Impact of Arid Environments on Beef Cow Resiliency

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Arid Environments

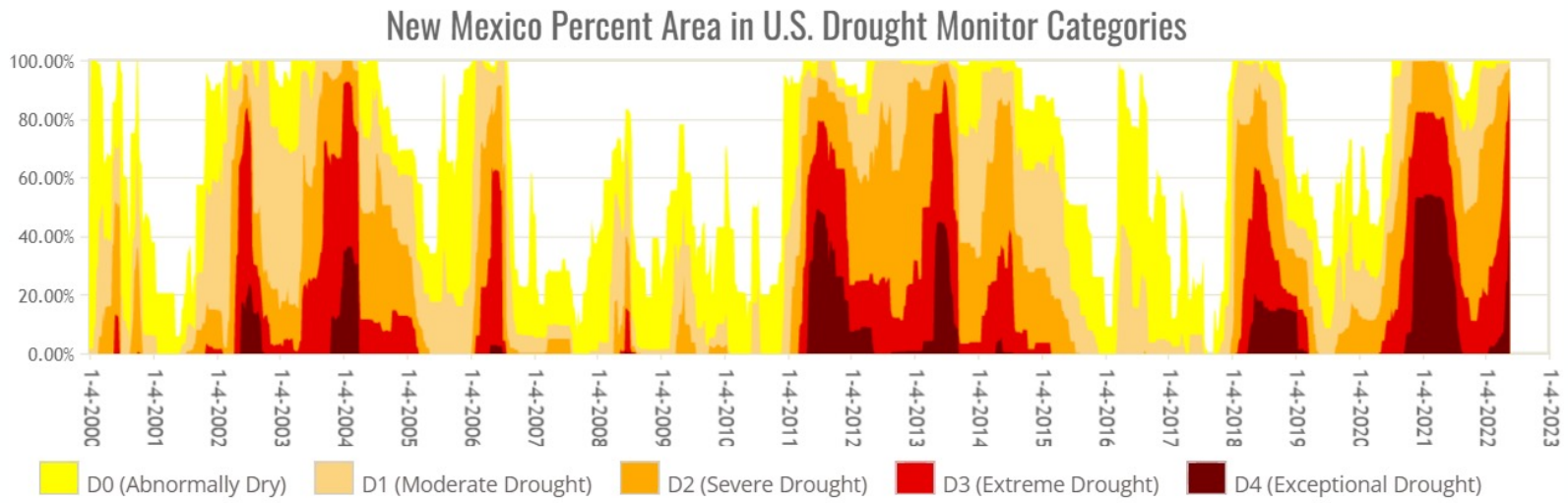
- 35% of the earths surface is classified as Arid with subcategories being arid and semi-arid
  - Arid: less than 10 inches of precipitation
  - Semi-arid: 10 to 20 inches

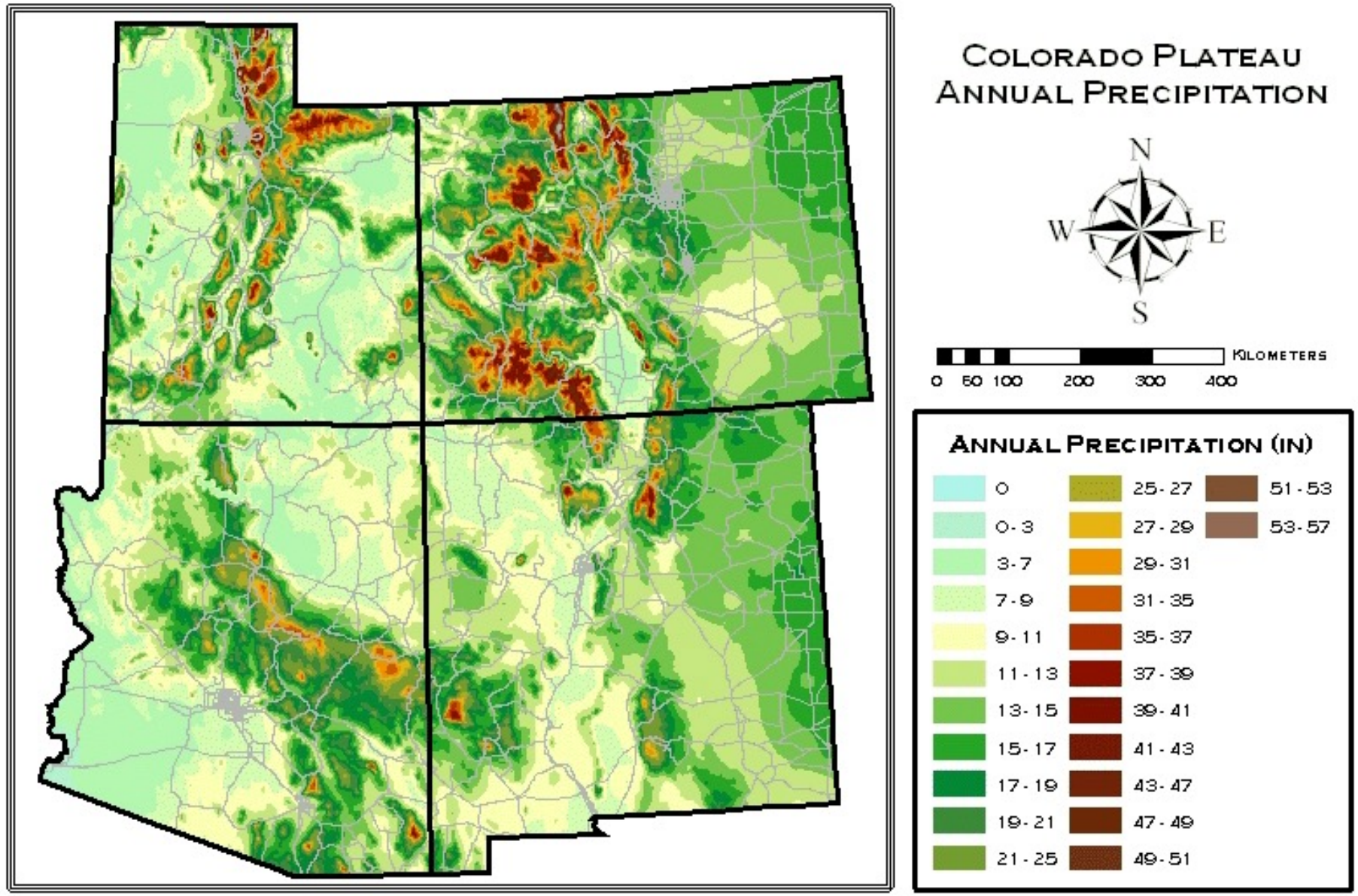
- New Mexico ranges from 8 to 20 inches of precipitation

- Winters are generally open in lower elevation rangeland

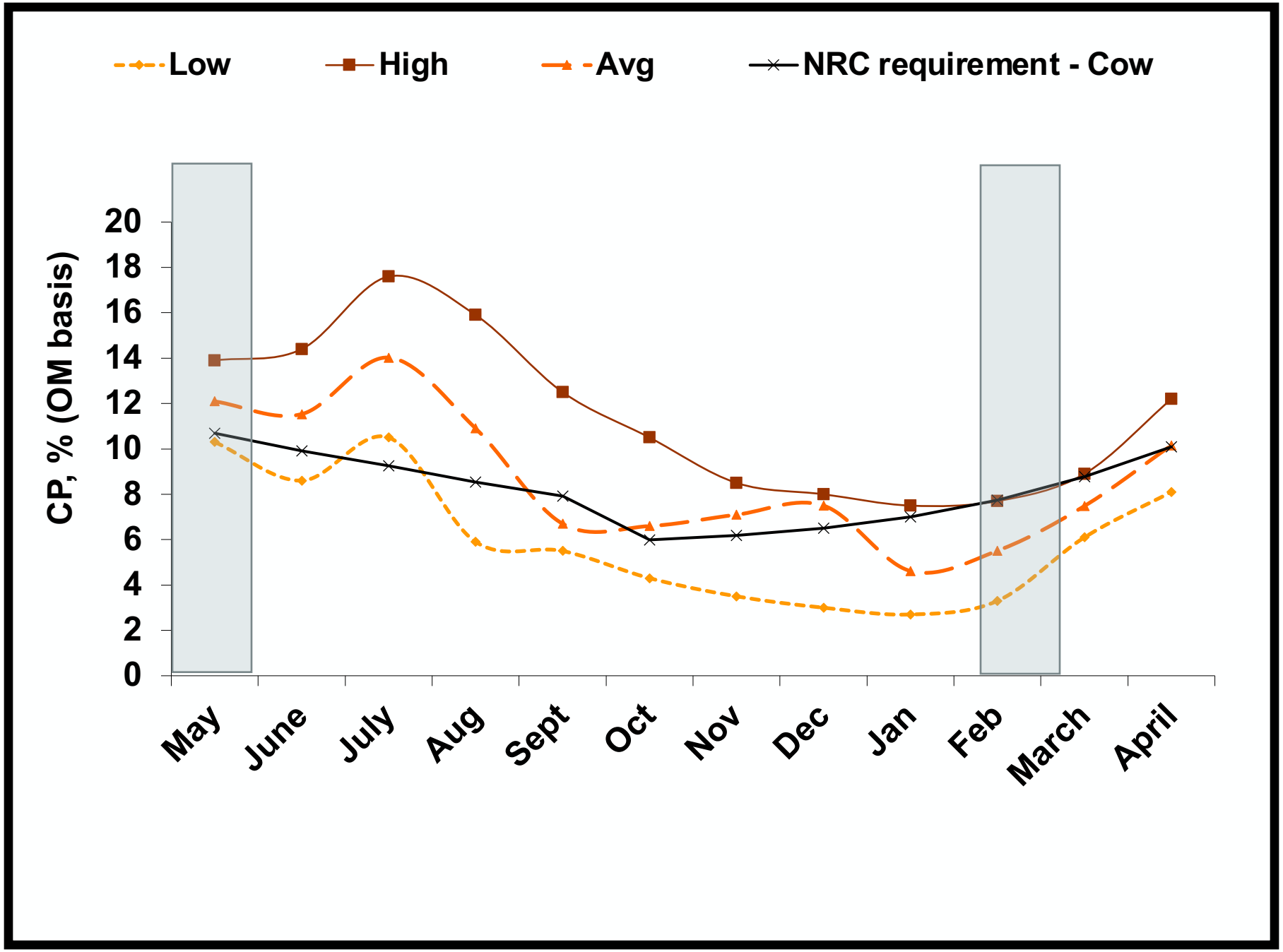
What is resiliency?

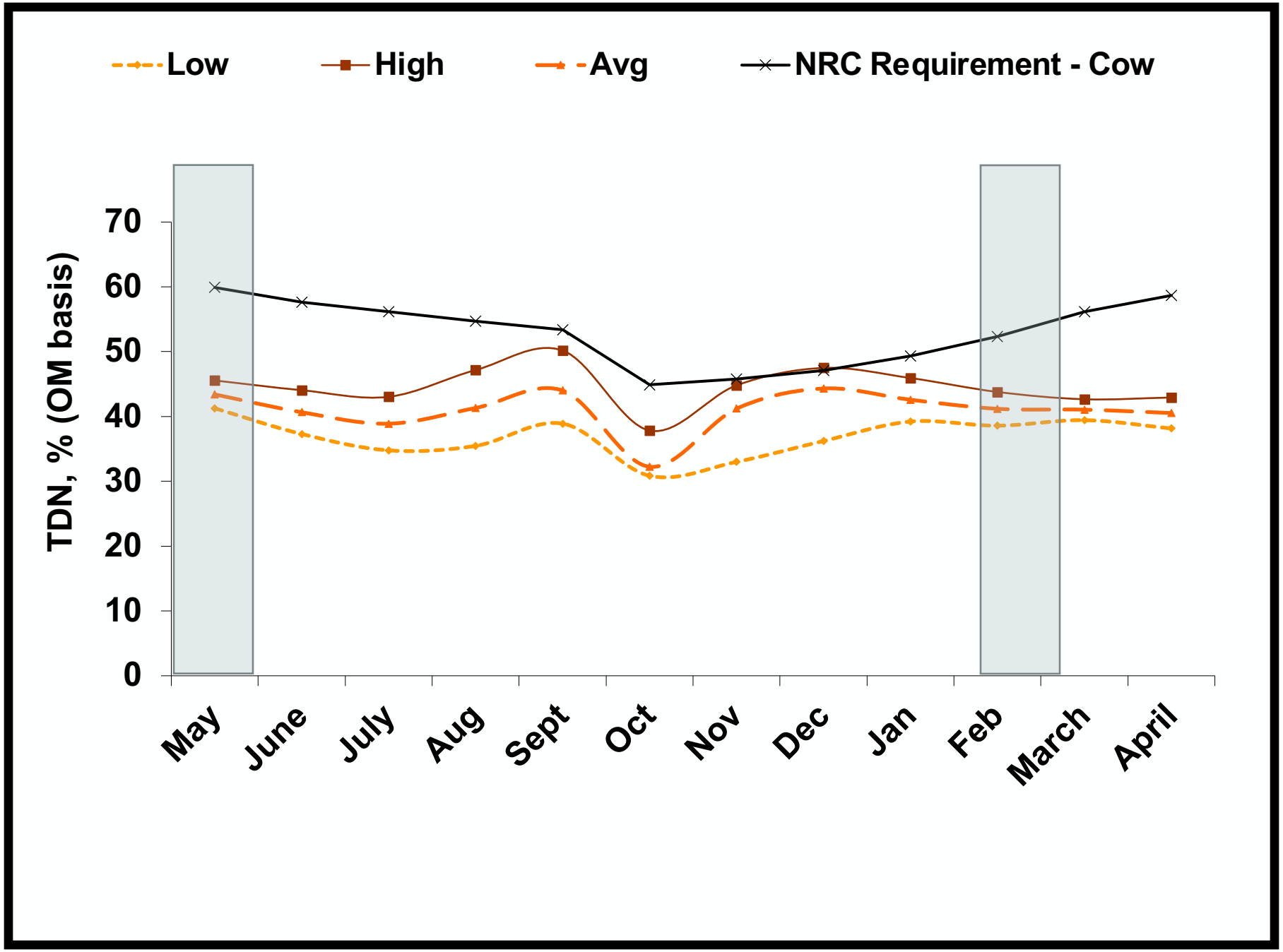
- **Resilience is determined by how the cow responds and adapts to stressors or her adaptive capacity**



