The influence of beef cow weaning weight ratio and cow size on winter grazing distribution, feed and supplement intake behavior, and milk production

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Objectives

- Assess how cow weaning weight ratio (WWR) and cow weight (BW) effect:
  - winter grazing behavior
  - winter supplement intake
  - winter rangeland resource use
  - feed intake
  - milk production

Reasoning

- The ideal cow would convert forage consumed to greater pounds calf weaned and optimize grazing distribution (Stewart and Martin, 1983; Scasta et al., 2015)
- Metrics that accurately identify cattle efficiency in extensive rangeland systems are needed (Dinkel and Brown, 1978; Beck et al., 2016)
- The ratio of calf weight weaned to cow weight is an accurate estimate of cow efficiency (Dinkel and Brown, 1978; Scasta et al., 2015)
- According to NRC Beef Cattle Nutrition Guidelines, small cattle eat less than large cattle (Walker et al., 2015; NASEM, 2016)
- Milk yield and constituents influence calf pre-weaning ADG (Totusek et al., 1973; Mondragon et al., 1983; Beal et al., 1990)

Questions? Please feel free to contact!
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Methods

- Four classification groups with 10 cows per group
  1. High WWR (56%) – light BW (1107 lbs)
  2. High WWR (53%) – heavy BW (1208 lbs)
  3. Low WWR (42%) – light BW (1316 lbs)
  4. Low WWR (42%) – heavy BW (1415 lbs)
- Classification groups determined by individual cow lifetime average weaning weight ratio and lifetime average body weight
- All cows had weaned at least 3 calves prior
- Winter grazing trial (Dec 1, 2016 to Jan 15, 2017 and Nov 1 to Dec 31, 2017)
  - Grazing distribution
    - Lotek 3300LR GPS collars
  - Supplement intake
    - SmartFeedPro electronic feed bunks
    - CHS 30% protein, fully-fortified, pellet
- Spring feedlot trial (May 2 to 23, 2017 and May 1 to 22, 2018)
  - Feed intake
    - SmartFeedPro electronic feed bunks
    - CHS 15% protein, fully-fortified, grass/alfalfa pellet
  - Milk yield and constituents
    - Weigh-suckle-weigh protocol
    - 100 ml milk sample collections

Future Analyses

- Resource use models for each classification group
  - Habitat selection preference between groups
  - Resource attributes that best describes areas of use

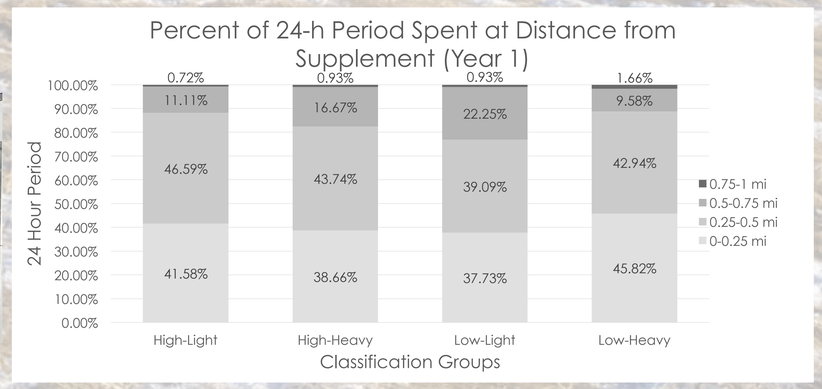

Figure 1. Percent of a 24-h period spent at distances of 0-0.25, 0.25-0.5, 0.5-0.75, and 0.75-1 mile from supplement locations between two cows from each classification group for year 1 (45-d study).

Conclusions

Table 1. Feed intake and milk performance trial results from year 1.

Item	High WWR Light	High WWR Heavy	Low WWR Light	Low WWR Heavy	SE	WWR *P*-value	BW *P*-value	WWR*BW *P*-value
Intake								
Daily, lb	40.1	45.9	38.8	46.5	2.14	0.98	<0.01	0.69
Daily, % of BW	3.4	3.6[a]	2.8[b]	3.3	0.16	<0.02	<0.06	0.42
Milk yield								
Yield, lb	4.6	5.3	3.1	4.4	0.62	<0.08	0.11	0.45
Yield, % of BW	0.39	0.41[a]	0.20[b]	0.30	0.05	<0.01	0.25	0.40

[a,b,c,d] Means within a row with different superscripts differ ($P \leq 0.05$)

- Heavy cows ate 6.7 lbs daily (*P* <0.01) and 0.4% of BW more than light cows (*P* <0.06)
- High WWR cows ate 0.4% of BW more than low WWR cows (*P* <0.02)
- High WWR cows produced 0.15% of BW more milk than low WWR cows (*P* <0.01)
- High WWR cows consumed 0.08% of BW more supplement per day than low WWR cows in year 2 (*P* <0.05)

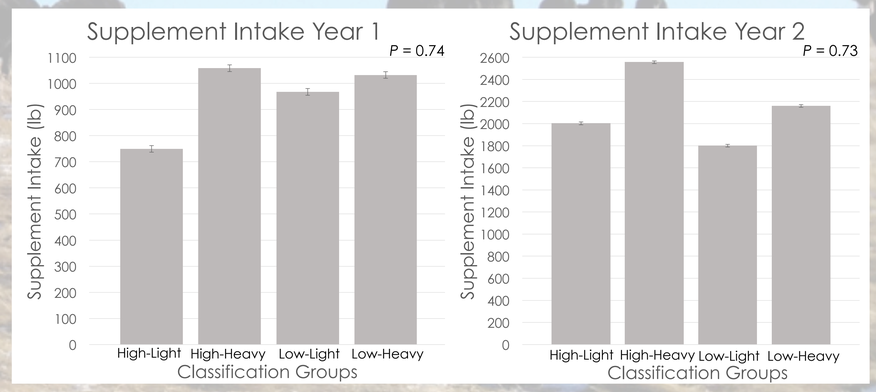

Figure 2. Supplement intake between the four classification groups for year 1 (45-d study) and year 2 (60-d study) represented in pounds with standard error bars.

Implications

- High WWR cows consumed more feed when compared on a percent of body weight basis, however, when calf weight weaned was considered the ratio between calf weight and feed consumed was better than for low WWR cows
- Smaller cows may wean smaller calves but they consume much less feed than large cows
- Provide additional knowledge for the discussion of what type of cow is more suited to western rangeland production systems