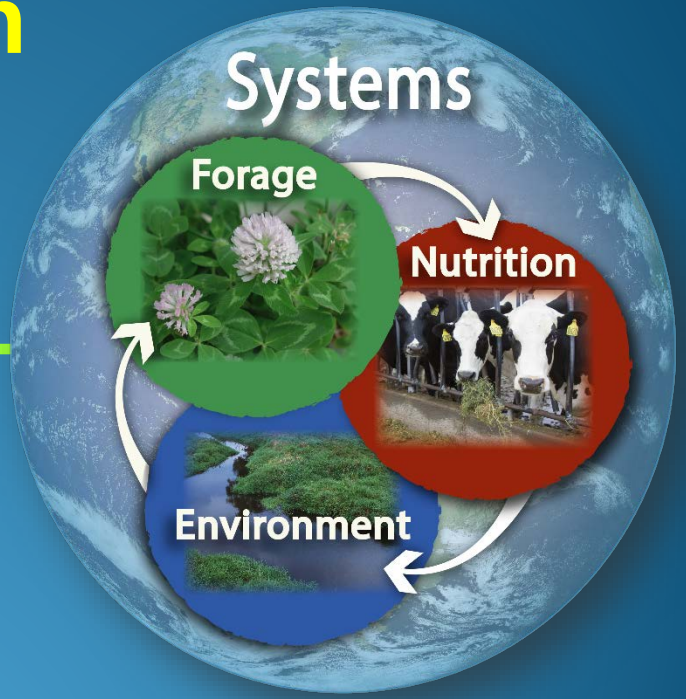
United States Department of Agriculture

"It" Doesn't Just Happen: What Manure Evaluation Can Tell Us About Cows and Rations



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WDE, 10/5/2016

What does manure have to do with forage?

Physical Form

Alfalfa silage

Corn silage

Wheat straw

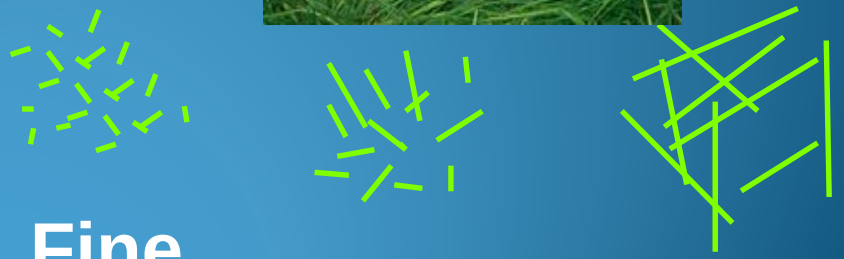
Byproducts

Sugar beet pulp

Ground corn

Physically Effective Form

- Enhances rumen function
- Increases rumination
- Rumen retention & passage
- Reduces digestive upset risk
- Allows rations to work



