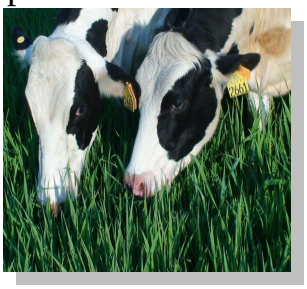
USDA Agricultural Research Service
PASTURE SYSTEMS AND WATERSHED MANAGEMENT RESEARCH UNIT
FACT SHEET

LINKING PASTURE AND ANIMAL PROCESSES

The effect of appetite on the way they graze.

Facts

- **Appetite** motivates animals to eat.
- Level of **appetite** influences **pasture** intake rate and grazing dynamics.
- **Ruminal fill** is inversely related to **appetite**.
- As **ruminal fill** increases during the progression of a meal, pasture intake rate decrease, not only due to increased searching time, but also through decreased bite mass, while maintaining a constant bite rate.



Despite these facts, *little is known regarding* how *cattle* adjust *bite dimensions* and pasture intake rate according to different hunger levels, or if variations in *ruminal fill* reflect changes in *appetite regulating hormones*.

- This study presents new insights in relation to the effect of ruminal fill on short-term bite mechanisms, pasture intake rate, and appetite regulating hormones levels of cattle grazing micro-pastures.

The study

Site:
USDA-ARS Pasture Systems and Watershed Management Research Unit.

Animals and pastures:
4 ruminally canulated dairy cows facing micro pastures.

Treatments:

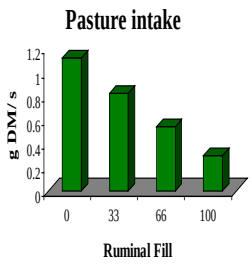
- 100 % of ruminal contents.
- 66 % of ruminal contents.
- 33 % of ruminal contents.
- 0 ruminal contents.

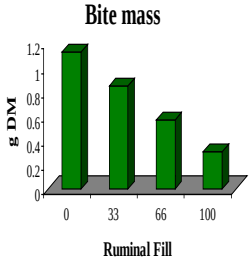
Note: Appetite level increases from 100 to 0.

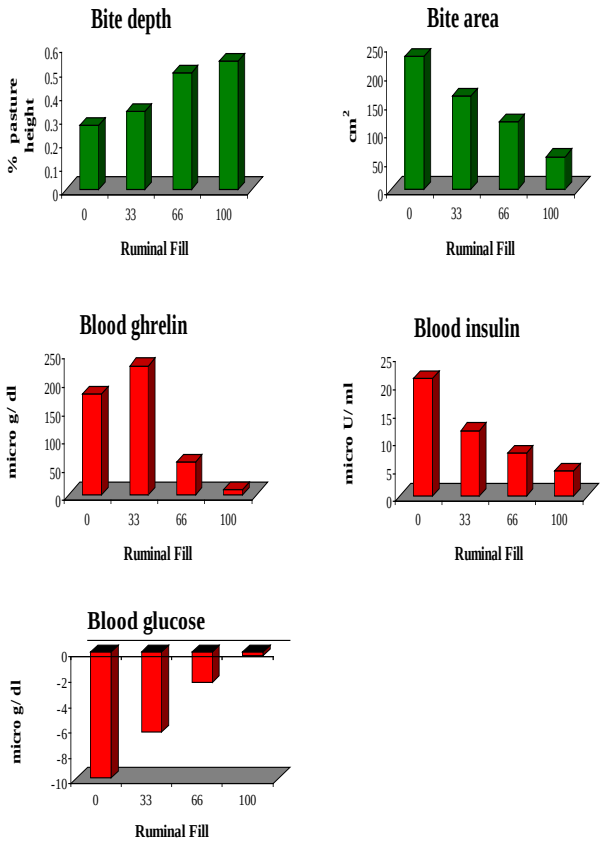
Measurements:

- Intake rate, bite mass, bite rate, bite area and bite depth.
- Levels of: ghrelin, insulin and glucose in blood.

Results:







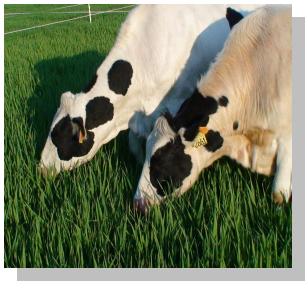
Note: Change in blood ghrelin, insulin and glucose are levels due to appetite level.

In summary

- The lower the ruminal fill the greater the appetite the cows feel.
- Cattle with more appetite consume more pasture per unit of time.
- Cattle with more appetite take heavier bites at the same rate.
- Cattle with more appetite take shallower bites with bigger area.
- Differences in levels of circulating ghrelin, insulin and glucose demonstrate the effect of ruminal fill on appetite regulating hormones; in other words, "hunger".

Potential implications

- This study showed that cattle may adjust bite mass and dimensions as a mechanism to increase instantaneous consumption of energy in response to decreasing levels of "physical stimulation" coming from the rumen.
- In the progression of a meal, these hunger signals seem to be mediated by ghrelin and potentially by insulin-glucose metabolism.



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