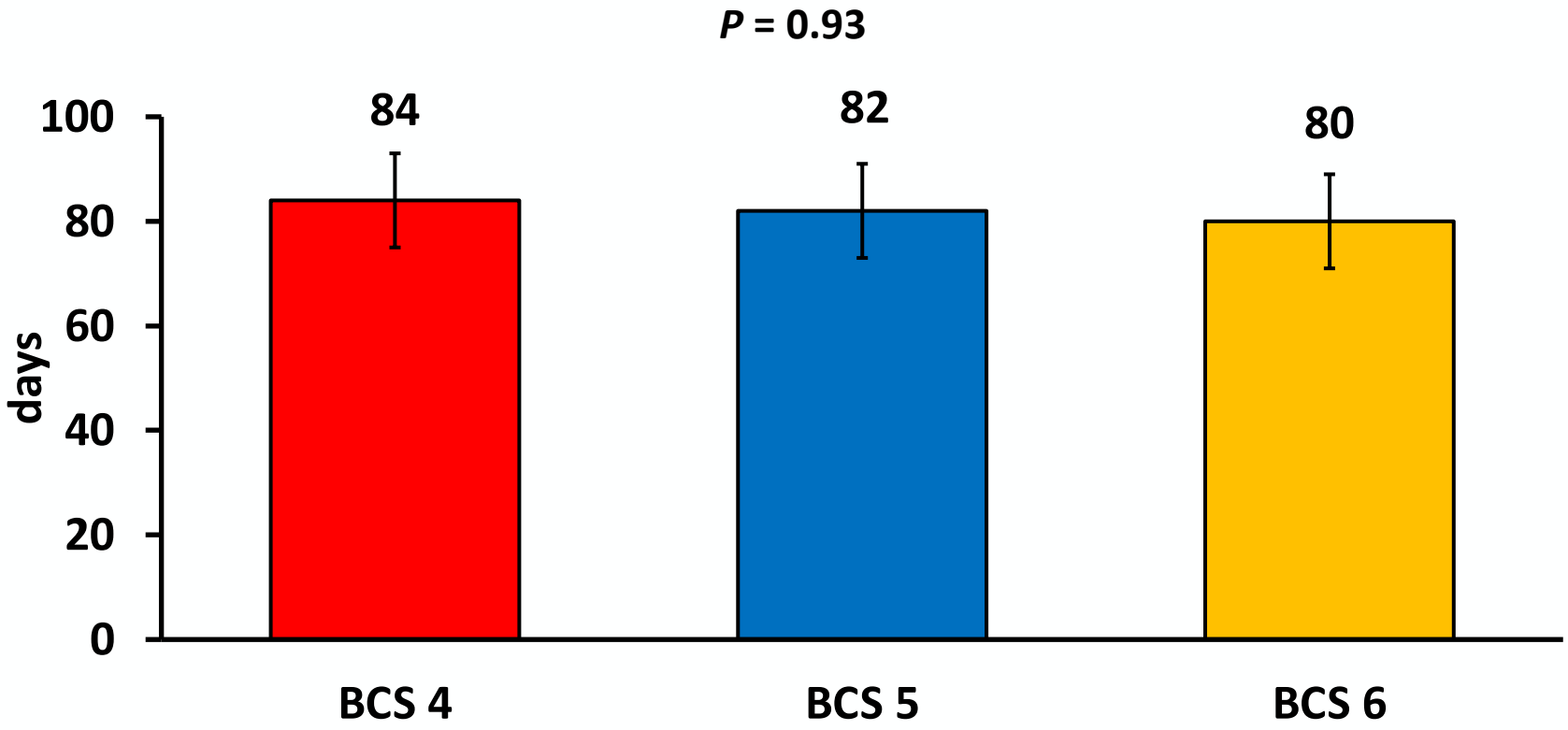


https://perg.nau.edu/datamap.htm


Low
High
Avg
NRC requirement - Cow
CP, % (OM basis)
0
2
4
6
8
10
12
14
16
18
20
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April

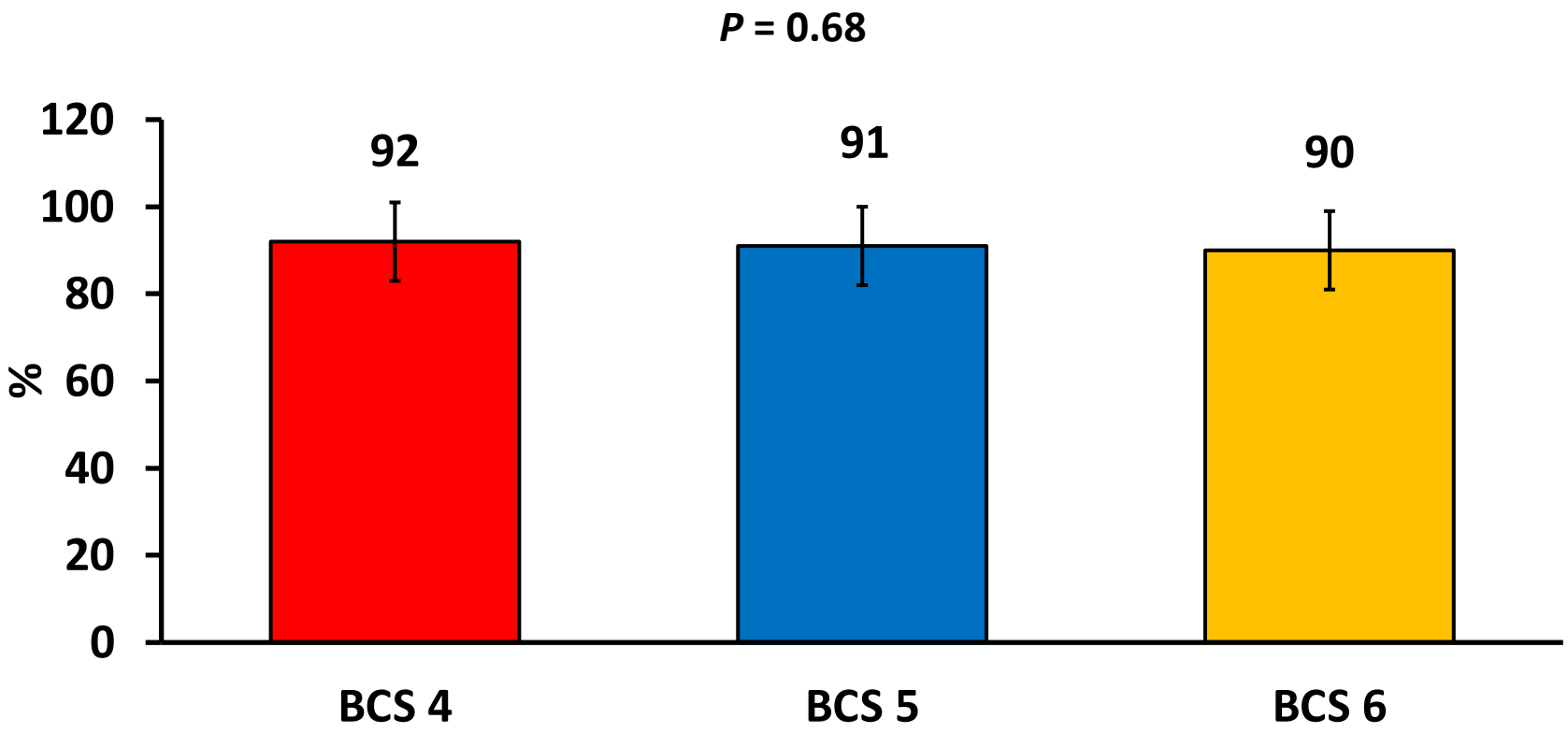

Low
High
Avg
NRC Requirement - Cow
TDN, % (OM basis)
70
60
50
40
30
20
10
0
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April

