 1
Year 2
Year 3


565
545
525
505
485
465
445
425
205-d Weaning Weight (lb)
0
1
2
3
4
5
T-Snip Score

This Relationship is Consistent Across Years

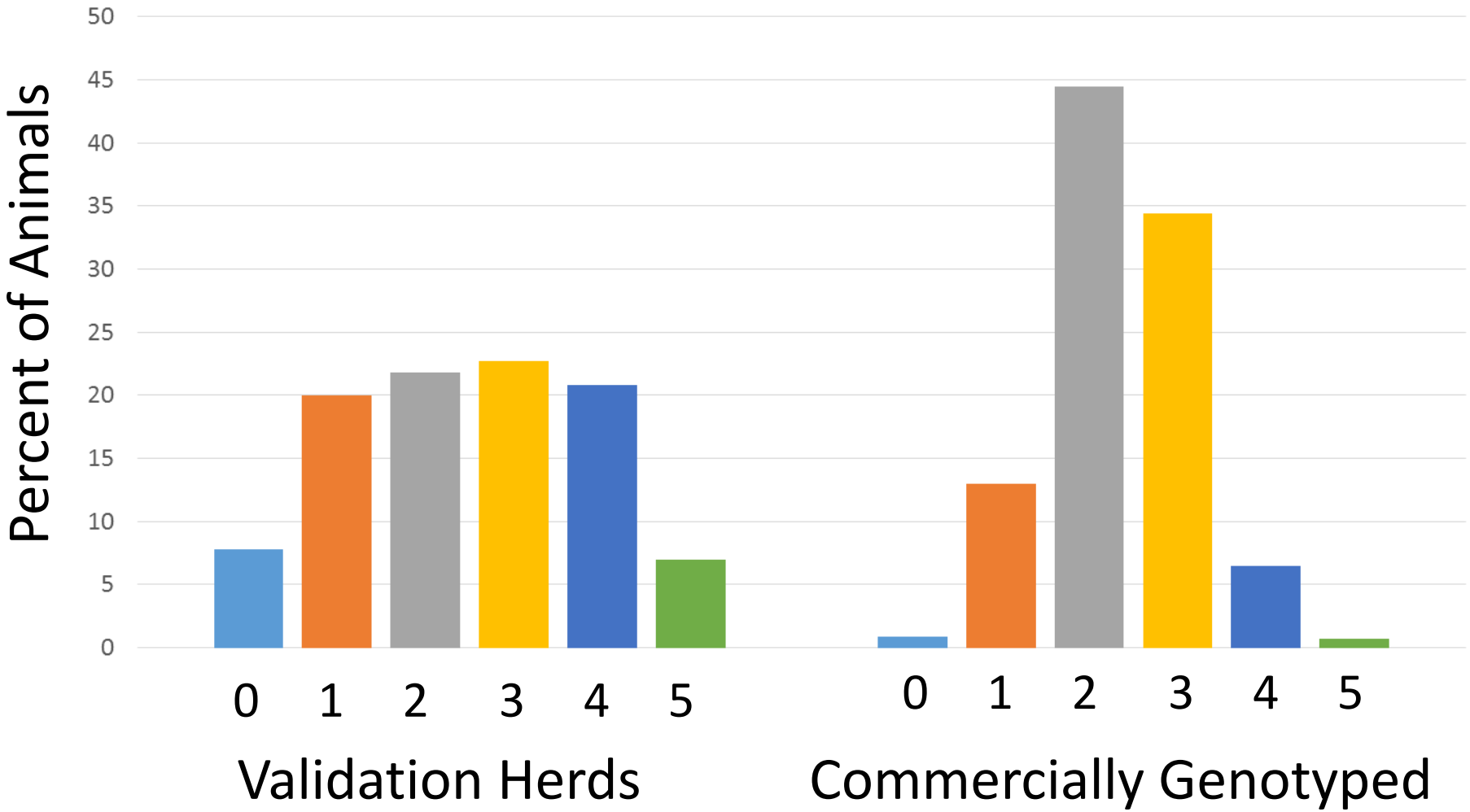


This Relationship is Consistent Across Breeds*



*Breed as defined by owner; cows were not registered

What Scores Should be Selected?



