



# Heifer Management Blueprints

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## Limit Feeding and Rumen Capacity in Dairy Heifers

### Introduction

Limit feeding is an alternative feed management strategy for dairy heifers. Studies demonstrate limit feeding dairy heifers can decrease total costs of raising heifers by reducing the amount of feed heifers consume. The volume of manure excreted by limit-fed heifers as compared to heifers fed a traditional high-fiber, low-energy diet is reduced because less feed dry matter is consumed. Limit feeding has also been used to help control over-conditioning of heifers by maintaining strict caloric intakes. Concerns exist however regarding the effect limit feeding may have on rumen capacity. This brief will address whether long term rumen capacity is compromised in heifers when fed 10-20% less dry matter than ad libitum.

### Key limit feeding principles

Limit feeding dairy replacement heifers is facilitated by decreasing the amount of forage fed to heifers while maintaining the same nutrient intakes that heifers would receive through a traditional high-fiber, low-energy diet. Heifer growth is maintained throughout the feeding period and the heifer grows consistently to reach industry standards for recommended body weights at first calving. Proper heifer growth is achieved by proportioning the diet with higher amounts of concentrates, such as corn and soybean meal and reducing forages fed. The diet should be formulated by a nutritionist to attain

the appropriate balance of protein and energy required for consistent growth.

### Heifer intakes on limit feeding diets

In an experiment at the University of Wisconsin, researchers formulated a traditional high forage heifer diet for ad libitum feeding based on recommendations from the National Research Council (2001), containing 13.1% CP and 2.1 Mcal/kg of metabolizable energy. The diet was fed to 990 lb Holstein heifers to achieve 1.8 lb/d of average daily gain. To facilitate limit feeding, corn and soybean meal were increased in the limit-fed diets to equal the intakes of energy and protein of heifers fed the high forage ration. A second limit feeding diet was constructed using an ionophore (Lasalocid, 325 mg/d) to reduce feed intake an additional 5.0 %. Dry matter intake (DMI) of heifers was significantly reduced in limit-fed heifers (18.7 lbs/d) and further reduced with the addition of an ionophore (17.9 lbs/d) as compared to the heifers fed a control diet ad libitum (22.7 lbs/d).

### Heifer growth and first lactation rumen capacity

Researchers measured rumen capacity (e. g. rumen volume, rumen density, digesta DM) three hours post-feeding. Differences in rumen capacity were not observed between limit-fed heifers and heifers fed high forage diets ad libitum. Rumen volumes of limit-fed heifers were numerically higher

3 hours post feeding as compared to heifers fed high forage diets ad libitum, indicating limit-fed heifers had similar rumen capacities. Upon completion of the 180-d trial period, limit-fed heifers were immediately assigned a common high forage diet fed ad libitum. Researchers measured rumen capacity in the post-trial period and observed no difference in rumen capacity, indicating limit-fed heifers adjusted to high forage diets following limit feeding. Rumen capacity was measured again at 45 and 90 days in milk (DIM) in cows that were limit-fed as heifers. Compromises in rumen volume

(Figure 1) and rumen digesta DM (Figure 2) were not evident during lactation. Dry matter intake at 45 DIM (42.3 lbs/d) and at 90 DIM (45.2 lbs/d) was not different for cows limit-fed as heifers as compared to cows fed high forage diets as heifers.

### Conclusions

In this experiment limit feeding had the potential to replace high forage diets with higher nutrient density diets without affecting rumen capacity as growing heifers or during the first lactation.