Effects of calving BCS on days to first postpartum ovulation



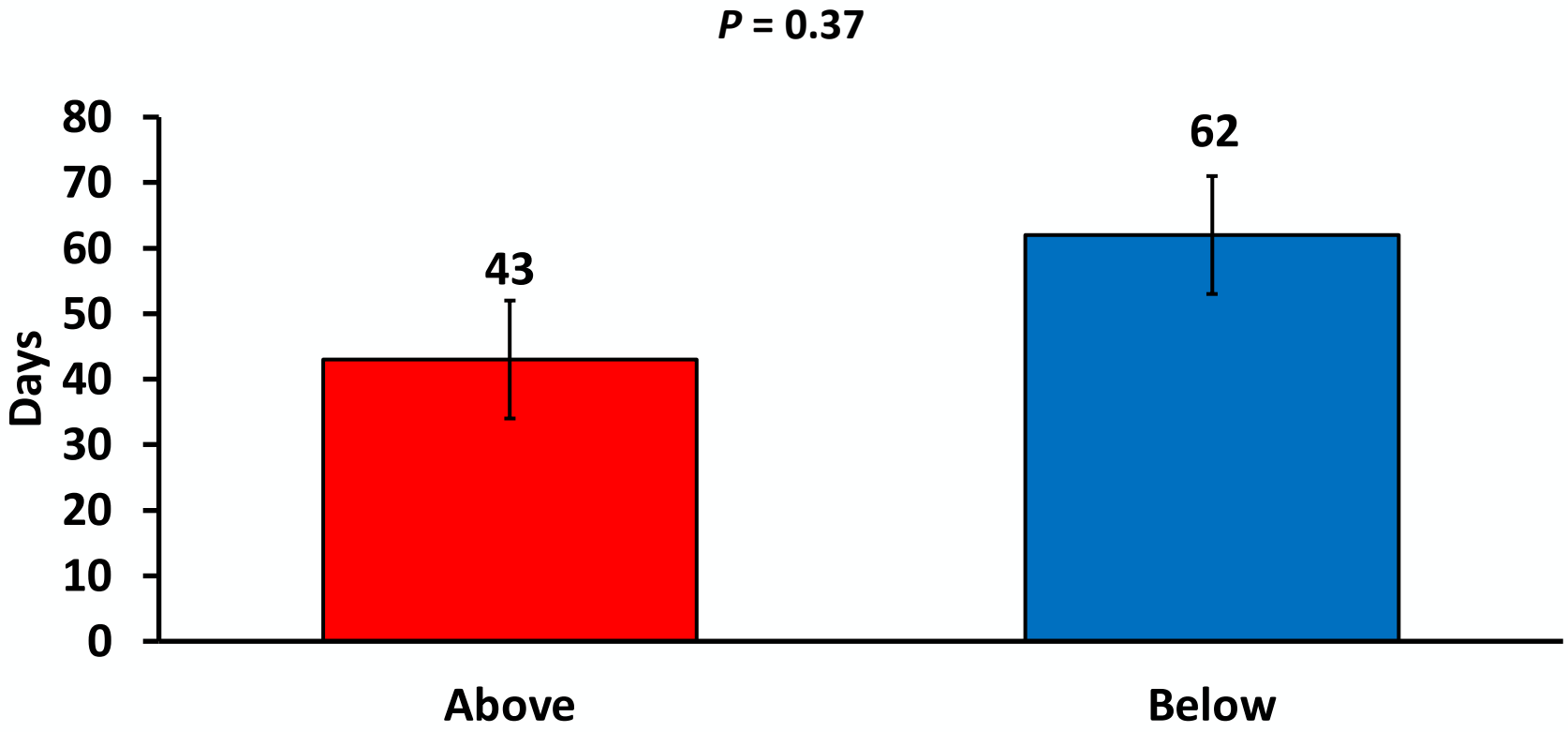
Mulliniks et al., 2012

Effects of calving BCS on pregnancy



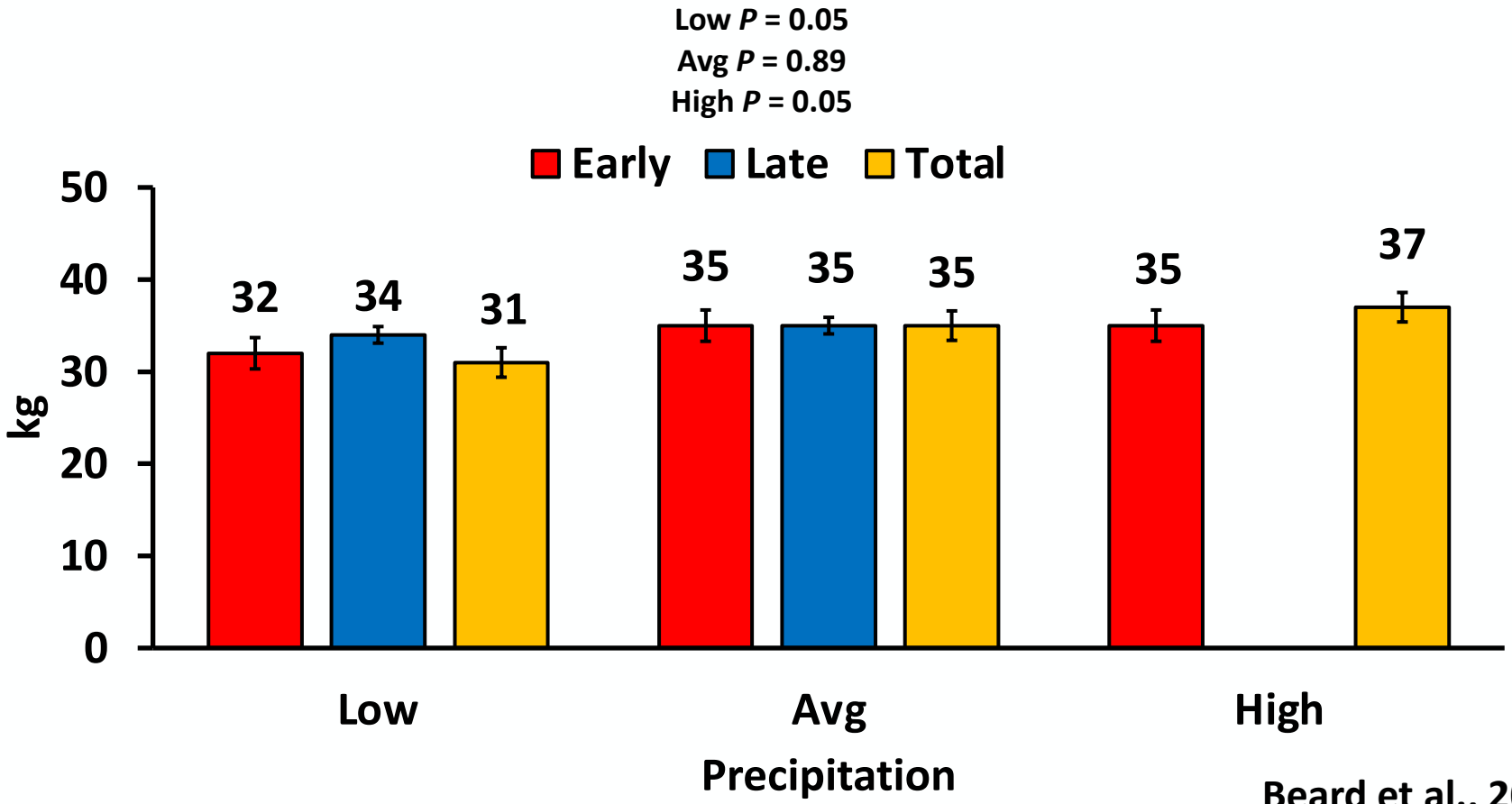
Mulliniks et al., 2012

Effects of annual precipitation on days to BW nadir



Mulliniks et al., 2012

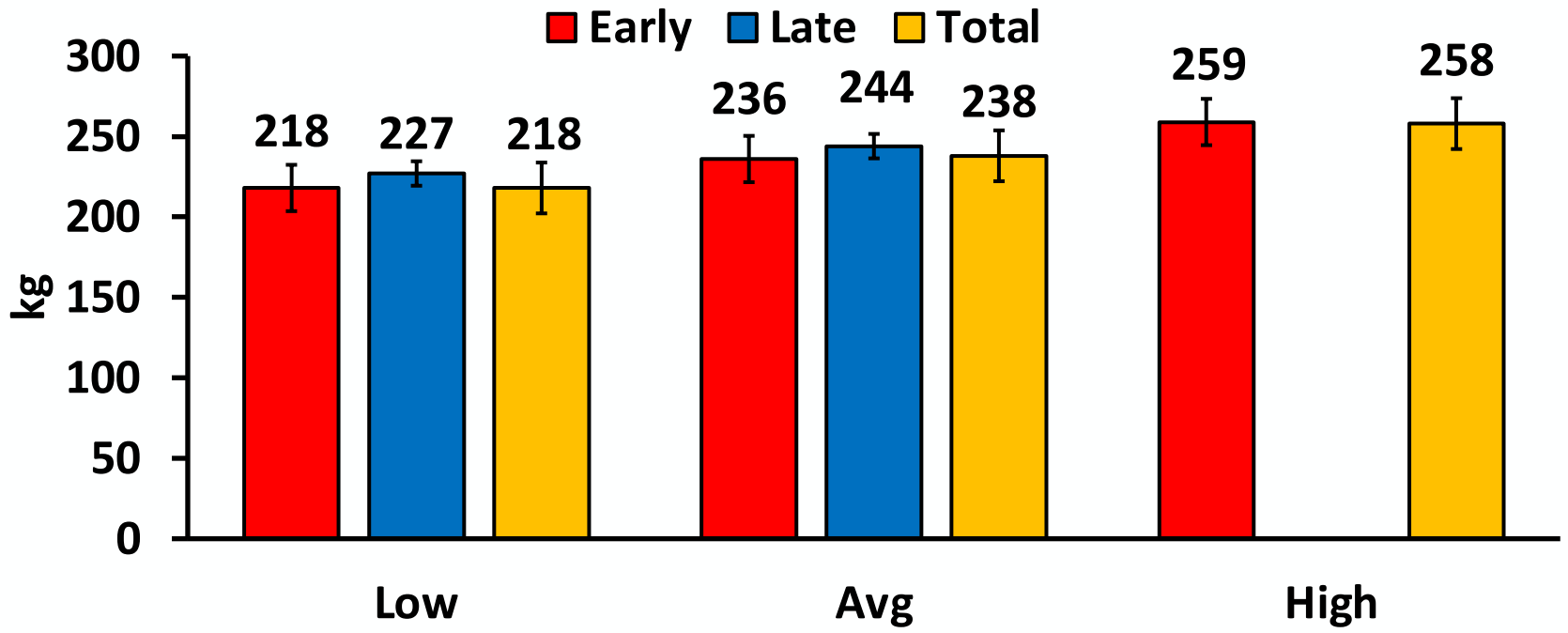
Effects of precipitation received *in utero* on calf birth weight



Beard et al., 2012

Effects of precipitation received *in utero* on calf weaning weight

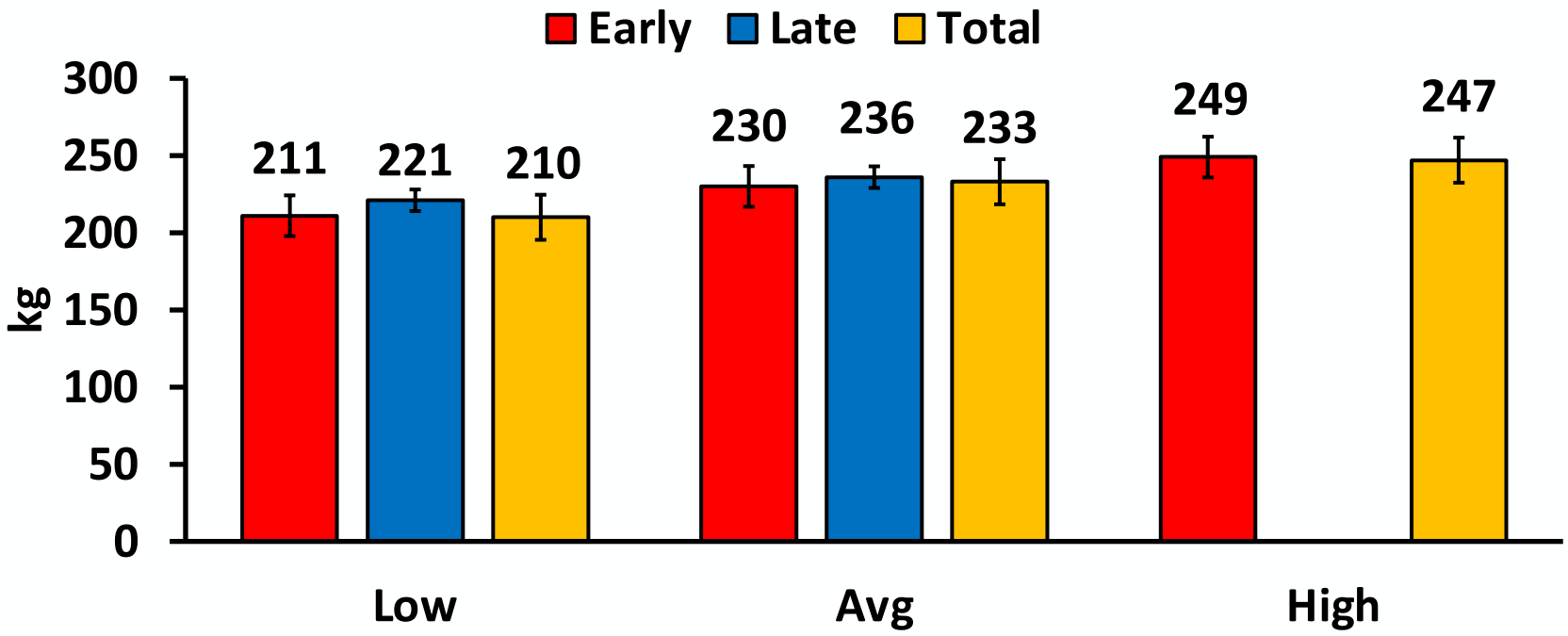
Low *P* = 0.04
Avg *P* = 0.12
High *P* = 0.05



Beard et al., 2012

Effects of precipitation received *in utero* on calf adj 205 d weight

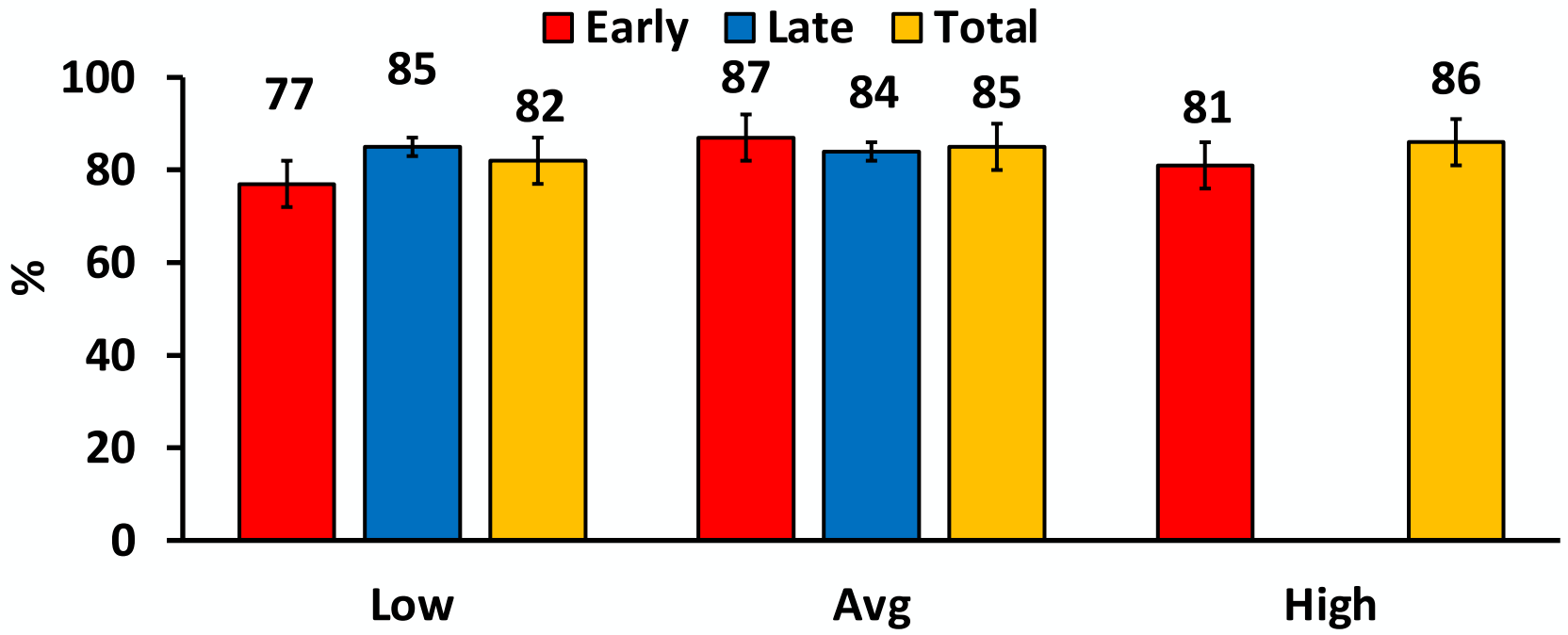
Low *P* = 0.03
Avg *P* = 0.13
High *P* = 0.08



Beard et al., 2012

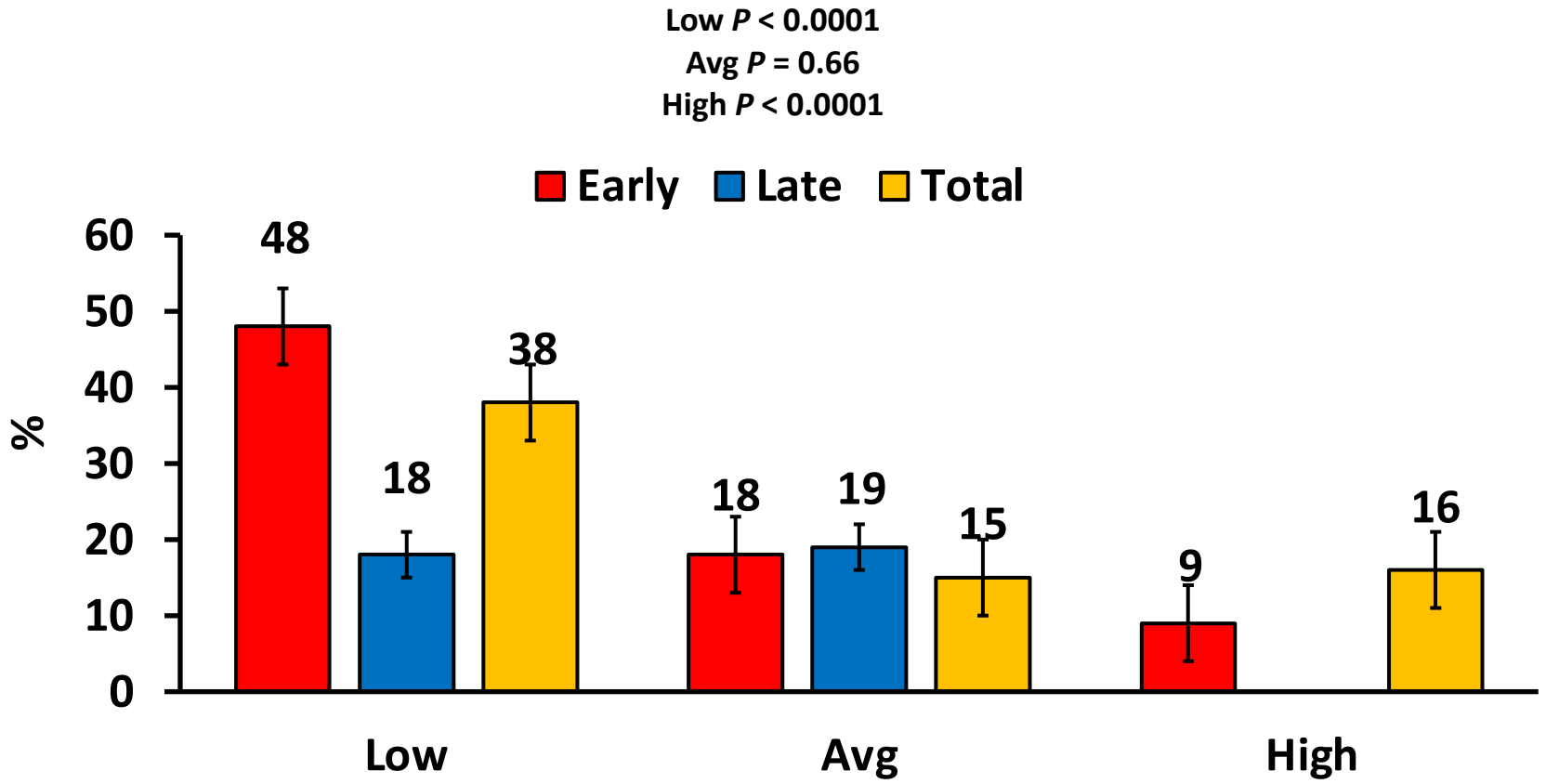
Effects of precipitation received *in utero* on calving at 2 yr of age