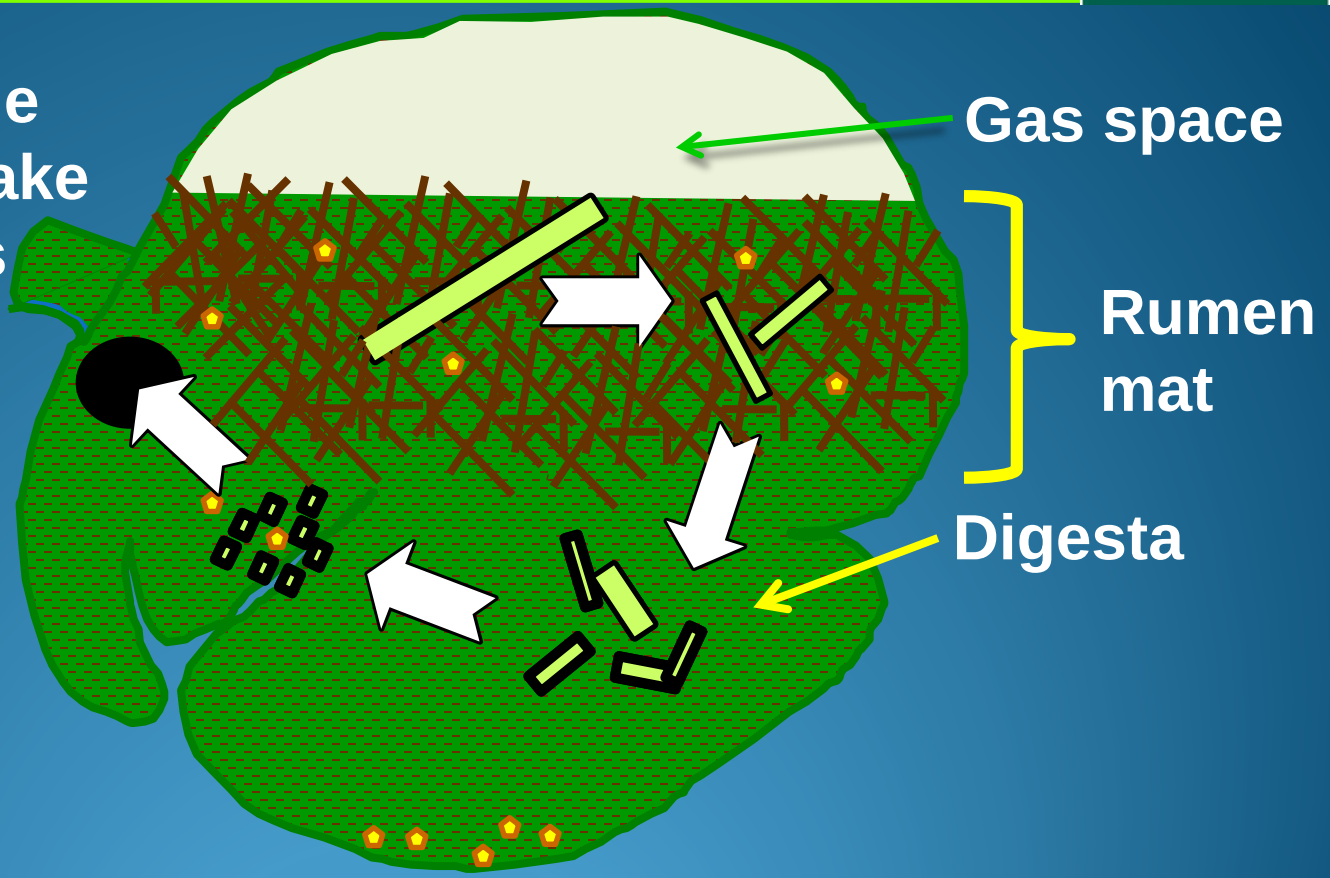
Fine

Medium

Coarse

Physical Form In The Rumen

The larger forage particles can make a mat that holds feeds in the rumen.



Longer time in the rumen gives more time for rumination and fermentation to digest feeds and break down particles. This affects the size of particles we see in manure.

Where Does Feed Digest?

Rumen (Fermentation)

Crude Protein
Carbohydrates
(NDF & NFC)

