

Livestock Efficiency

FEEDING VALUE OF WALKINGSTICK CHOLLA

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THE STORY IN BRIEF: Drought is a recurring situation faced by livestock producers in New Mexico where it is often necessary to supply emergency feeds and(or) reduce herd size. Traditional supplemental feeds such as hay or grain may be unavailable or cost-prohibitive, and producers may prefer a less expensive alternative. Walkingstick cholla has been used as an emergency feed in New Mexico for over 100 years and is an available resource across much of the region. However, limited data exist regarding feeding value of cholla, and most research concerning cactus as livestock feed has focused on pricklypear. We assessed the feeding value of singed walkingstick cholla by 1) evaluating its digestibility when fed with a basal diet of mature blue grama hay and 2) examining the nitrogen balance of wethers consuming this diet. Treatments consisted of 0%, 15%, and 20% cholla in a blue grama hay-based diet on a dry matter basis. The experiment was planned with 0%, 15%, and 30% cholla, but wethers would voluntarily consume cholla up to 20% of the diet. Cholla was harvested in September 2001 at the Corona Range and Livestock Research Center and clippings consisted of green, non-woody cladodes, which were burned with a propane torch until no spines remained and little to no singeing of the plant occurred. Burned segments were chopped with a knife and added to blue grama basal diet each day. Neutral detergent fiber digestibility decreased linearly as cholla in the diet increased. Diet dry matter and organic matter digestibilities tended to decrease linearly as cholla in the diet increased, while crude protein digestibility was similar across diets. Nitrogen retention was similar for all diets. In a drought situation, cholla would be fed to supply energy. Because of its high moisture (and low dry matter) content, a large amount of cholla must be fed to make up a notable part of diet dry matter. We found that physical characteristics of cholla may reduce its digestibility and consequently its energy value and further, that cholla may impair fiber digestibility of the basal diet it is consumed with. The true feeding value of walkingstick cholla is lower than expected based on chemical composition, and producers should carefully consider the use of cholla as an emergency feed.

THE PROBLEM: Walkingstick cholla has been used as an emergency feed during drought in New Mexico for over 100 years and is an available resource across much of the region. However, limited data exist regarding feeding value of cholla, and most research concerning cactus as livestock feed has focused on pricklypear.

OBJECTIVES: Our objectives were to assess the feeding value of singed walkingstick cholla by 1) evaluating its digestibility when fed with a basal diet of mature blue grama hay and 2) examining the nitrogen balance of wethers consuming this diet.

DURATION: September – December 2001

APPROACH: Treatments consisted of 0%, 15%, and 20% cholla in a blue grama hay-based diet on a dry matter basis. The experiment planned with 0%, 15%, and 30% cholla, but wethers would voluntarily consume cholla up to 20% of the diet. Cholla was harvested in September 2001 at the Corona Range and Livestock Research Center, and clippings consisted of green, non-woody cladodes. Clippings were burned with a propane torch until no

spines remained and little to no singeing of the plant occurred, and burned segments were chopped with a knife and added to the blue grama basal diet each day. Total urine and fecal collections were conducted and dry matter, organic matter, neutral detergent fiber, and crude protein digestibilities calculated. Nitrogen retention of the wethers was also evaluated.

RESULTS: Nutrient composition of blue grama hay, cholla cactus, and total diets consumed by wethers is detailed in Table 1. Neutral detergent fiber digestibility decreased linearly as cholla in the diet increased. Diet dry matter and organic matter digestibilities tended to decrease linearly as cholla in the diet increased, while crude protein digestibility was similar across diets (Table 2). Increasing dietary cholla had no impact on nitrogen retention (Table 2).

POTENTIAL APPLICATION: Cholla would be fed to supply energy in drought situations. Due to its high moisture (and low dry matter) content, a large amount of cholla must be fed to make up a notable part of diet dry matter. Physical characteristics of cholla may reduce its digestibility and consequently its energy value. Further, cholla may impair fiber digestibility of basal diet. The true feeding value of walkingstick cholla is lower than expected based on chemical composition, and producers should carefully consider the use of cholla as an emergency feed.

EDUCATIONAL PLAN: Research results will be disseminated via NMSU Agriculture Communications press release.

REFERENCES: Endecott, R. L., J. E. Sawyer, C. A. Löest, and M. K. Petersen. 2005. Feeding value of singed walkingstick cholla. *Rangeland Ecology and Management*. 58:(In press).

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Table 1. Nutrient composition of mature blue grama hay, cholla cactus, and diets consumed by wethers with cholla cactus as 0%, 15%, or 20% of diet with mature blue grama hay.

| | Dry Matter | Organic Matter | Neutral Detergent Fiber | Crude Protein |
|-------------------------------------|------------|----------------|-------------------------|---------------|
| Ingredient | | | | |
| Mature blue grama hay | 92.7 | 90.8 | 69.1 | 9.0 |
| Walkingstick cholla | 20.3 | 79.6 | 36.4 | 9.9 |
| Treatment (cholla % of diet) | | | | |
| 0 | 92.7 | 90.8 | 69.1 | 9.0 |
| 15 | 81.9 | 89.1 | 64.2 | 9.1 |
| 20 | 78.3 | 88.5 | 62.5 | 9.1 |

Table 2. Nutrient digestibilities and daily nitrogen retention in wethers consuming cholla cactus as 0%, 15%, or 20% of the diet with blue grama hay.

| Item | Cholla percent of diet | | | P-value |
|--|------------------------|-------|-------|---------|
| | 0 | 15 | 20 | |
| Dry matter digestibility, % | 52.6 | 50.2 | 47.8 | 0.08 |
| Organic matter digestibility, % | 59.3 | 57.7 | 55.4 | 0.16 |
| Neutral detergent fiber digestibility, % | 58.0 | 54.2 | 51.0 | 0.04 |
| Crude protein digestibility, % | 63.1 | 61.9 | 66.5 | 0.16 |
| Retained nitrogen, g | -0.07 | -0.02 | -0.41 | 0.56 |