Low $P = 0.06$
Avg $P = 0.81$
High $P = 0.77$



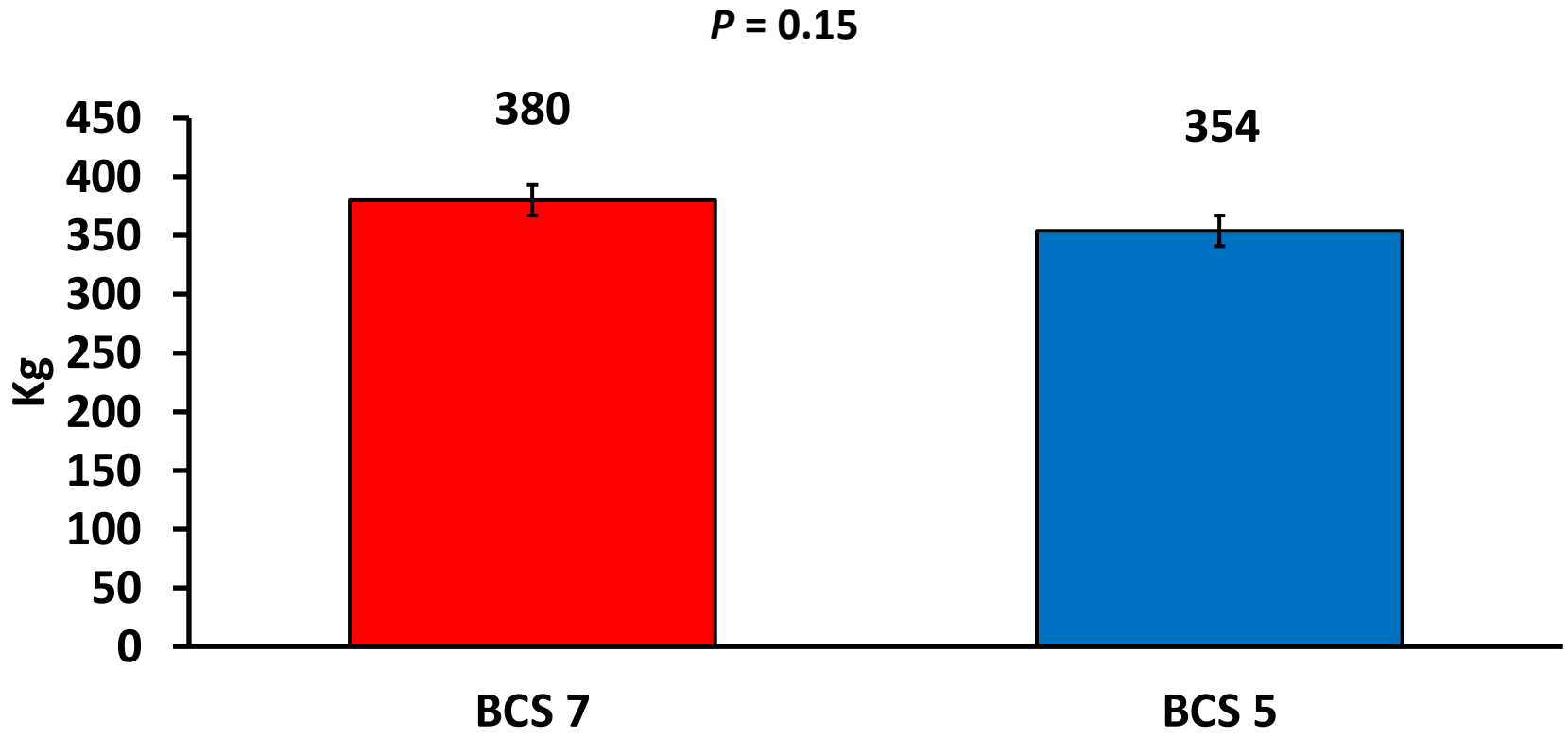
Beard et al., 2012

Effects of precipitation received *in utero* on calving at 8 yr of age



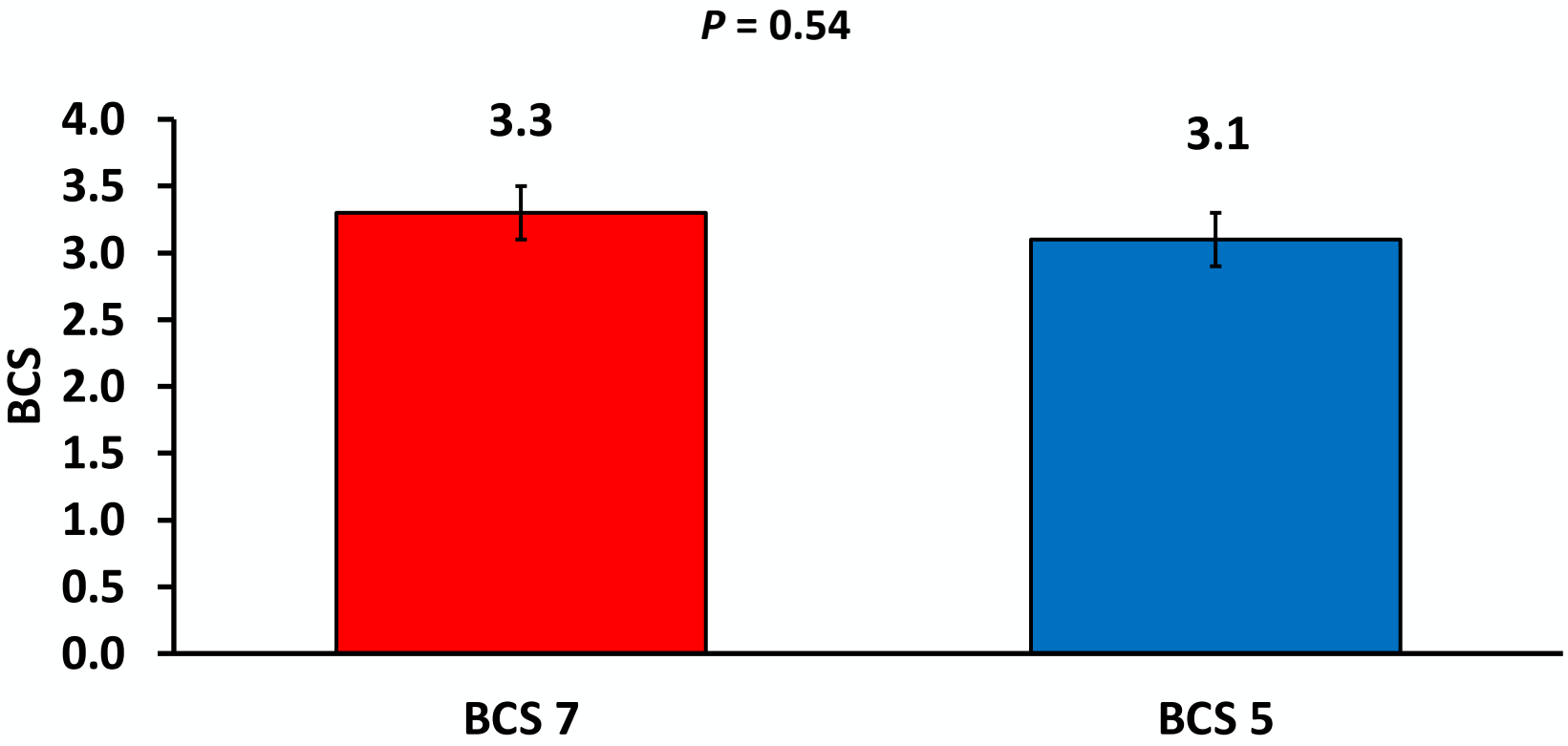
Beard et al., 2012

Effects of initial BCS at start of nutrient restriction on BW at onset of anestrus



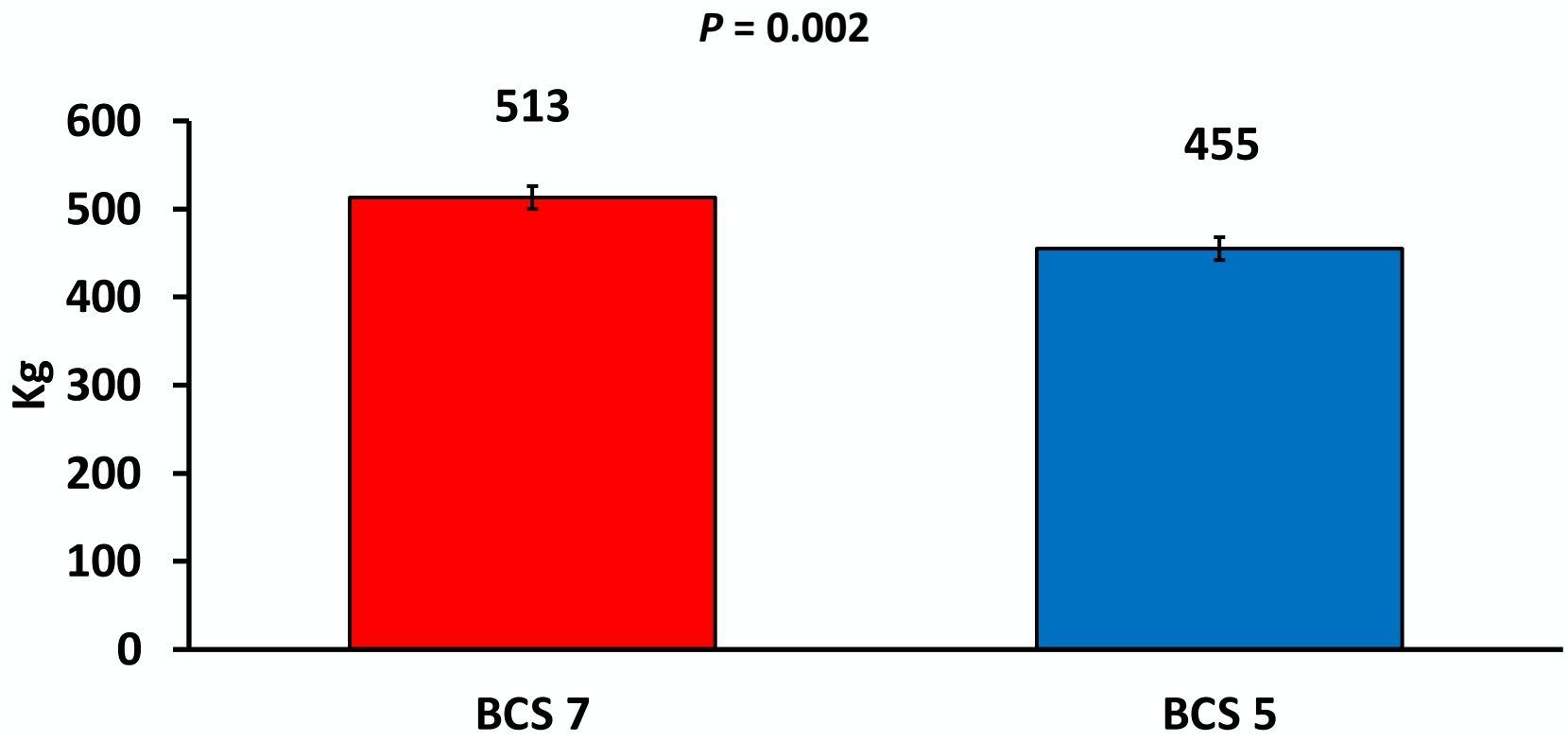
Cassady et al., 2009

Effects of initial BCS at start of nutrient restriction on BCS at onset of anestrus



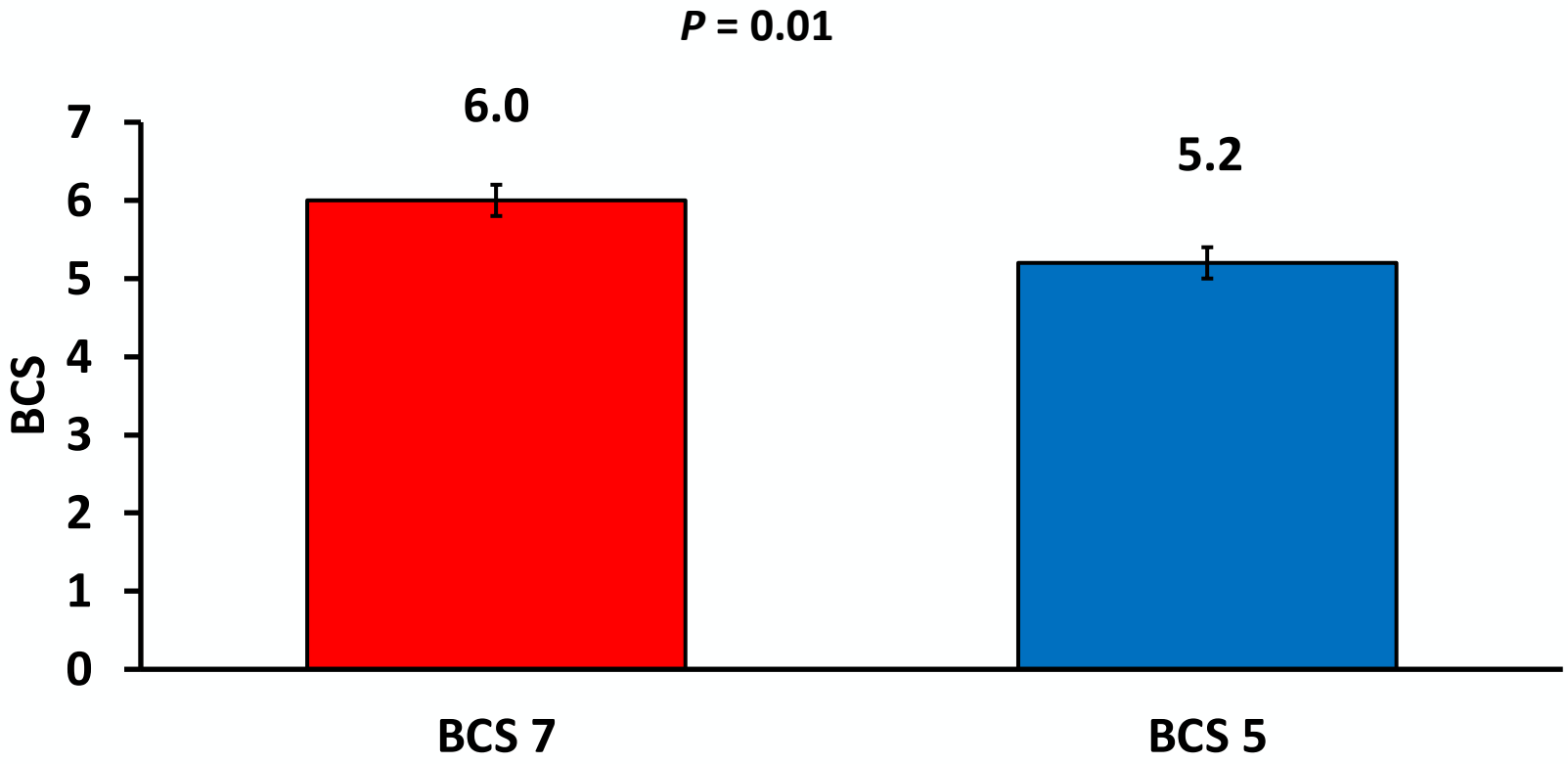
Cassady et al., 2009

Effects of initial BCS at start of nutrient restriction on BW at resumption of estrous cycle