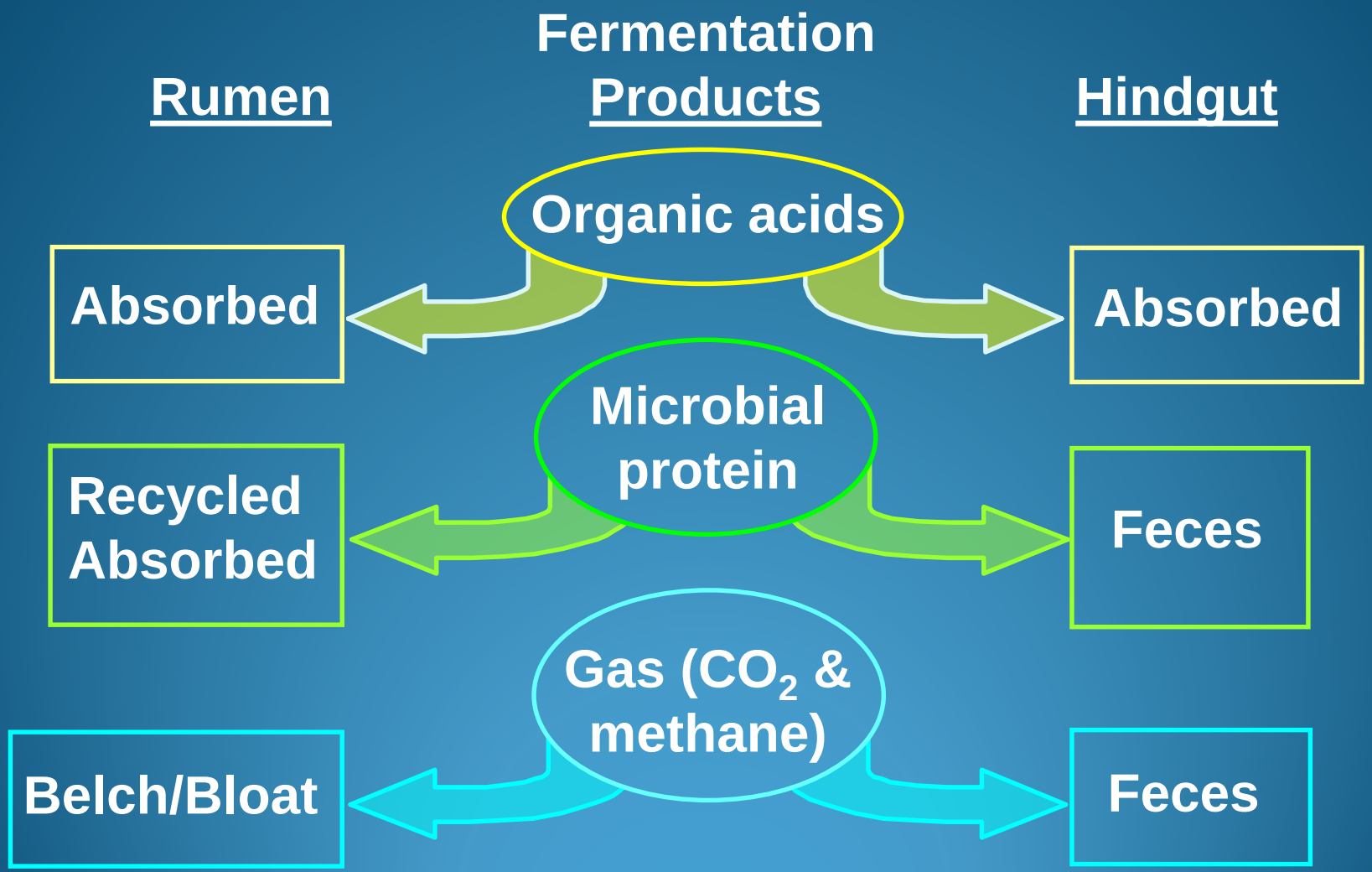
Small Intestine (Enzymic)