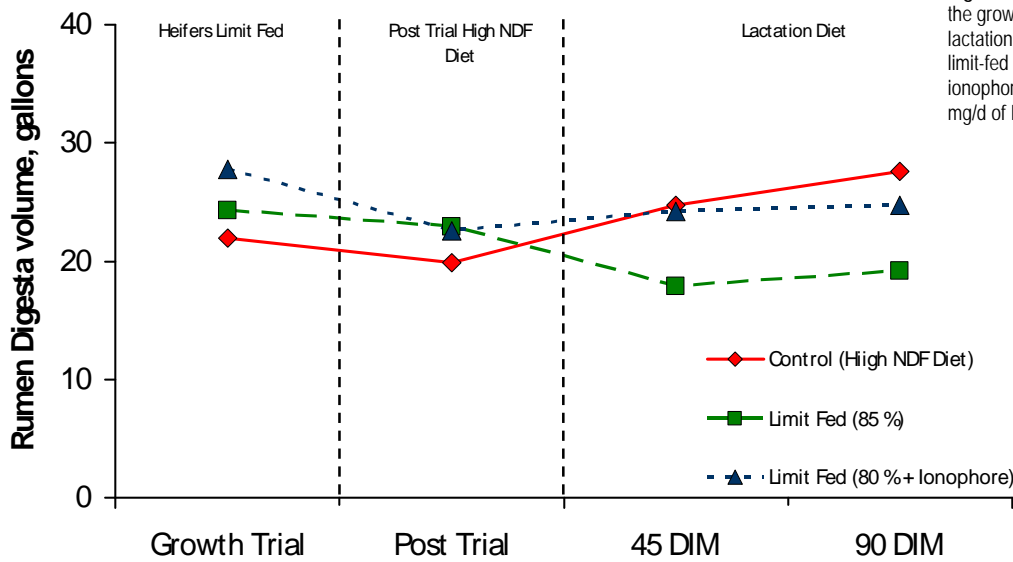


Figure 1. Rumen digesta volume (gallons) during the growth phase, post trial, and during first lactation for Holstein heifers fed a high NDF diet, limit-fed (85 % of intake) and limit-fed plus ionophore supplemented (80 % of intake with 325 mg/d of Lasalocid).

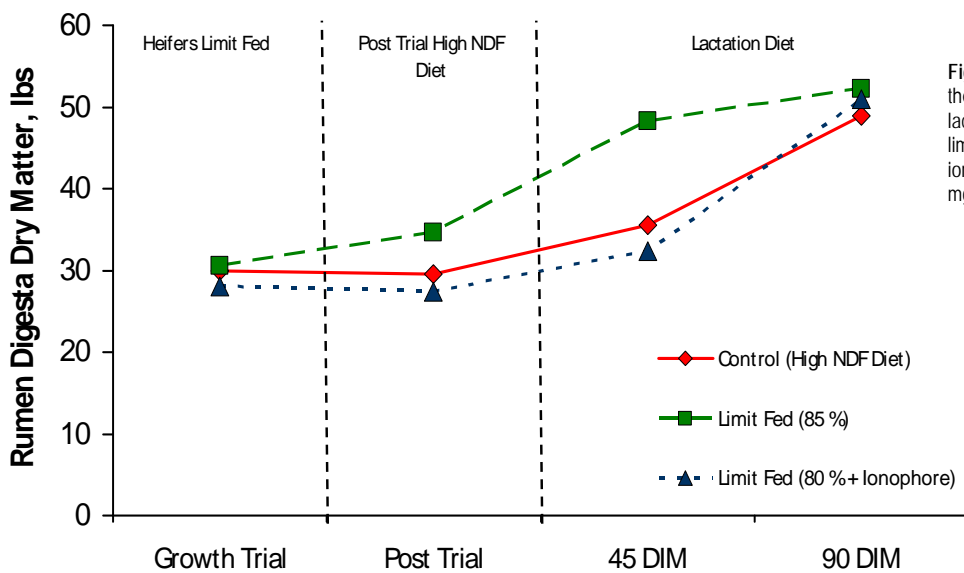


Figure 2. Rumen digesta dry matter (lbs) during the growth phase, post trial, and during first lactation for Holstein heifers fed a high NDF diet, limit-fed (85 % of intake) and limit-fed plus ionophore supplemented (80 % of intake with 325 mg/d of Lasalocid).