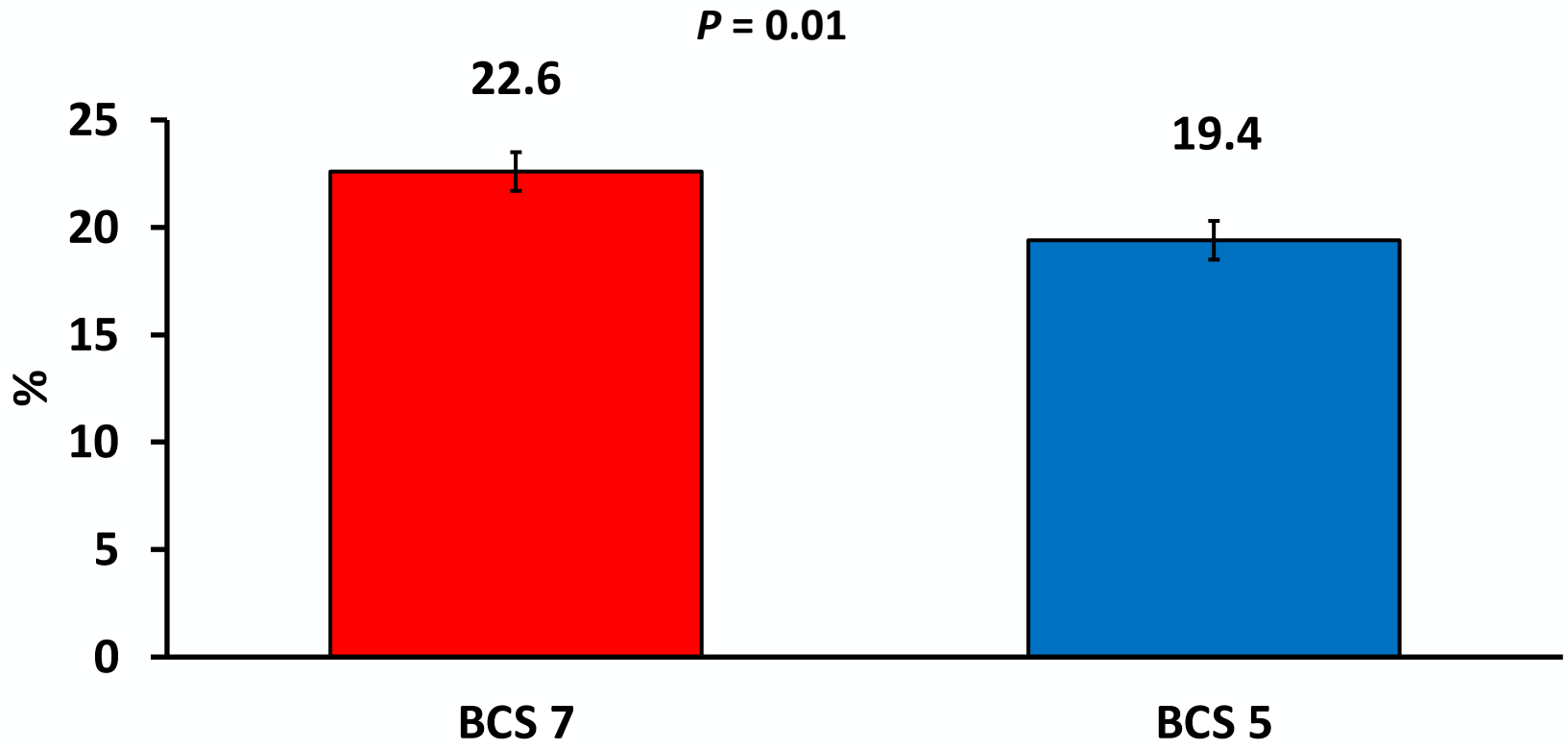
Cassady et al., 2009

Effects of initial BCS at start of nutrient restriction on BCS at resumption of estrous cycle



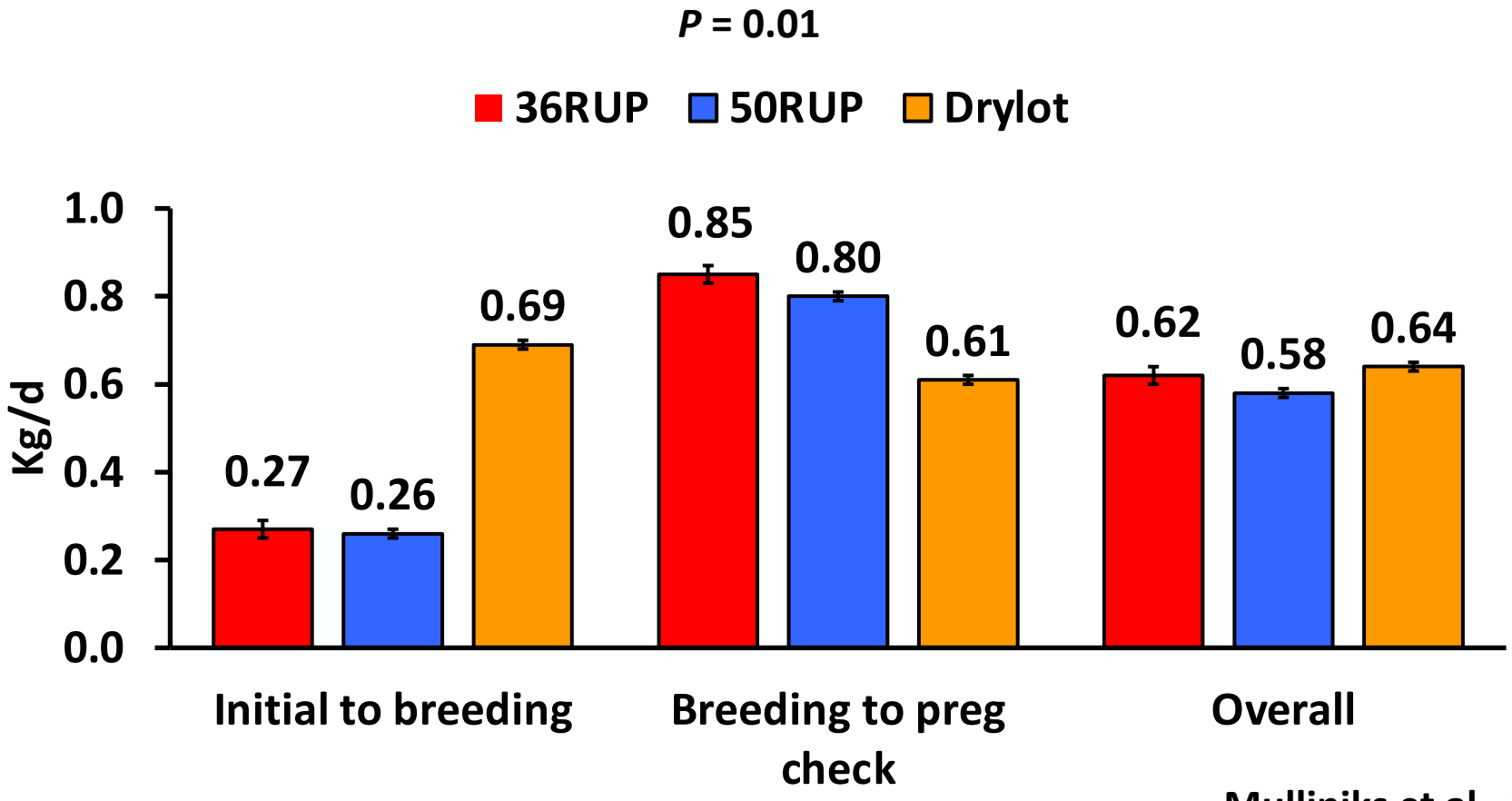
Cassady et al., 2009

Effects of initial BCS at start of nutrient restriction on % body fat at resumption of estrous cycle



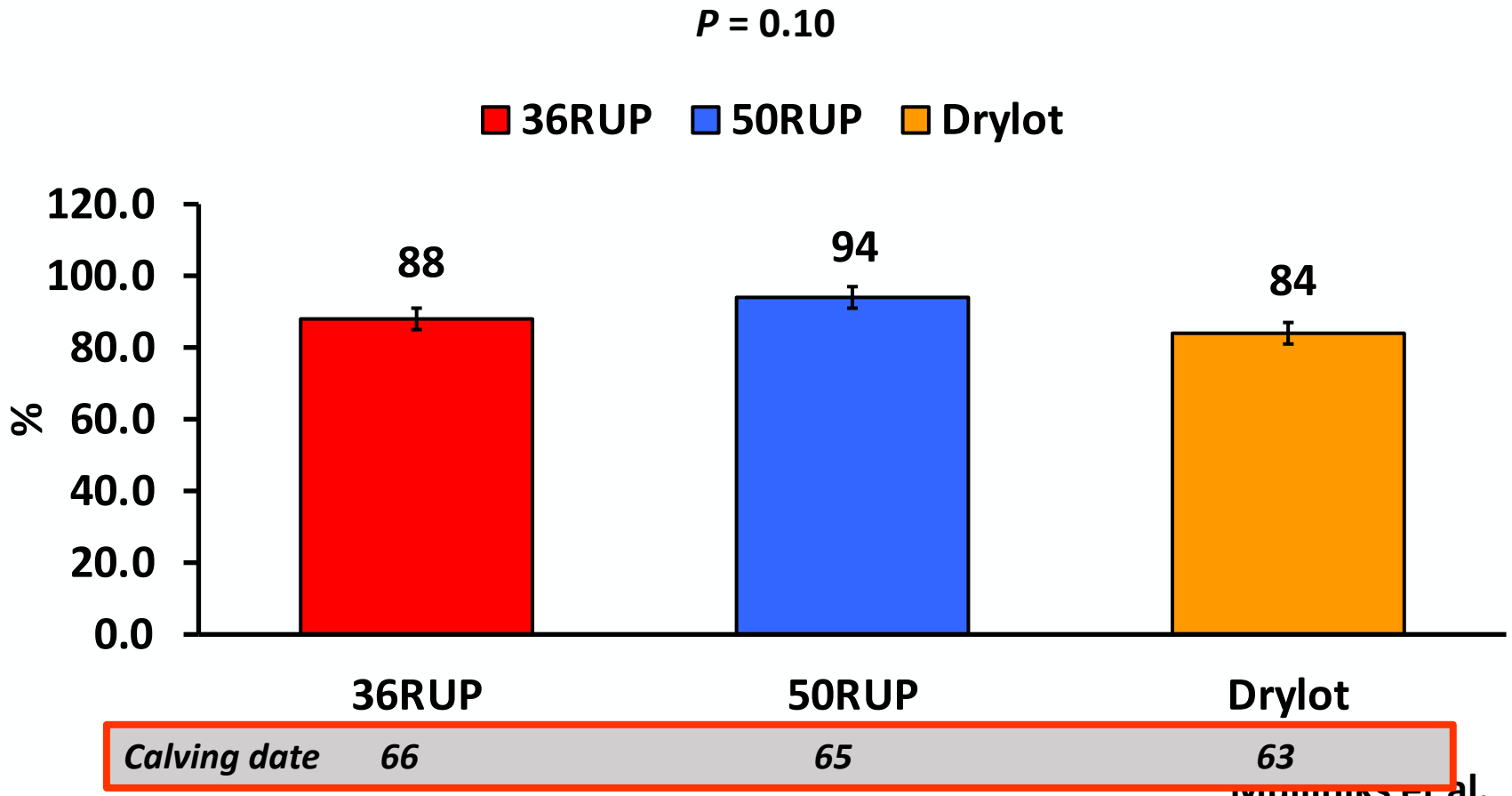
Cassady et al., 2009

Effects of heifers developed on pasture or dry-lot fed bypass protein on ADG



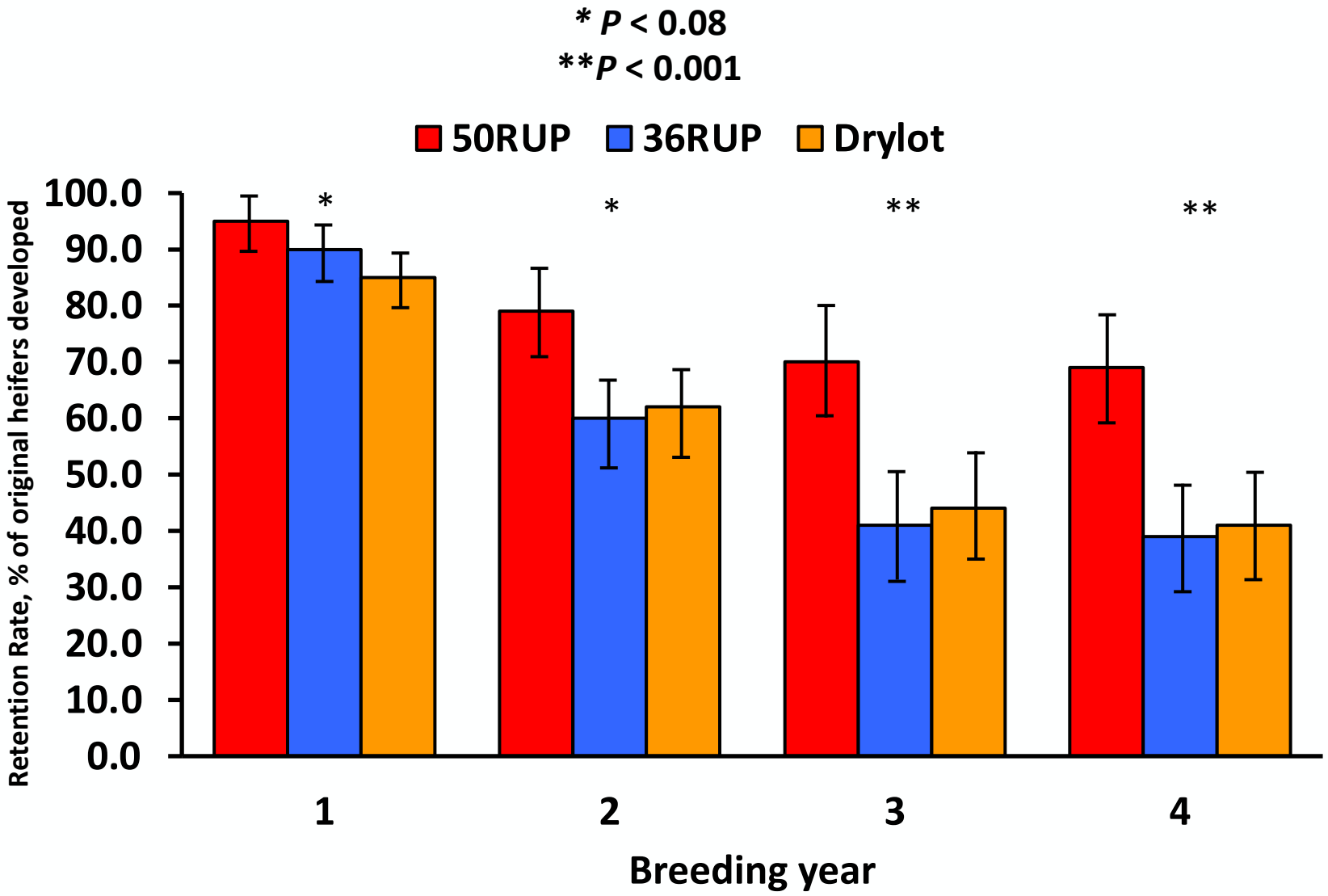
Mulliniks et al., 2013

Effects of heifers developed on pasture or dry-lot fed bypass protein on Pregnancy%