True Protein
Starch
Lipids

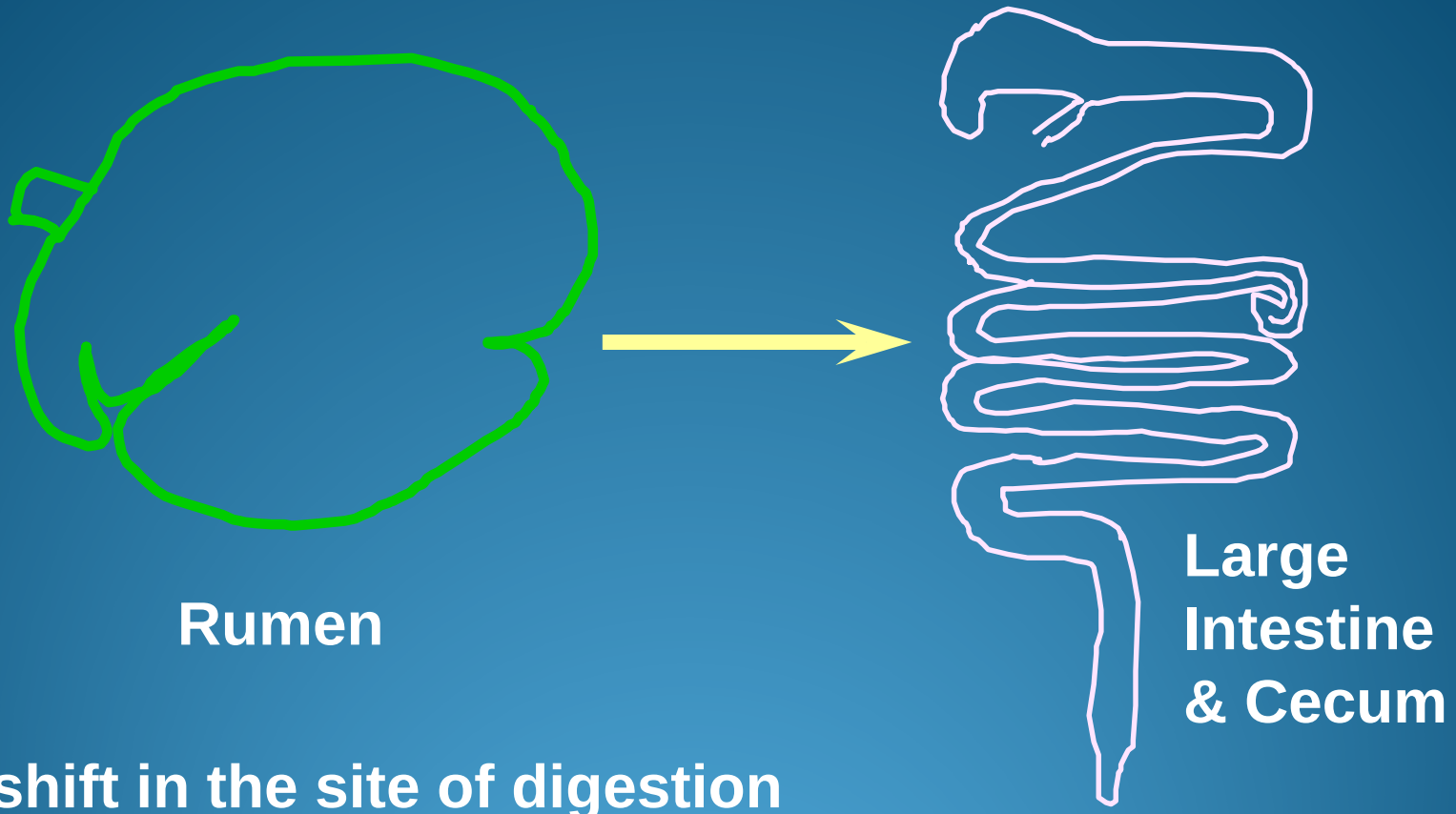
Cecum & Large Intestine (Fermentation)

Crude Protein
Carbohydrates
(NDF & NFC)

Fates of Fermentation Products



Where Does The Feed Ferment?