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Submit a Sample

Find out More

To find out more, view the video or click here to learn more about Fescue Toxicosis

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T-Snip™ Testing

T-Snip™ is a genetic test that identifies cattle with improved tolerance to fescue toxicosis. T-Snip™ has been confirmed in grazing and feeding
been identified by T-Snip™ as tolerant have had 8% higher intake, 41% higher gain, and 55 lb heavier weaning weights. For more information
toxicosis, click here.

To submit a sample for T-Snip™ testing, create an account with AgBotanica or login to your existing account.

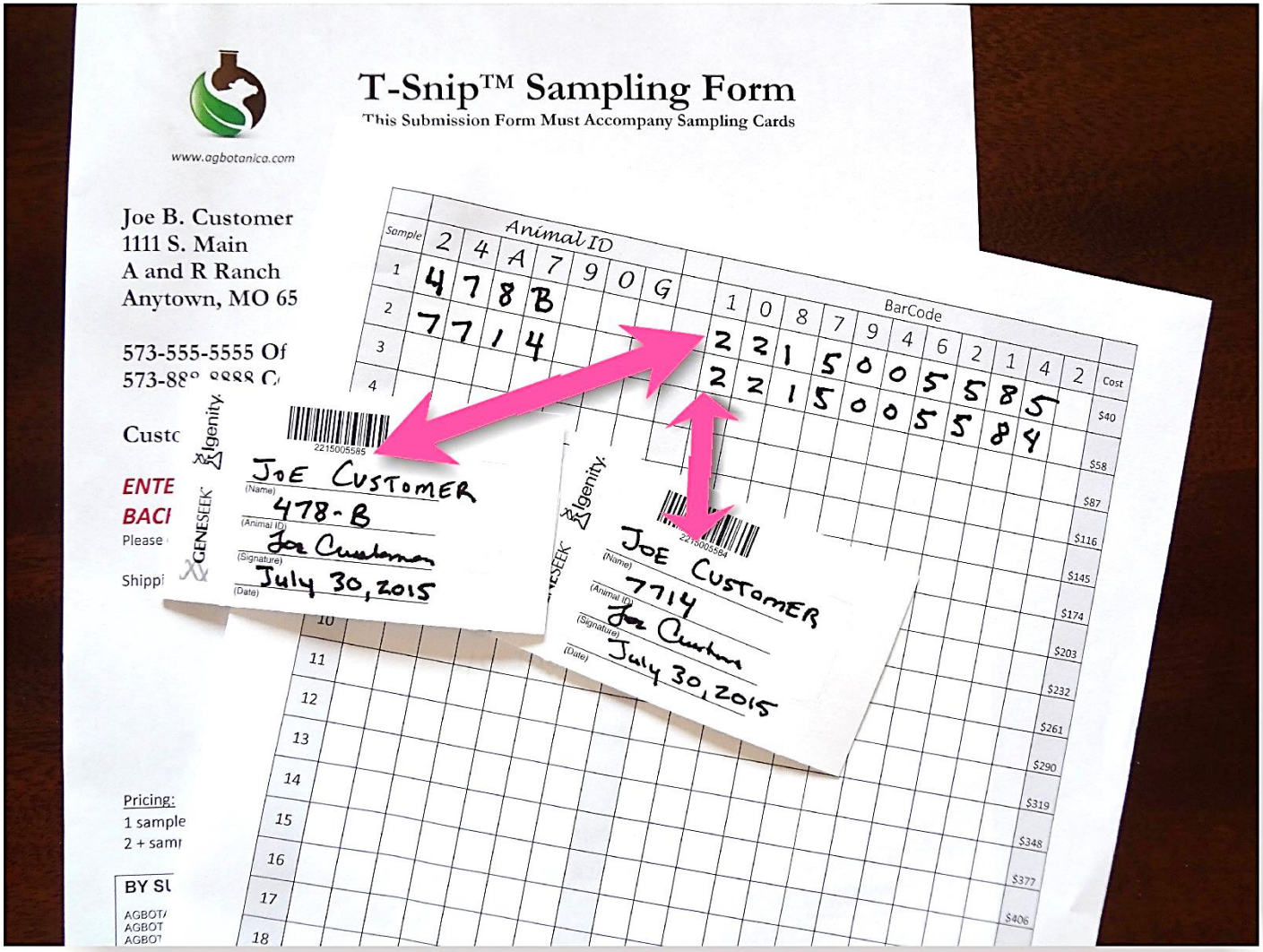
Create Account | Login

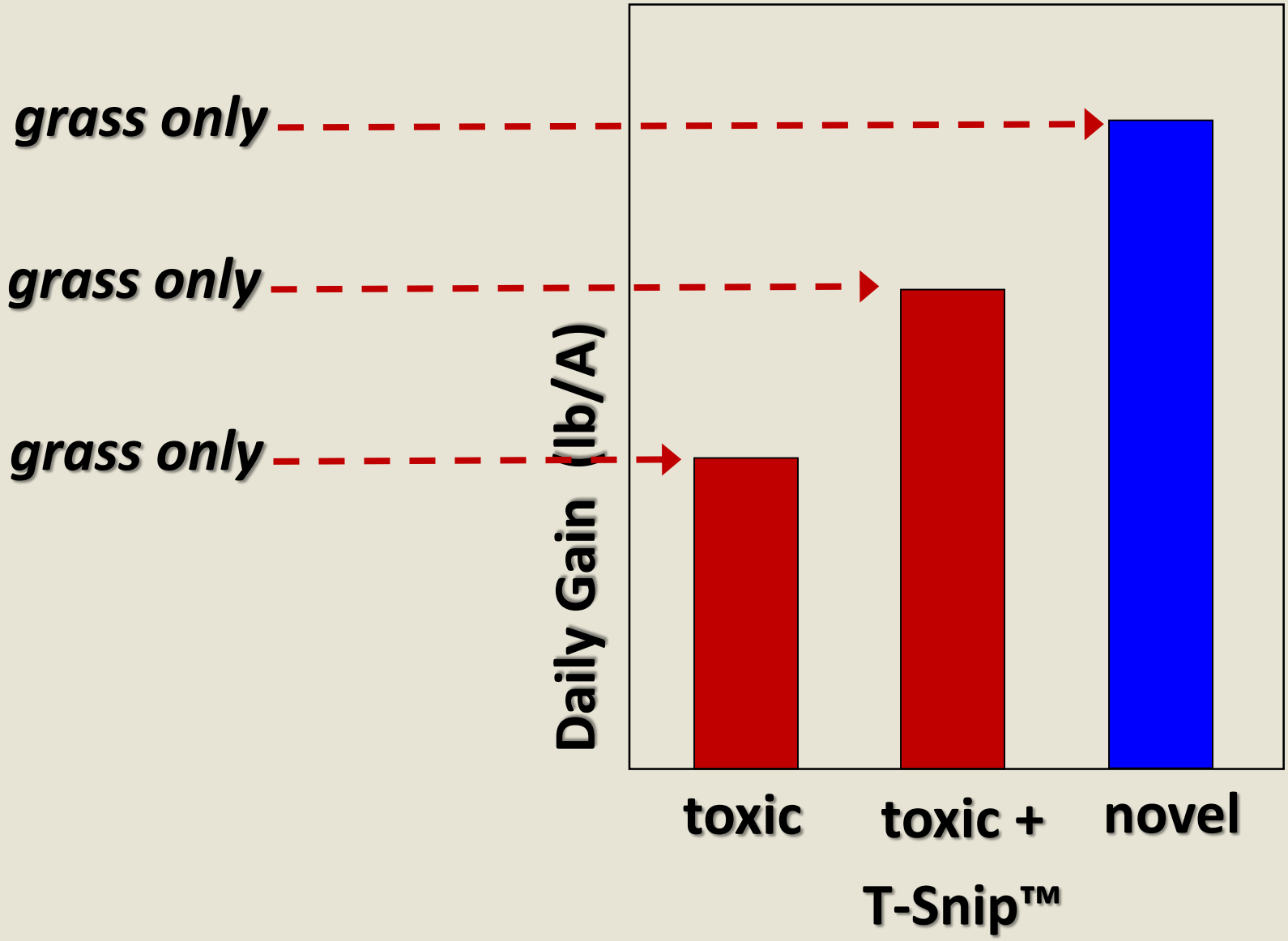
Then follow the 5-step process below. If you do not have cards, begin with step 1 by clicking on it.