Mulliniks et al., 2013

Effects of heifers developed on pasture fed bypass protein or dry-lot on retention rate



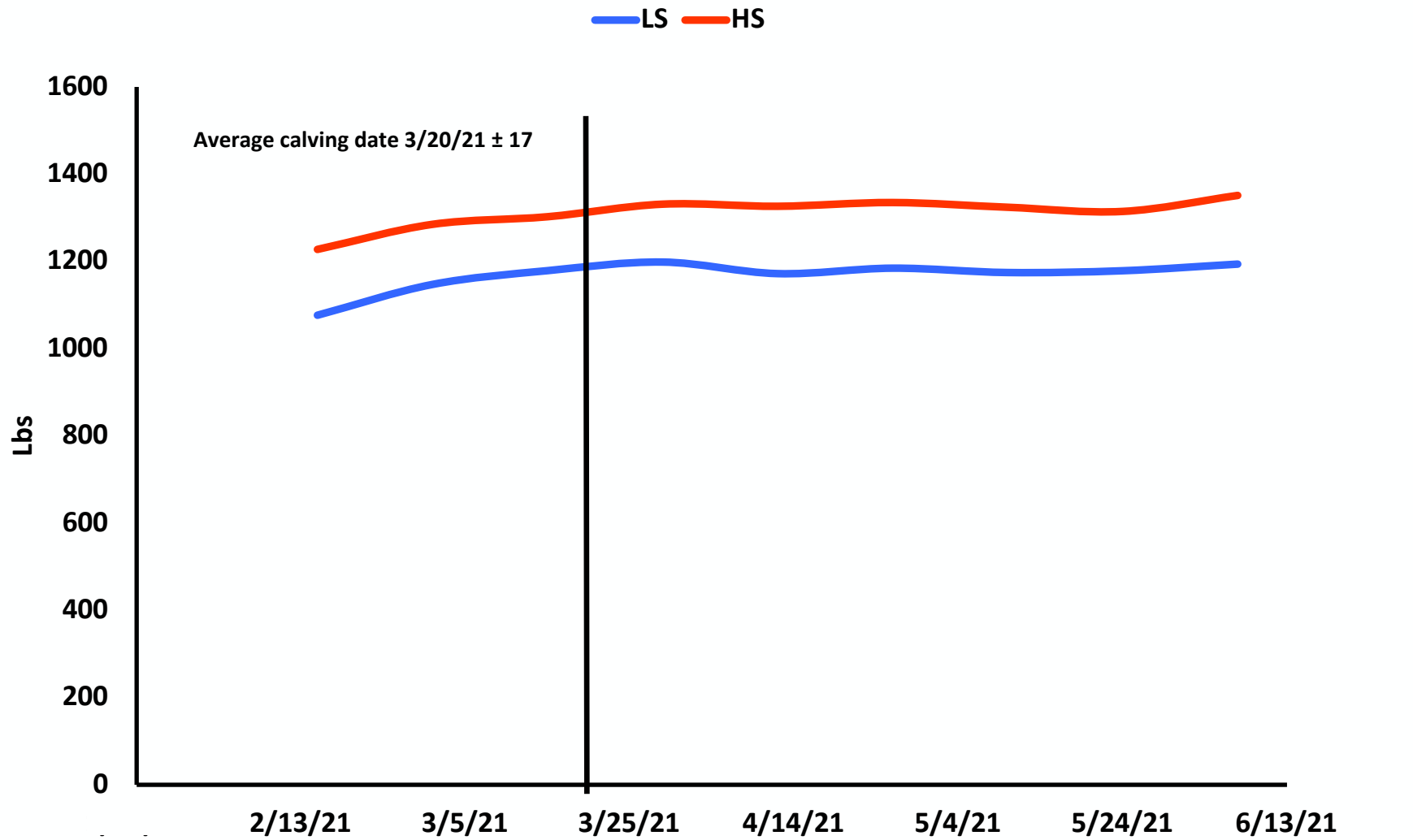
Adapted from Mulliniks et al., 2013

Divergent BCS at Corona Range and Livestock Research Center

- Set of cows that grazed same pasture during drought of 2020
  - Low BCS 4.4 (7.1 yr old)
  - High BCS 5.8 (7.2 yr old)

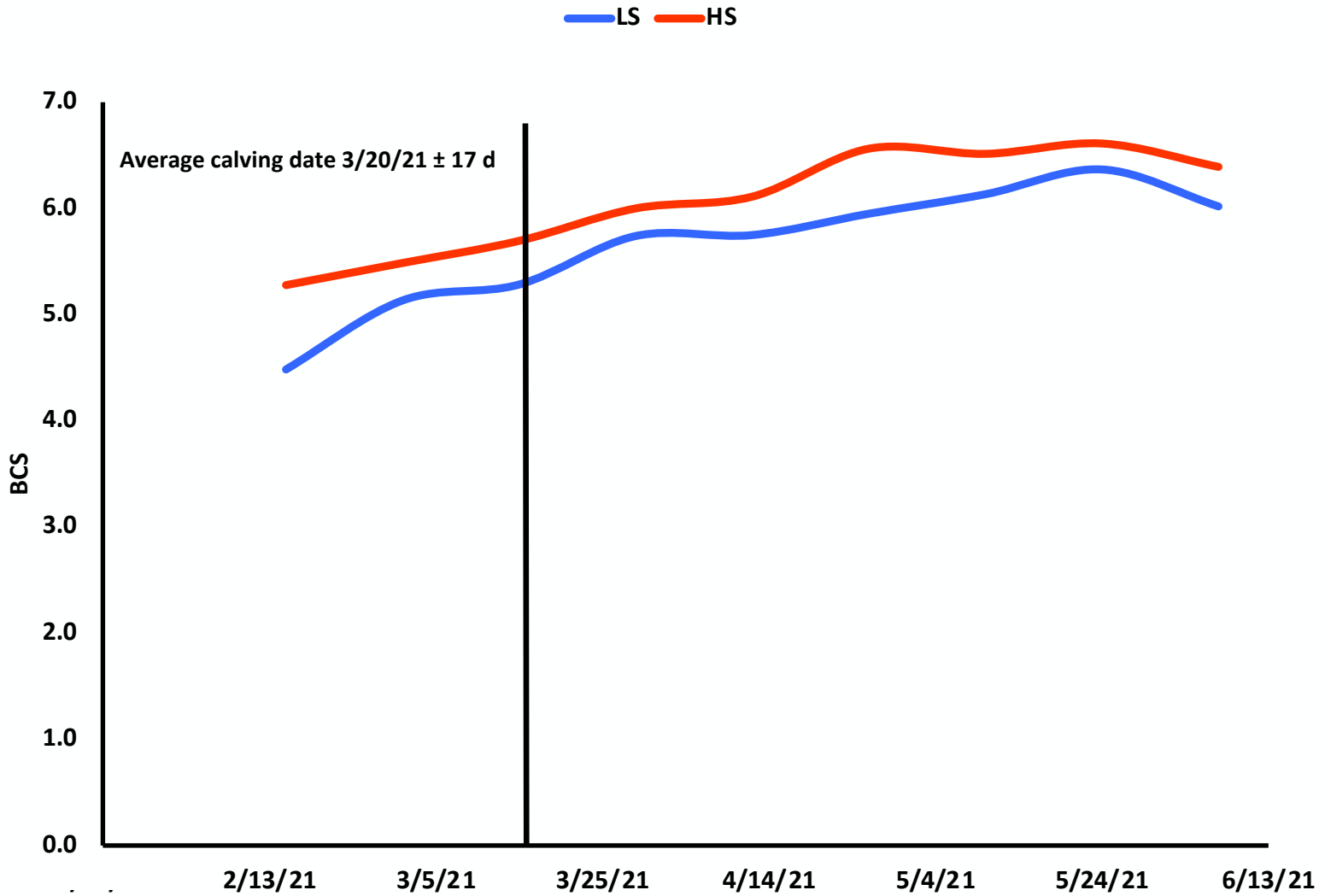
- Calf weaning wts 2020
  - Low 426 lb
  - High 474 lb
- Transported to Calan gate system on campus
  - February prior to calving
  - Average calving date for both 3/20/22