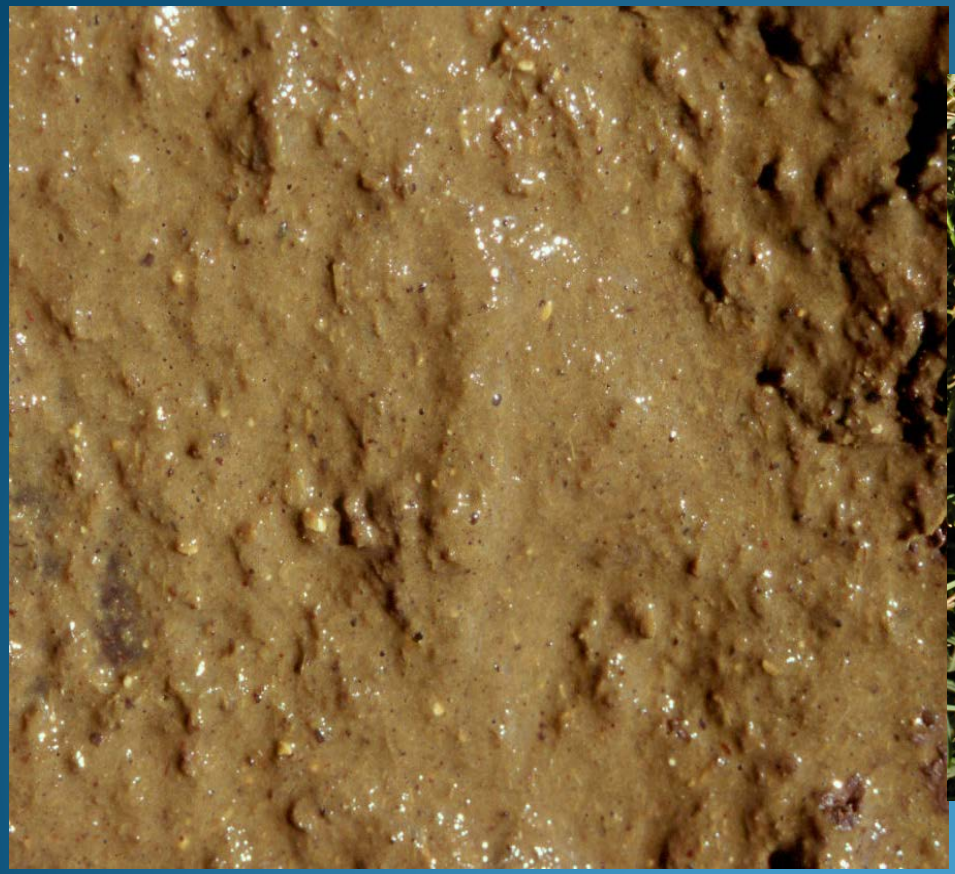
A shift in the site of digestion changes nutrient supply & causes some of the symptoms of ruminal acidosis and digestive upset.


All that affects what we see here.

Consistency: The Good Stuff

For lactating cows, soft, but forms up.