1 Order Cards — 2 Print Forms — 3 Collect Samples — 4 Pay for Samples — 5 Mail Samples

1 Order Cards — 2 Print Forms — **3 Collect Sample** — 4 Make Payment — 5 Mail Samples

1 Order Cards — 2 Print Forms — **3 Collect Sample** — 4 Make Payment — 5 Mail Samples




grass only
grass only
grass only
Daily Gain (lb/A)
toxic
toxic + T-Snip™
novel

General Comments about T-Snip™

- Research needs: heritability, vasoconstriction, etc.
- One-time cost
- Not “resistant” but tolerant
- Allows “half recovery” (intake, gain, weaning weight)
- No set recommendation—Bulls first? Heifers first?

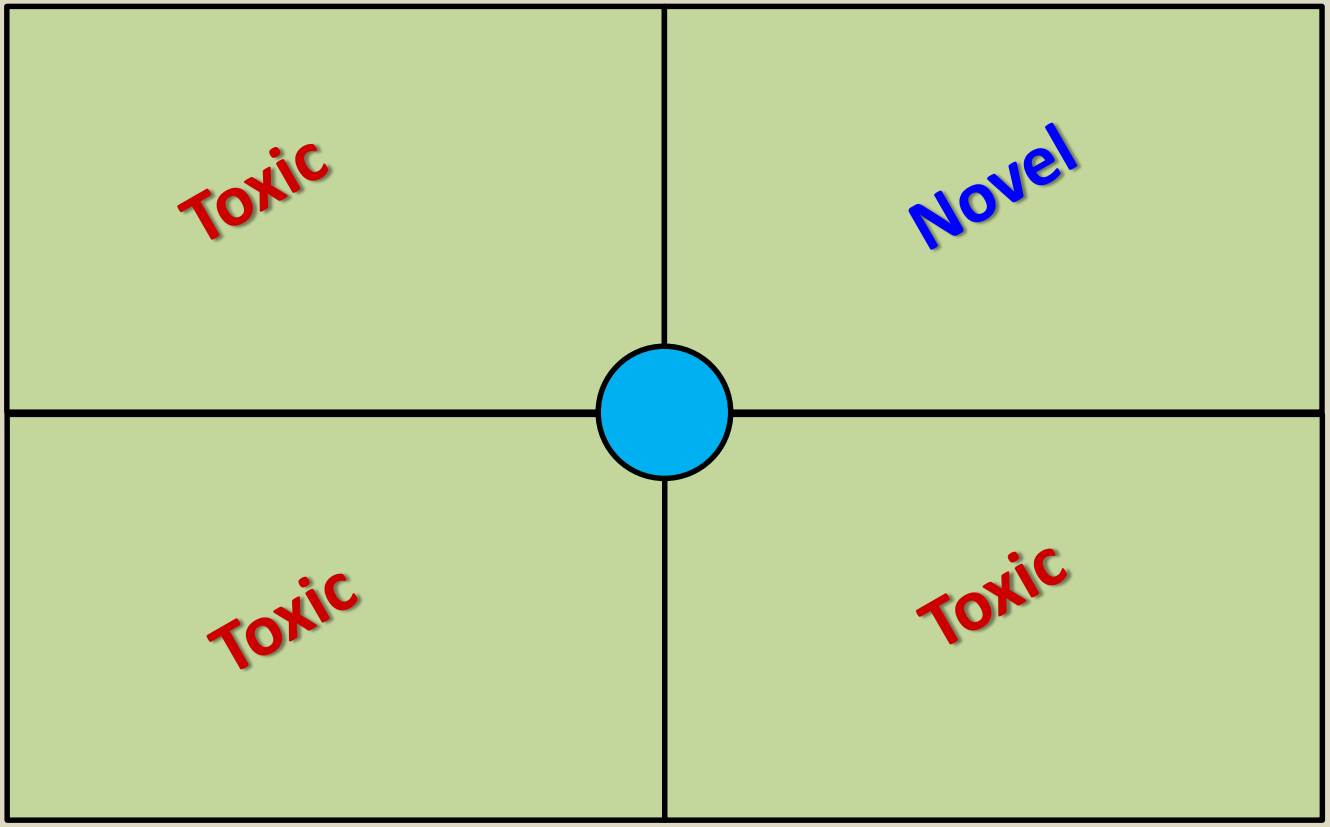
How can the scores be used? (Dr. Spurlock)