Divergent BCS on BW in subsequent calving season



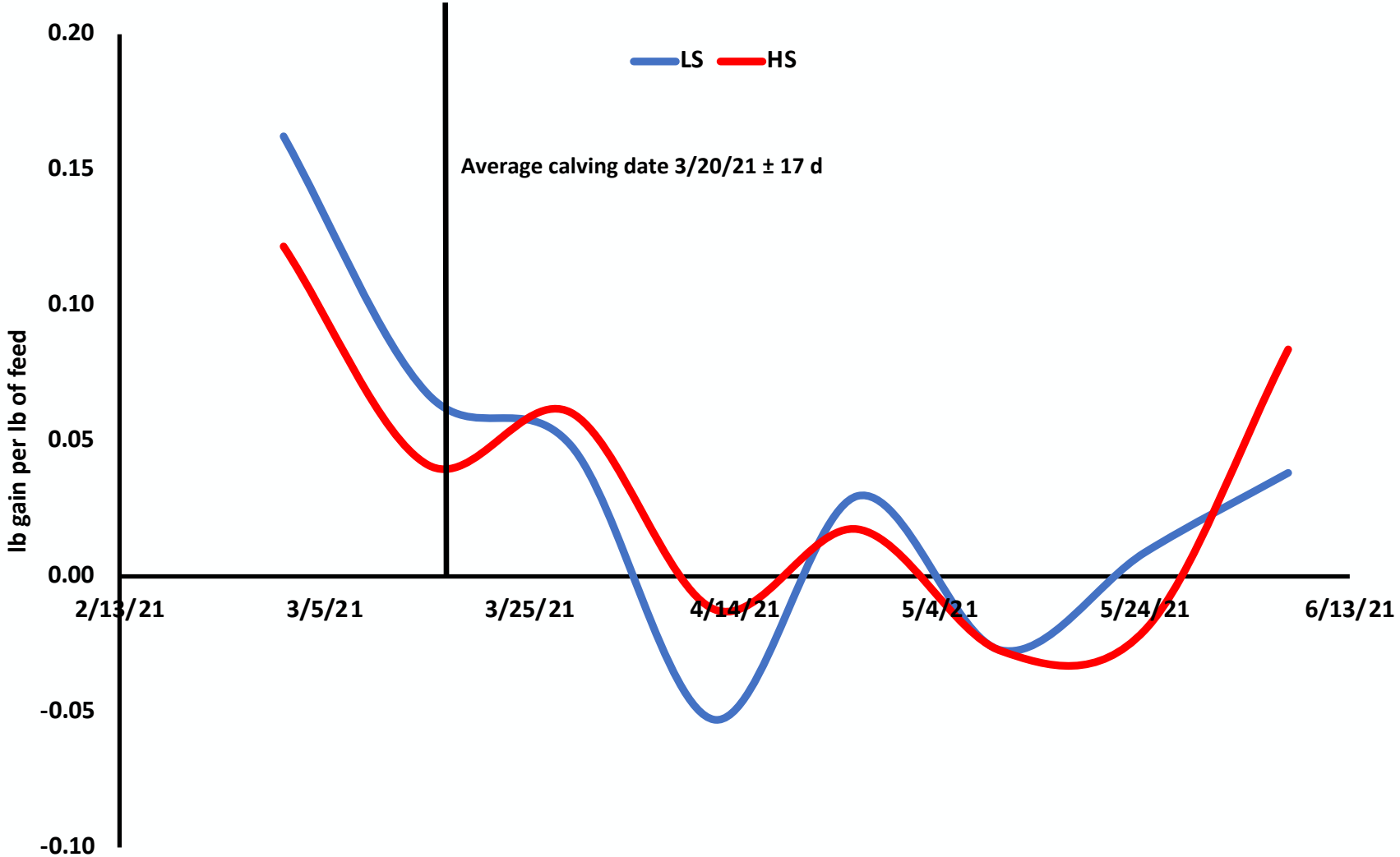
NMSU unpublished data

Divergent BCS on BCS in subsequent calving season



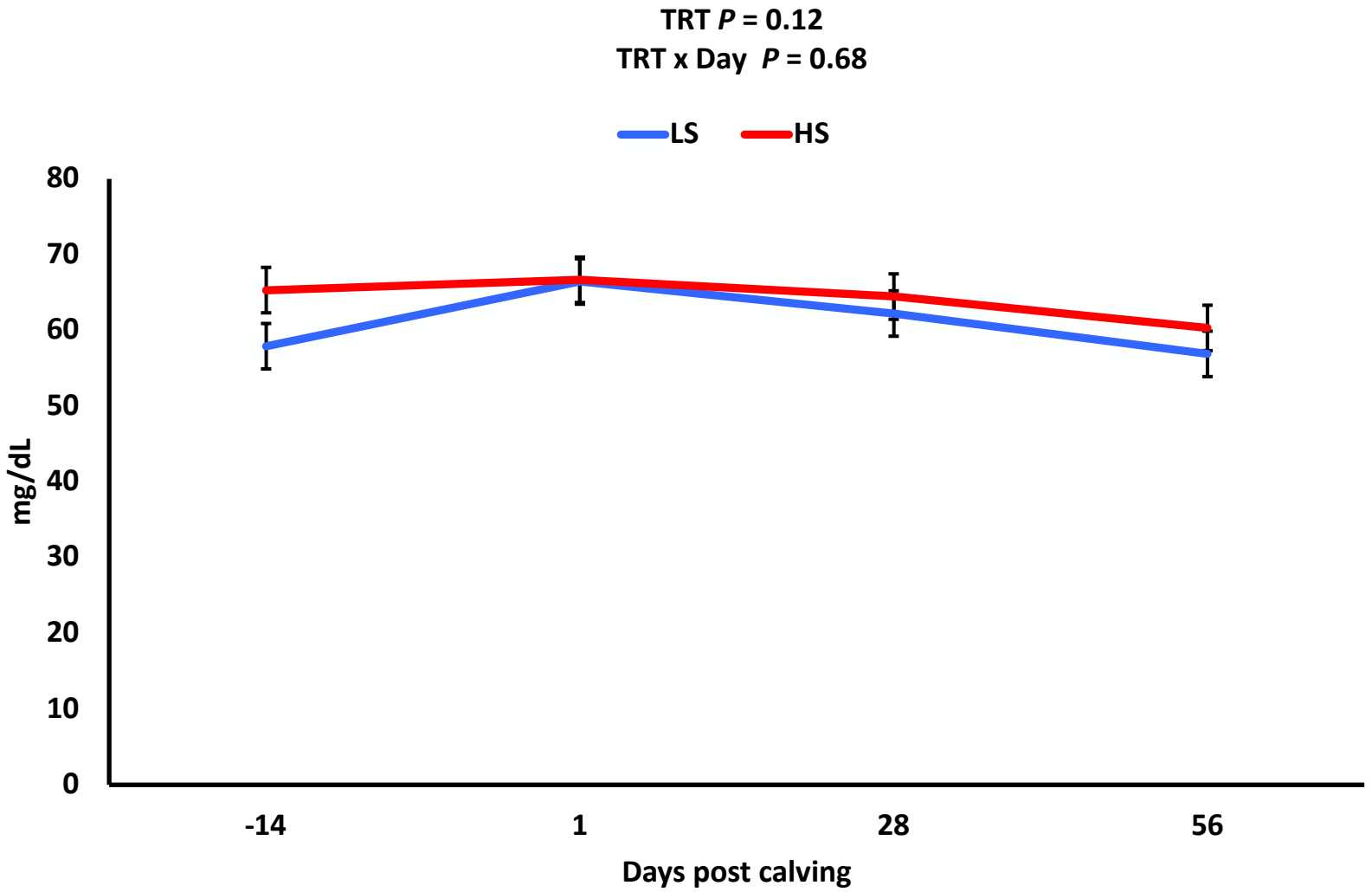
NMSU unpublished data

Divergent BCS on G:F in subsequent calving season



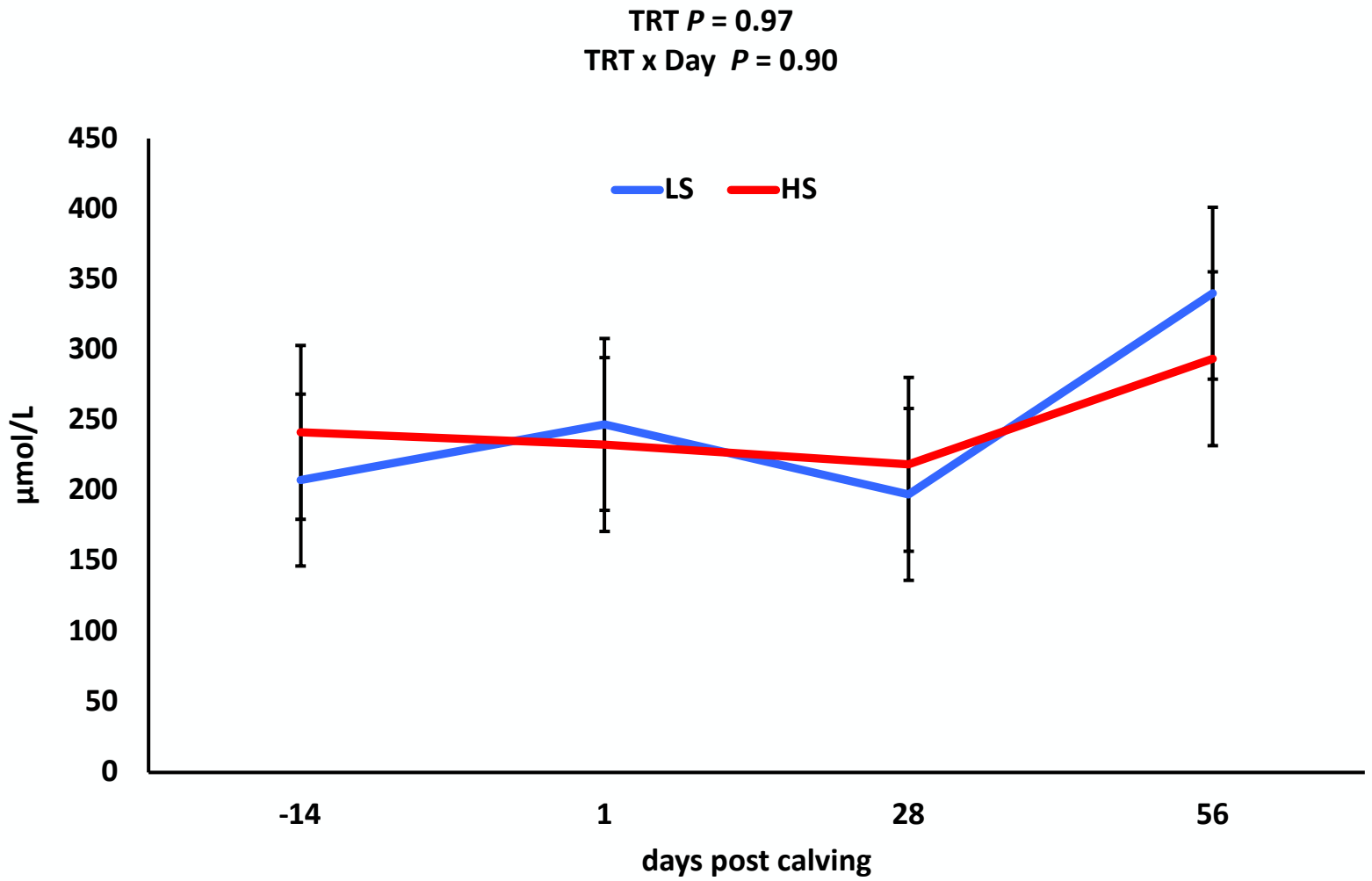
NMSU unpublished data

Divergent BCS on plasma glucose in subsequent calving season



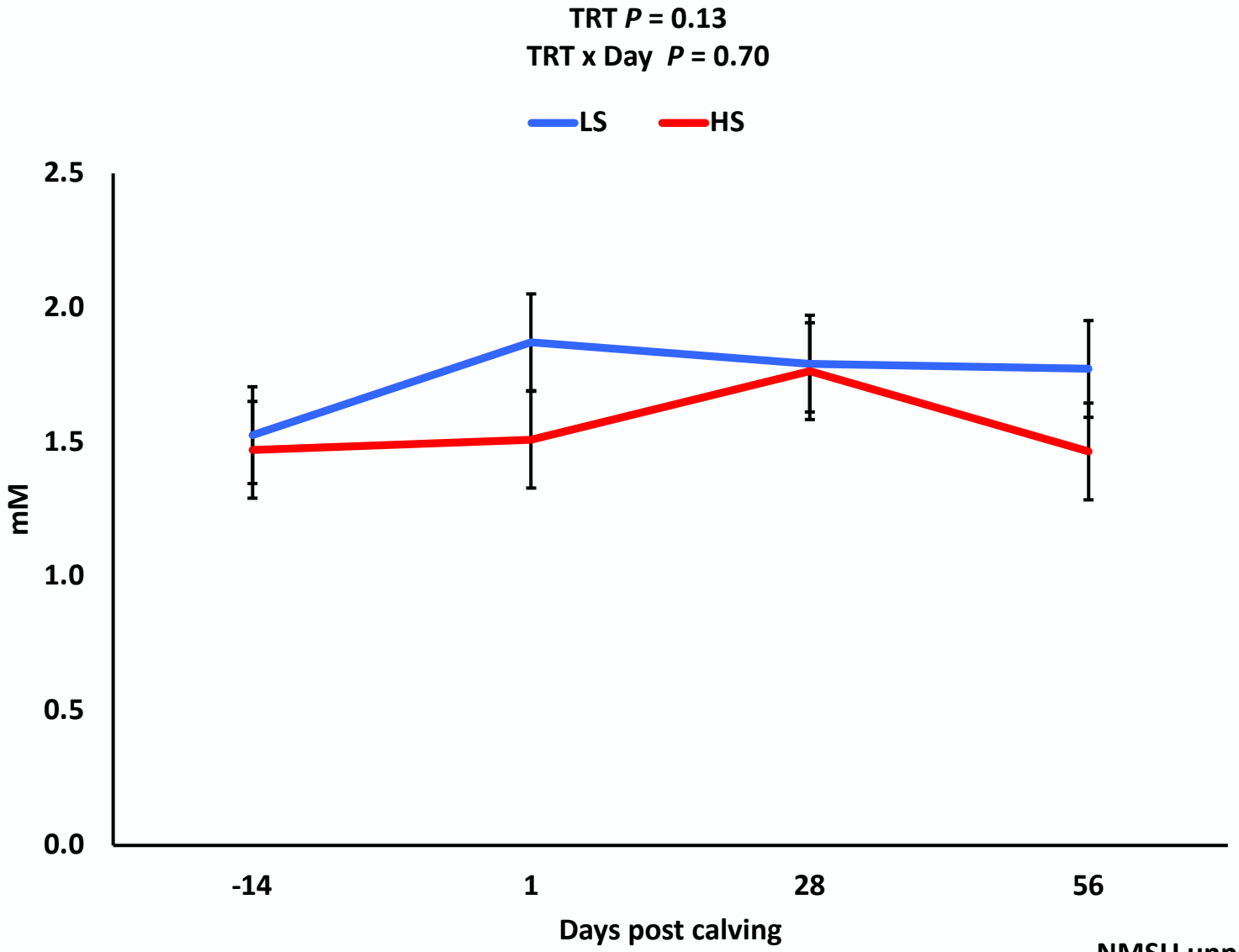
NMSU unpublished data

Divergent BCS on plasma NEFA in subsequent calving season



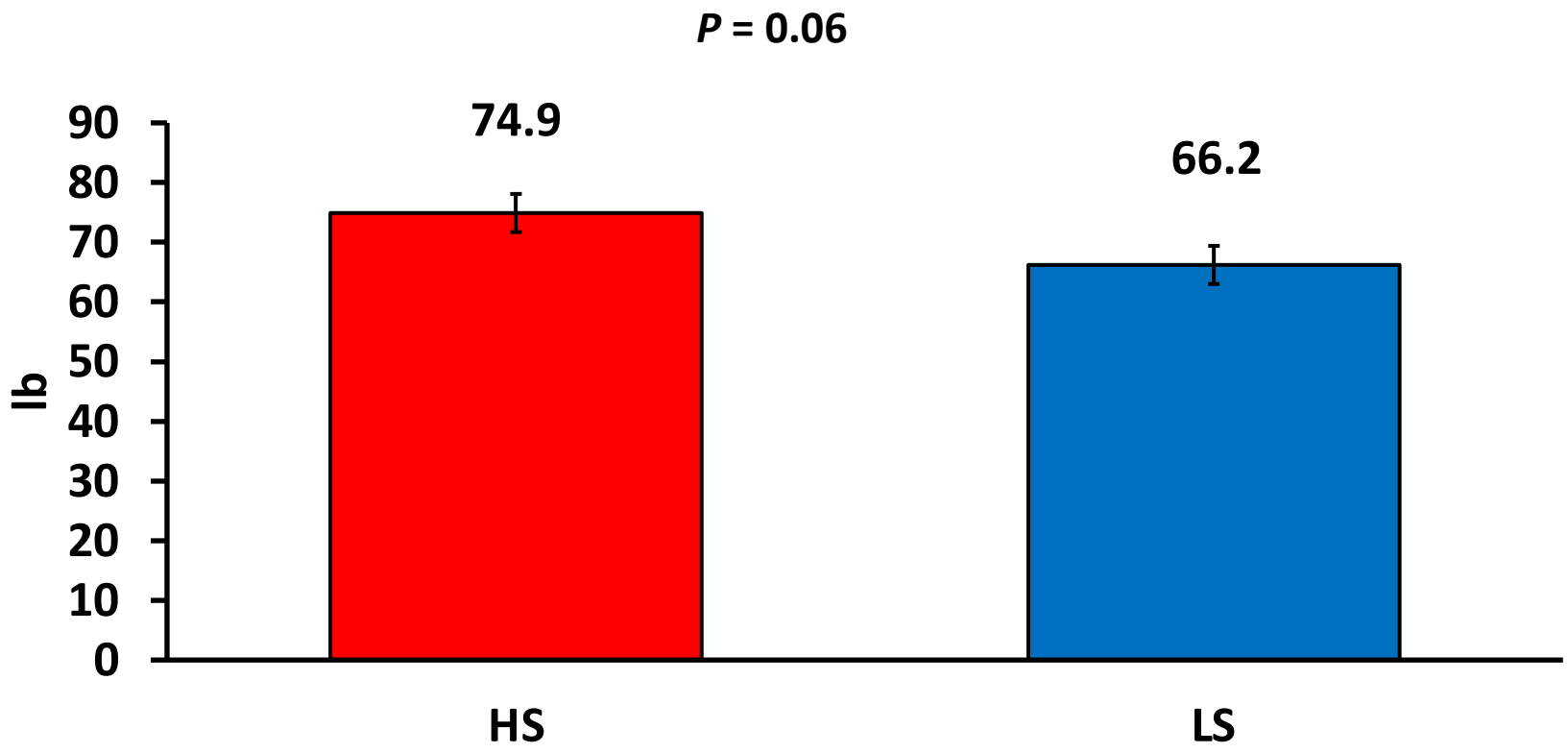
NMSU unpublished data

Divergent BCS on plasma β-hydroxybutyrate in subsequent calving season



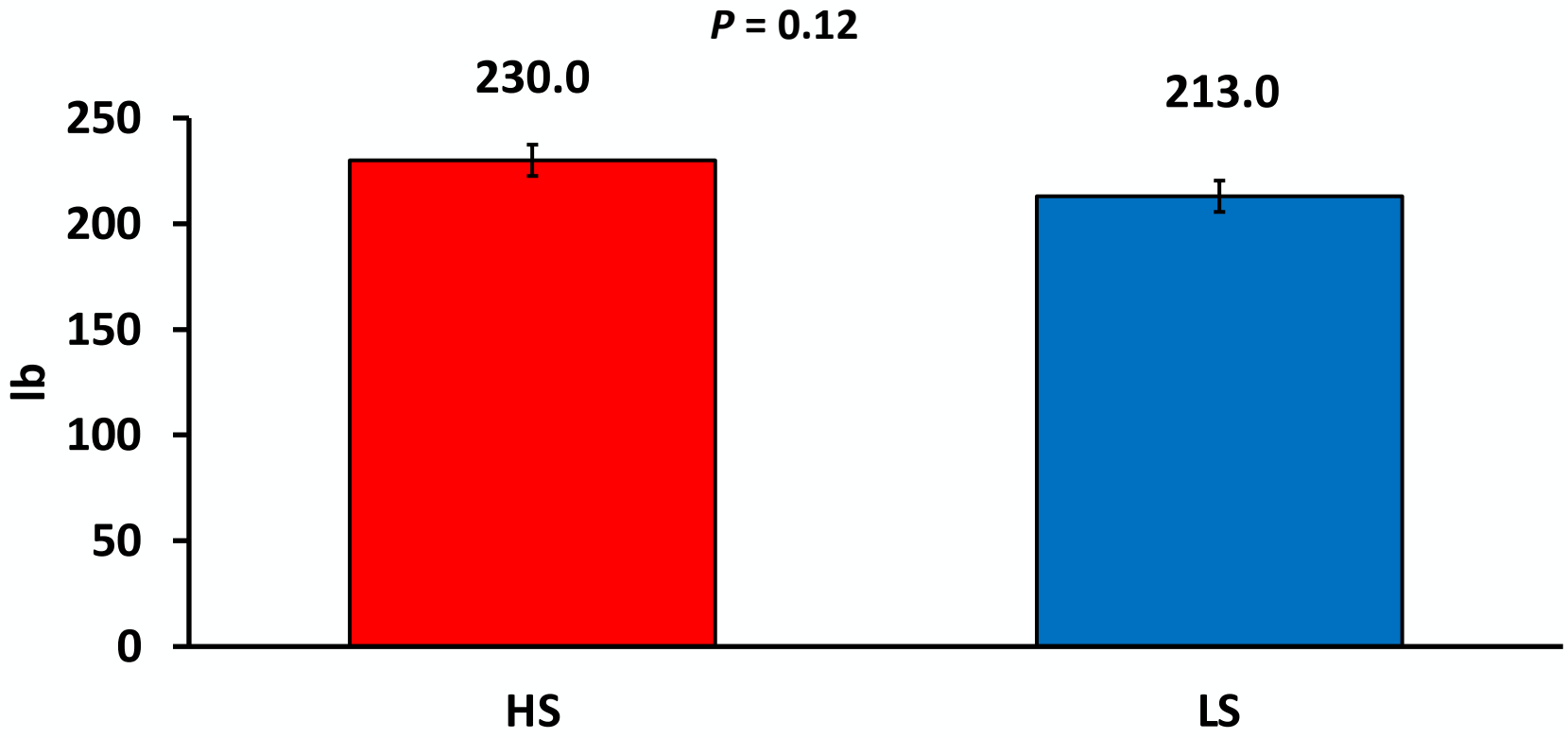
NMSU unpublished data

Divergent BCS on calf birth weight in subsequent calving season