Not Normal: Foamy

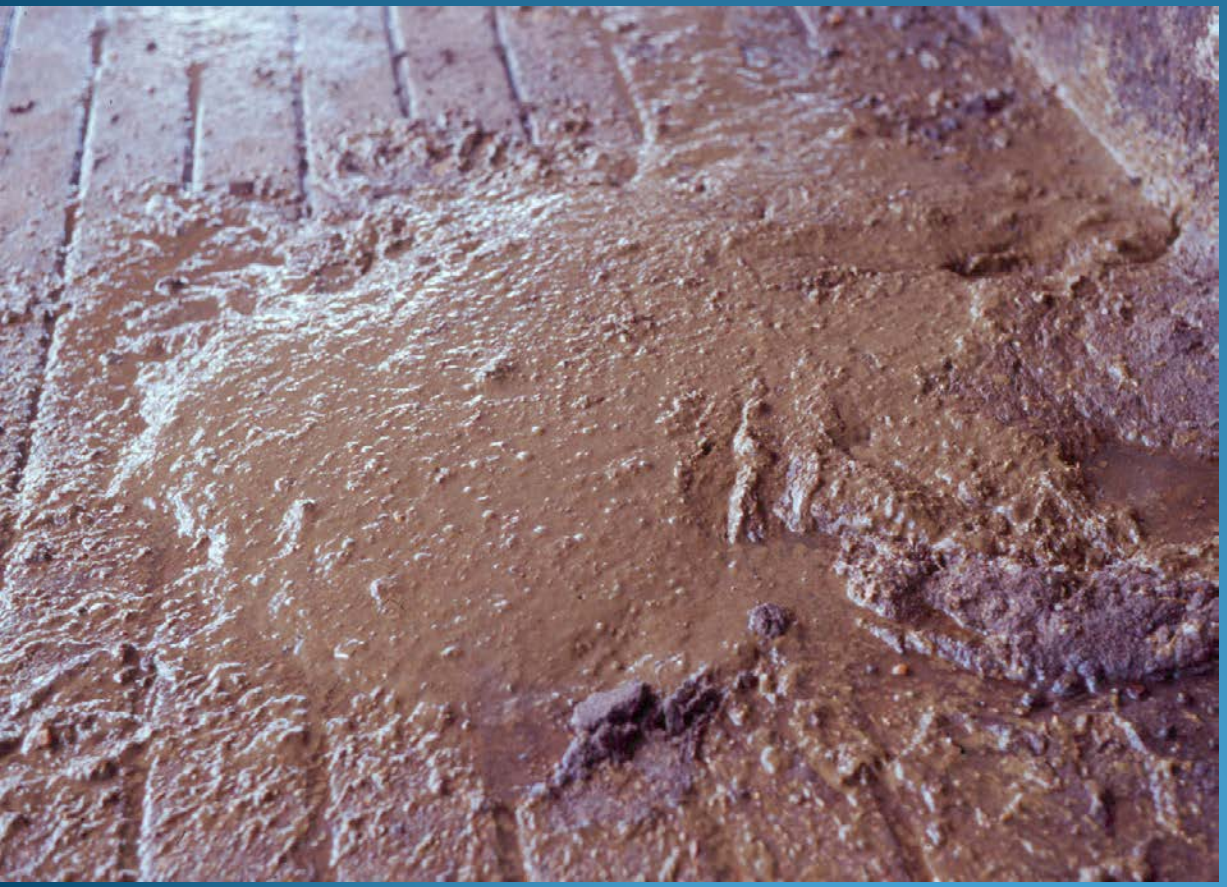


Excess fermentation in the hindgut created acid & gas.

Feed didn’t digest where it should have.

Not Normal: Diarrhea

A sign of ruminal acidosis/digestive upset or eating spoilage.
Can be caused by disease, as well.



Not Normal: Undigested Feed

Eaten does not mean digested.
Need a finer grind?
Is forage feeding / particle size adequate?

Not Normal: Undigested Feed

You're not supposed to be able to ID feed that's in the manure…whole linted cottonseed, citrus pulp, ….

