# Do beef cows reared on mountain pastures of central Spain need to be supplemented?

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**Keywords:** mountain grazing, natural resources, supplementation, suckler cows

**Introduction:** Beef cows in mountain areas are managed during long periods on natural pastures, where their performance is affected by seasonal variations in forage avalability and/or quality. The aims of this study were: I) to evaluate the quality of available pastures throughout the year in an extensive cow farm, and II) to estimate the timing, amount and type of supplement required to maintain permanently cows on these pastures.
**Materials and methods:** The study was carried out in a mountain farm located in Campisábalos (central Spain, 41º 15´N, 3º8´W; 1350 m a.s.l.). The suckler cows (n=128) grazed permanently on natural grasslands, meadows, and shrub and forest pastures (total of 2200 ha). Samples of the pastures where cows were grazing at the time of sampling were collected every 1.5 months, from May 2018 to May 2019. On each date, 3 samples per ha were obtained to determine the contents of dry matter (DM), crude protein (CP), neutral detergent fibre, acid detergent fibre, acid detergent lignin and ash. A free on-line software (www.remugants.es, by REMUGANTS "Ramon Trias") based on the INRA feeding system for ruminants was used to a) calculate the forage nutritive value, b) determine the energy and protein requirements of cows in different physiological states (non-pregnant, late pregnancy, initial lactation, mid-lactation), and c) evaluate if diets based on *ad libitum* intake of the sampled pastures were able to meet cow requirements. The quantity of forage that cows should eat was calculated according to their physiological state, while maintaining a body condition score of 2.5 at calving and a daily milk yield of 10 kg/d over 6 months of lactation. Moreover, forage intake was calculated taking into account the maximum intake capacity of the cow and the fill value of the forage. When *ad libitum* forage intake did not meet requirements, three types of concentrate differing in the CP content (with 18, 15 or 12%) were tested as supplements.
**Results:** In spring, forage quality (13.9 and 11.5% CP, and 5.7 and 5.5 MJ NEl/kg DM, in May and June, respectively) was enough to maintain the body condition score of cows, then no supplementation was advisable (Table 1). The quality of forage decreased thereafter, down to 7.3% CP, and 4.4 MJ NEl/kg DM in August, and 5.4% CP, and 4 MJ NEl/kg DM in October; only lactating cows needed a high-protein supplement on these dates. However, the low CP content could have decreased the intake, therefore the supplementation of non-lactating cows should be revised. In December, forage quality improved (13.7% CP, and 6.7 MJ NEl/kg DM) and no supplement was needed, although forage availability was minimum (not determined), which may compromise a sufficient forage intake. In February and March forage quality and availability were very low, due to persistent snowfall and the late start of the growth season. All the cows needed supplementation, ranging between 1.5 and 4.5 kg. Finally, in May the quality (12.7% CP, and 5.6 MJ NEl/kg DM) was enough to maintain the herd without supplementation.

Table 1. Amount (kg DM) and type of concentrate needed depending on the physiological state.

| Cow | Non-pregnant | Late pregnancy | Initial lactation | Mid-lactation |
|---|---|---|---|---|
| May 2018 | NO | NO | NO | NO |
| June 2018 | NO | NO | NO | NO |
| August 2018* | NO | NO | 1.5 kg (18% CP) | 1 kg (18% CP) |
| October 2018* | NO | NO | 2.5 kg (18% CP) | 2 kg(18% CP) |
| December 2018* | NO | NO | NO | NO |
| February 2019 | 1.5 kg (15% CP) | 2 kg (15% CP) | 4.5 kg (15% CP) | 4.5 kg (15% CP) |
| March 2019 | 3 kg (15% CP) | 4 kg (15% CP) | 6.5 kg (15% CP) | 6.5 (15% CP) |
| May 2019 | NO | NO | NO | NO |

*Cows should be supplemented due to the low CP content or the limited quantity of forage available.

**Conclusion:** The quality of forage was enough to maintain the herd without supplement during some months. These data showed the interest of managing the herd in batches according to their physiological state, allowing the farmer to reduce feed costs.
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# DO BEEF COWS REARED ON MOUNTAIN PASTURES OF CENTRAL SPAIN NEED TO BE SUPPLEMENTED?