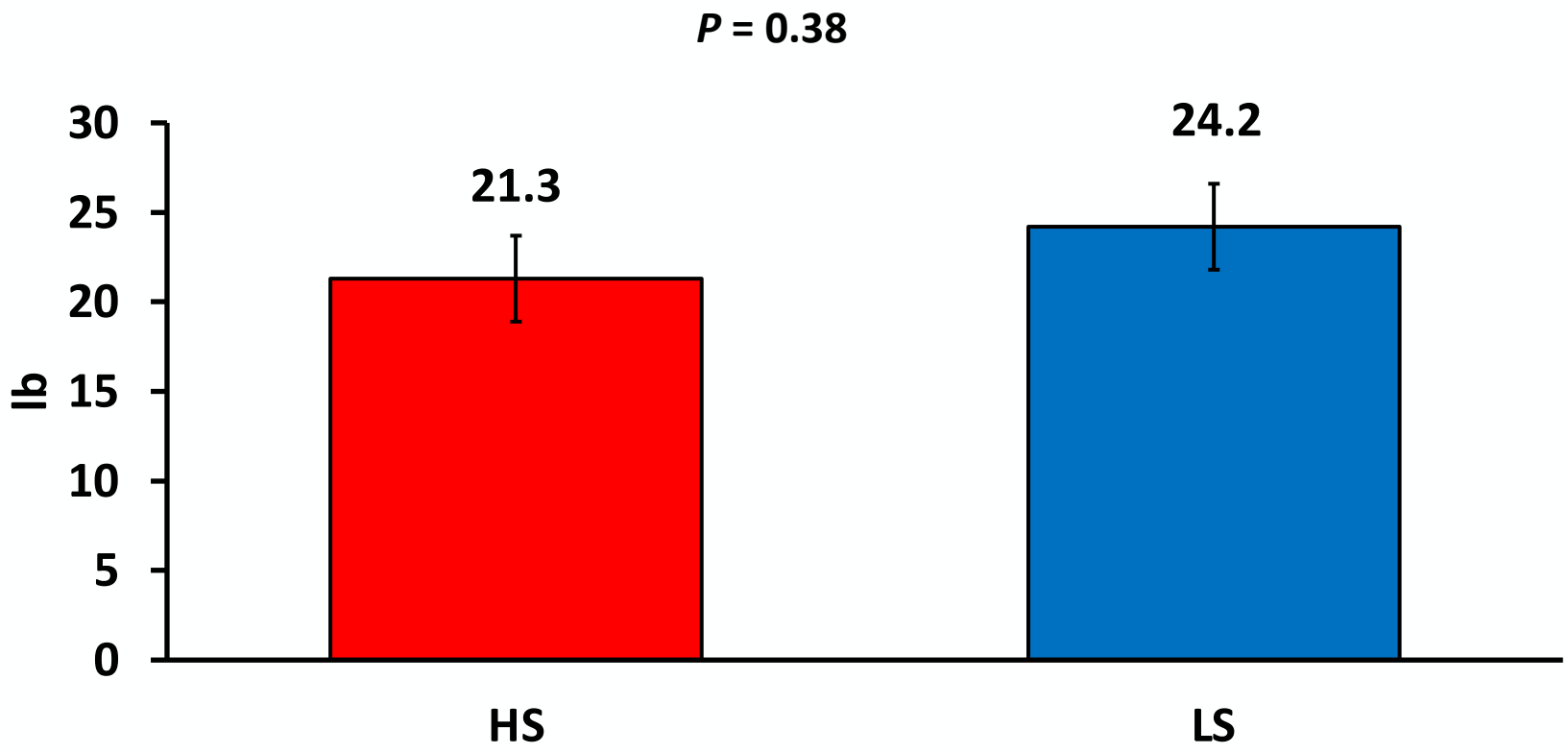
NMSU unpublished data

Divergent BCS on calf d-60 BW in subsequent calving season



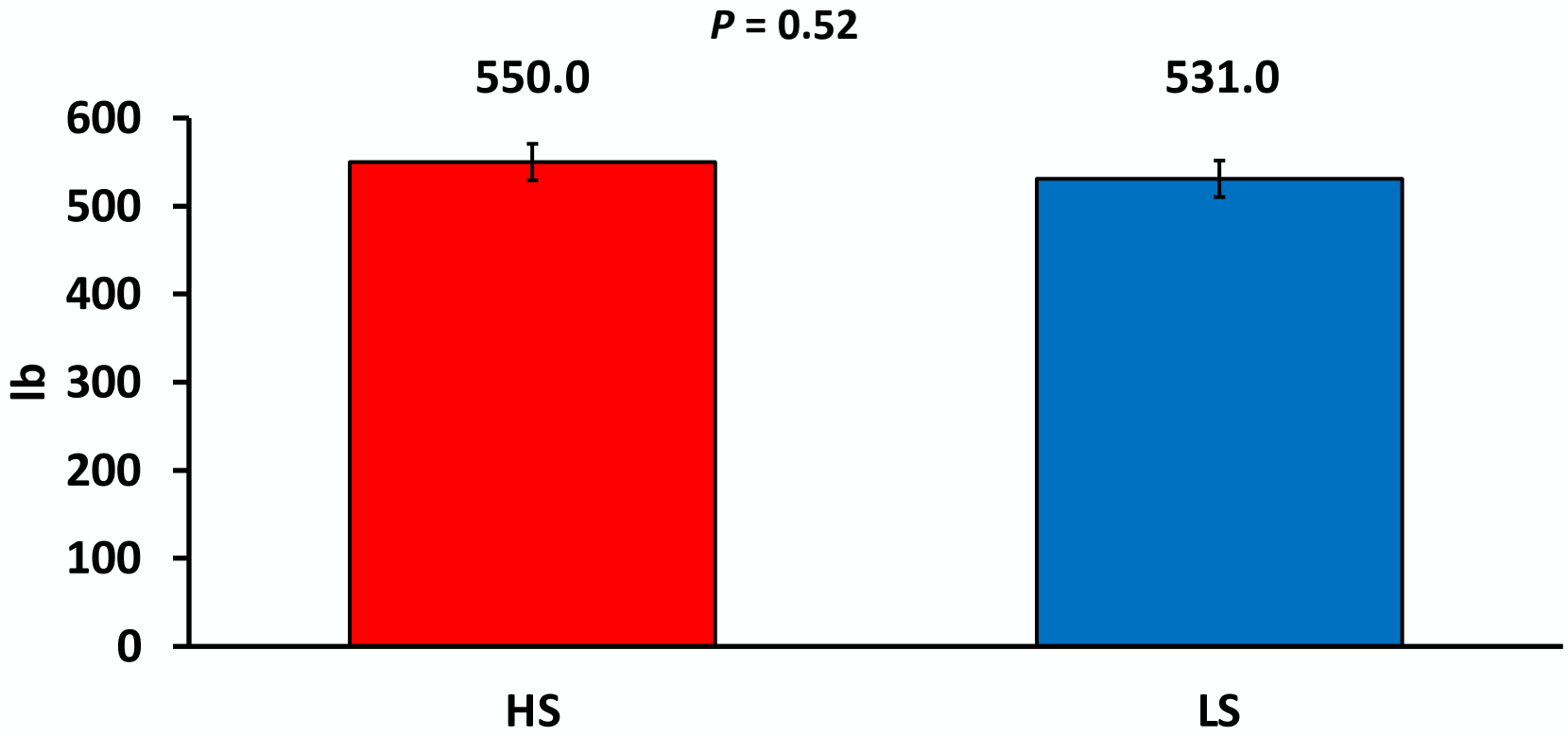
NMSU unpublished data

Divergent BCS on cow 24 hr milk production in subsequent calving season



NMSU unpublished data

Divergent BCS on calf WW in subsequent calving season



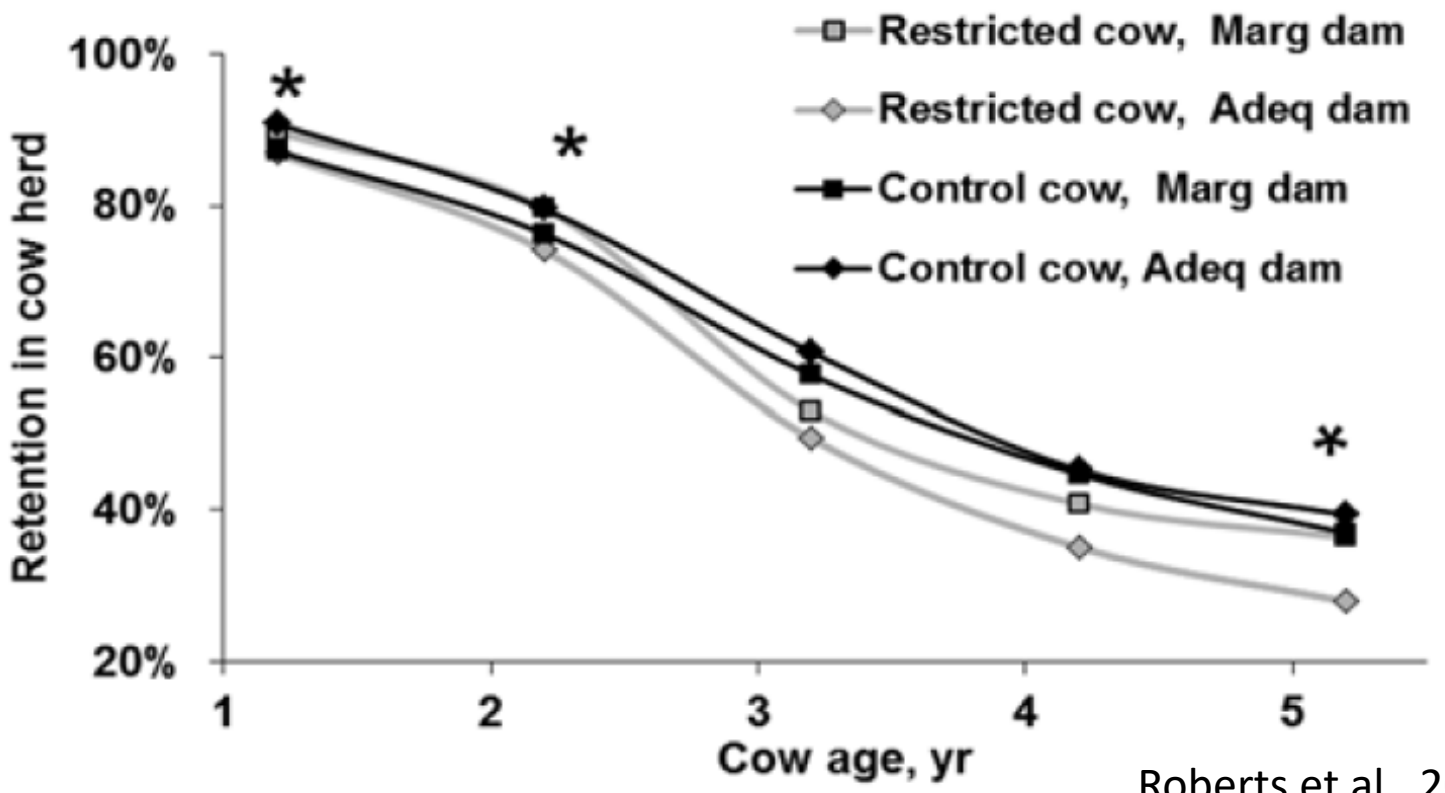
NMSU unpublished data

NMSU Cow history

- From 2014 to 2020
  - BCS
    - Low 5.06
    - High 5.45
  - Calf WW
    - Low 513
    - High 528
  - Average calving date
    - Low March 10
    - High March 15
  - Cow WW
    - Low 1057
    - High 1142

NMSU unpublished data

Summary



Roberts et al., 2016

Questions

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