1) **Selection Decisions**
   - Replacement Heifers
   - Bulls to sire Replacement Heifers

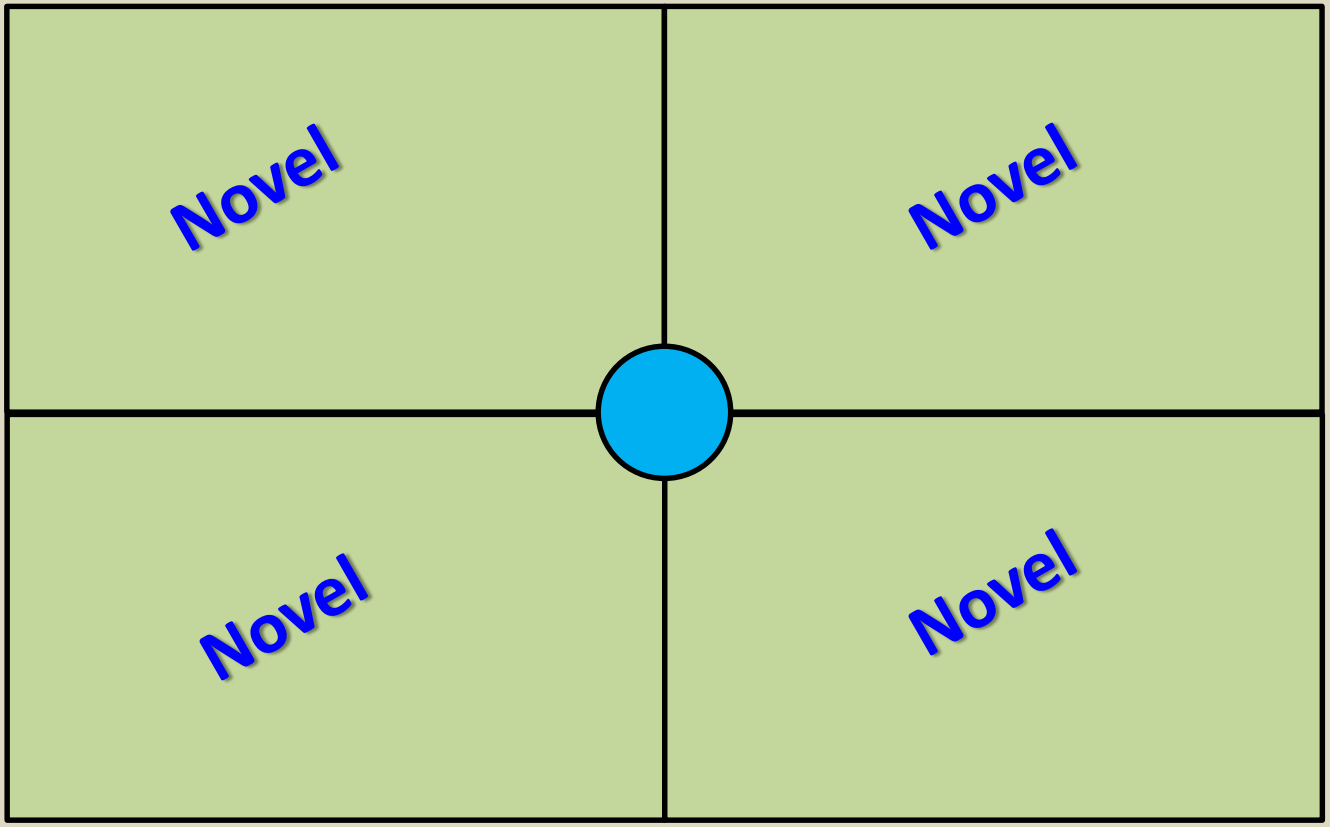
2) **Mating Decisions**
   - Mate highest scoring cows and bulls to optimal replacement heifers

3) **Culling Decision**
   - Information to consider when removing cows from herd

Management when Converting to Novel



Management with Novel Endophyte Fescue



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