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The performance of beef cows in mountain areas managed on natural pastures is affected by seasonal variations in forage availability and/or quality. Supplementation could be advisable

## OBJECTIVES

- ❖ Evaluate the quality of pastures throughout the year in an extensive cow farm
- ❖ Estimate the timing, amount and type of supplement required to maintain permanently cows on these pastures

## MATERIALS AND METHODS

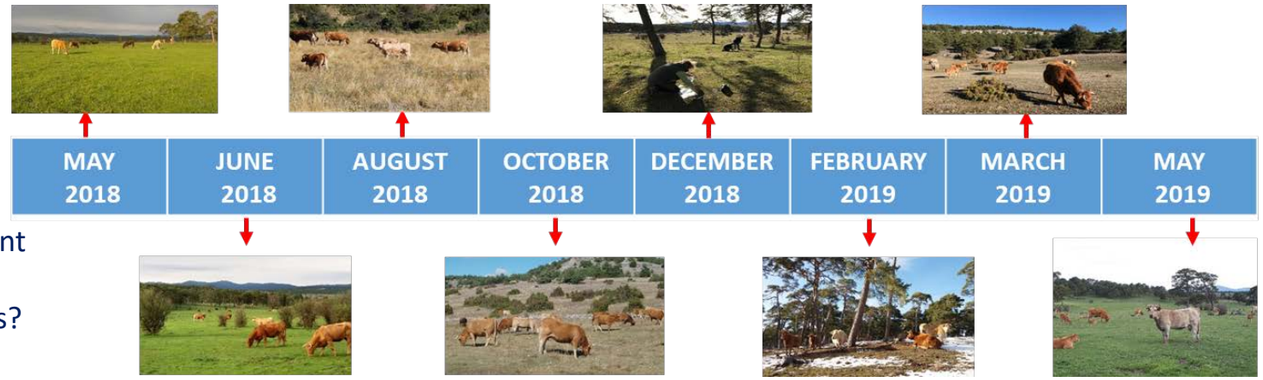
**Mountain farm located in Campisábalos** (Spain, 41º 15´N, 3º8´W; 1350 m a.s.l.).
**Chemical analysis of pastures** (DM, CP, NDF, ADF, ADL, ash)
**Free on-line software** (www.remugants.es) based on the INRA feeding system for ruminants
**Used to estimate:**

a) the forage nutritive value
b) the energy and protein requirements of cows in different physiological states
c) *ad libitum* intake of the pastures met cow requirements?

yes

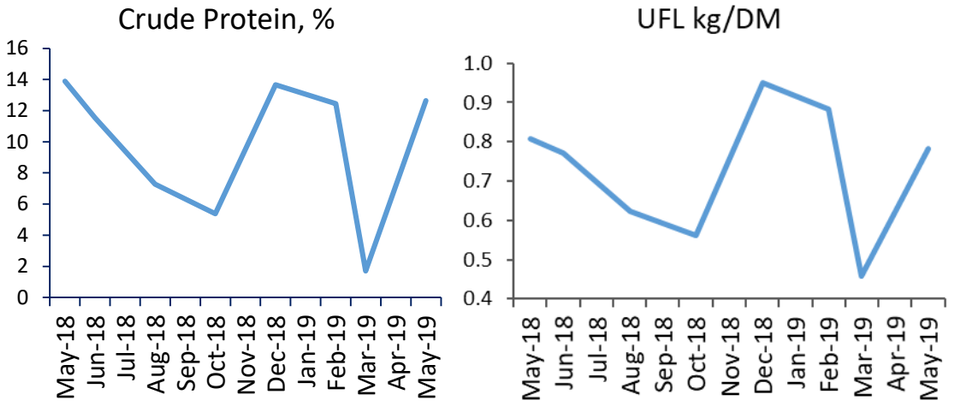
no → Evaluation of the quantity of concentrate with 12, 15 or 18% CP to supplement the cows

**Sampling every 1.5 months (3 samples/ha)**




## RESULTS

Evolution of protein and energy (UFL) of pastures




Amount and type of concentrate needed according to physiological stage

| Cow | Non-pregnant | Late pregnancy | Initial lactation | Mid-lactation |
|---|---|---|---|---|
| May 2018 | NO | NO | NO | NO |
| June 2018 | NO | NO | NO | NO |
| August 2018* | NO | NO | 1.5 kg (18% CP) | 1 kg (18% CP) |
| October 2018* | NO | NO | 2.5 kg (18% CP) | 2 kg(18% CP) |
| December 2018* | NO | NO | NO | NO |
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| May 2019 | NO | NO | NO | NO |

* Cows should be supplemented due to the low CP content or the limited quantity of forage available.

## CONCLUSIONS

The quality of forage was enough to maintain the herd without supplement during some months. These data showed the interest of managing the herd in batches according to their physiological state, allowing the farmer to reduce feed costs.

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