

## **Profitability of early weaning of beef cows at northern Sonora, Mexico: A rancher experience**

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### **Introduction**

Amount and distribution of precipitation is normally inadequate and uncertain in arid and semiarid Sonoran Desert rangelands. Low precipitation reduces forage quality and quantity and it can negatively influence livestock yield reducing milk production and calf gains. Early removal of the calf from its dam reduces forage needs of the cow-calf enterprise and has been found to improve body weight gain and pregnancy rates in the cow herd (Mulliniks *et al.*, 2013). Additionally, weaning calves early can result in improved animal performance by increasing pregnancy rates, cow body condition scores and increased steer carcass quality while reducing forage needs of the cow-calf enterprise. Under normal conditions, a cow must yield a calf every year to be economically profitable so care should be taken in animal and range management to accomplish these goals

Blanco *et al.*, (2009), reported that income received for early weaned calves may be greater than traditionally weaned calves. Previous studies in Mexico have shown that early weaning is a practical tool for calf production; however, local information regarding performance of cows following early weaning does not exist. The objectives of this study were to evaluate the effect of early and normal weaning of calves on cows performance, percent pregnancy, calving interval and total profitability.

### **Materials and Methods**

The study was conducted during 2012 and 2013 at Rancho Grande which is located 60 miles north of Hermosillo, Sonora, Mexico (29° 49' 31.9" N. Lat; 111° 15' 5.6" W. Long.) at an elevation of 560 m, with an average precipitation of 325 mm and 22.1 °C of mean annual temperature. The vegetation is a Matorral Arbosufrutescente which was sown with buffelgrass (*Cenchrus ciliaris*) during 1980 and re seeded again in 2001. Treatments applied were: 1) early weaning at 90 days and 2) normal weaning at 210 days of age (check). Forty crossbred cows (Charolais x Brahman) 6 years old and similar body condition score were selected, 30 on each treatment. Calves were removed from cows at the start of breeding season (90-d postpartum) or at normal weaning (210-d postpartum). Early weaned calves received a 16.0% crude protein diet for approximately 120-d in a dry lot. Concentrate feed used contained (85% TDN, 16% protein, 8% NFE, 7% crude fiber 0.7% calcium and 0.7% phosphorus). Animals from both groups were vaccinated to protect against respiratory and diarrhea diseases and were treated with ADE vitamins and protected against internal and external parasites. Early weaned calves were fed ad libitum and amounts delivered were adjusted daily by previous day intake. Both, cows on the early weaning treatment and calves in the normal weaned treatment remained with the cows in the buffelgrass pastures until they were 210 days old. All animals in the study were exposed to normal breeding season and were individually weighted once a week during the study period.

Evaluated variables were: calves weaning weight, cows weaning weight, calves sale weight, cow's body condition and weight, percentage of pregnancy, calving intervals and profitability. Data for normal weaning (NW) and early weaning (EW) calves were analyzed using the MIXED procedure in SAS (SAS Inst. Inc., Cary, NC, USA) with a model that included weaning. Least squares means were used to compare differences between significant variables at  $P \leq 0.05$ . Duncan's Multiple Range Test was used for mean comparison. Economic data and profitability projection were conducted for EW and NW by using computer software programs (UNISON, 2006). Profitability models used real resulting values.

Fixed and variable costs were used on estimations. Early weaned calves were charged yardage at \$0.25 pesos/calf/d, \$78.0 Pesos for medicines and vaccinations and \$6.20 pesos for kg of supplement. Selling cost for calves on both treatments was \$32.0/kg.

## Results and Discussion

Results show similarities in cow weights at the beginning of the study, but significant differences ( $P \leq 0.05$ ) in body weight of cows at the end of the study (*Table 1*). Cow weight in the EW treatment increased 21.7 kg during the study period while cows in the NW treatment lost an average of 74.0 kg. Initial calves weights were similar ( $P \geq 0.05$ ) among groups but resulted different ( $P \leq 0.05$ ) in the final weight. Calves under EW won on average a total of 135.6 kg while only 54.1 kg in the NW treatment. Consequently, calves average daily gain was 1.13 and 0.451 kg on EW and NW treatments, respectively. Early weaned calves consumed an average of  $4.3 \pm 1.4$  kg of feed daily while the NW calves consumed none. Cow pregnancy averaged 95% and 74% on EW and NW treatments, respectively and resulted different ( $P \leq 0.05$ ) among treatments. Calving intervals were also different ( $P \leq 0.05$ ) among treatments and resulted with 90 and 185 days for EW and NW, respectively. Total profitability was greatest on the EW cows with \$3,955.00 per calf produced while profitability with NW cows was only \$1,170.65.

**Table 1.** General characteristics of animals, feed, production costs and profitability of calf production under early weaning and normal weaning for 120 days during 2012 and 2013 at Rancho Grande Sonora, Mexico.

Variables	Early weaning	Normal weaning
Initial cow weight (kg)	513.5 a*	522.7 a
Final cow weight (kg)	535.2 a	448.7 b
Initial calf weight (kg)	119.5 a	125.3 a
Final calf weight (kg)	255.1 a	179.4 b
Total calf weight gain (kg)	135.6 a	54.1 b
Calf average daily gain (kg)	1.13 a	0.451 b
Feed consumption/animal/day (kg)	$4.3 \pm 1.4$	0
Total cost per calf produced (Pesos/kg)	**19.5	17.6
Cow pregnancy (%)	98	74
Calving interval (days)	90	185
Total profitability (\$pesos/calf produced/year)	**3,955.00	1,170.65

\*For each variable means followed by similar letter are not significantly different ( $P \leq 0.05$ ; Duncan).

\*\* Obtained from economic analyses

The results of this study agrees with Blanco *et al.* (2009), who suggest that early removal of the calf from its dam reduces forage needs of the cow-calf enterprise and improve body weight gain and pregnancy rates in the cow herd. The authors suggests that during years of drought conditions, early weaning and feeding calves in a dry lot could potentially be a cost-effective management decision compared to selling light-weight calves. Other studies show that although early weaning can reduce net income in the short term; however, avoiding overgrazing and reducing the need to liquidate the cow herd may have greater long-term financial benefits (McSwweeney *et al.*, 1993; Ibarra *et al.*, 2011). According to McSwweeney *et al.*, (1993) and Mulliniks *et al.* (2013), this is especially important in times of drought, since weaning calves earlier than the traditional 200 days can relieve the nutritional stress on the cow herd and allow them to maintain or regain the body condition needed for future reproduction. Economic analyses demonstrate that total cost per calf produced is similar among treatments and varies from \$17.6 to 19.5 pesos/kg, EW is the most profitable practice for beef production. Blanco *et al.* (2009), found that early weaning reduces annual cow costs per calf weaned, they had lower pasture costs and winter feed costs per cow as well as lower depreciation costs because of lower cow pregnancy percentages and culling rates.

## Conclusion

Early weaning enhances cow weight, body condition, and calves daily gains as well as cow pregnancy rates, reducing calving intervals and increasing overall ranch economics. Ranchers applying this technology can gain additionally \$2,784.35 pesos per cow per year and under this regime, cows will continue producing one calf every 12 or 13 months.

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