Not Normal

Pasty

Splattered

Dry

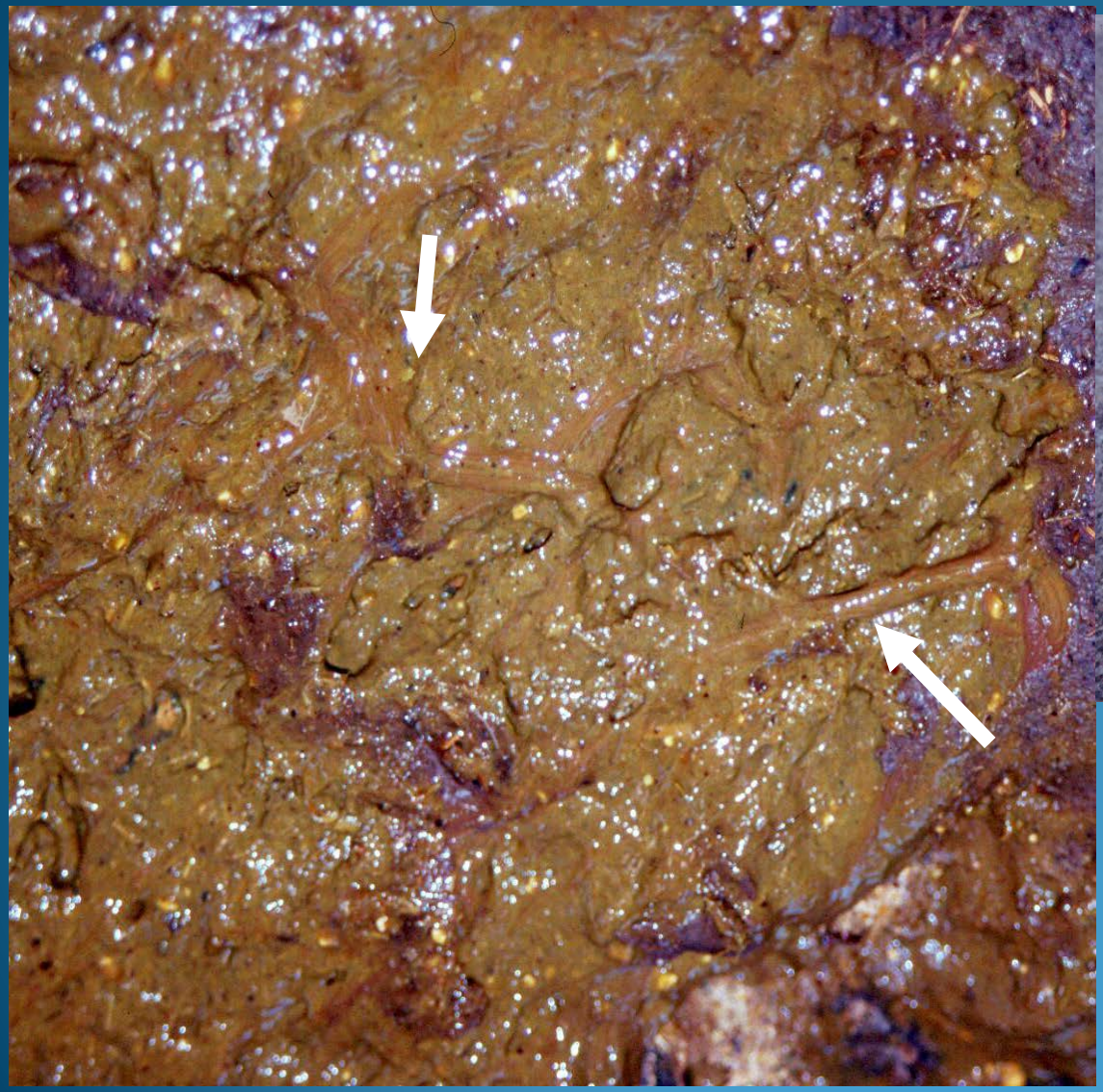
Not Normal: Lots of Variation

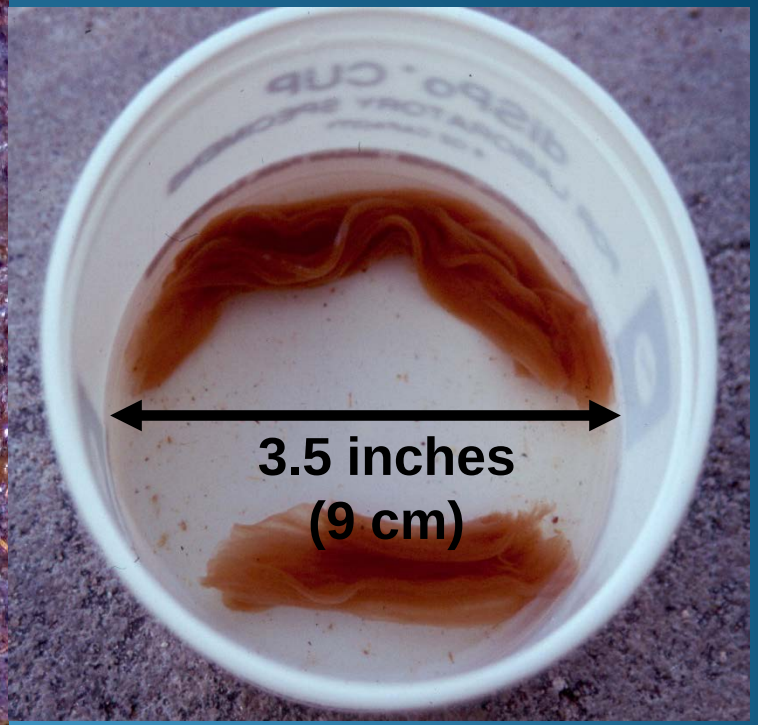
Except for maybe 5% of the cows, cows eating the same diet should have similar manure. If not, are they sorting their feed?
Go look.


Cows have very few hobbies, so they sort their feed.

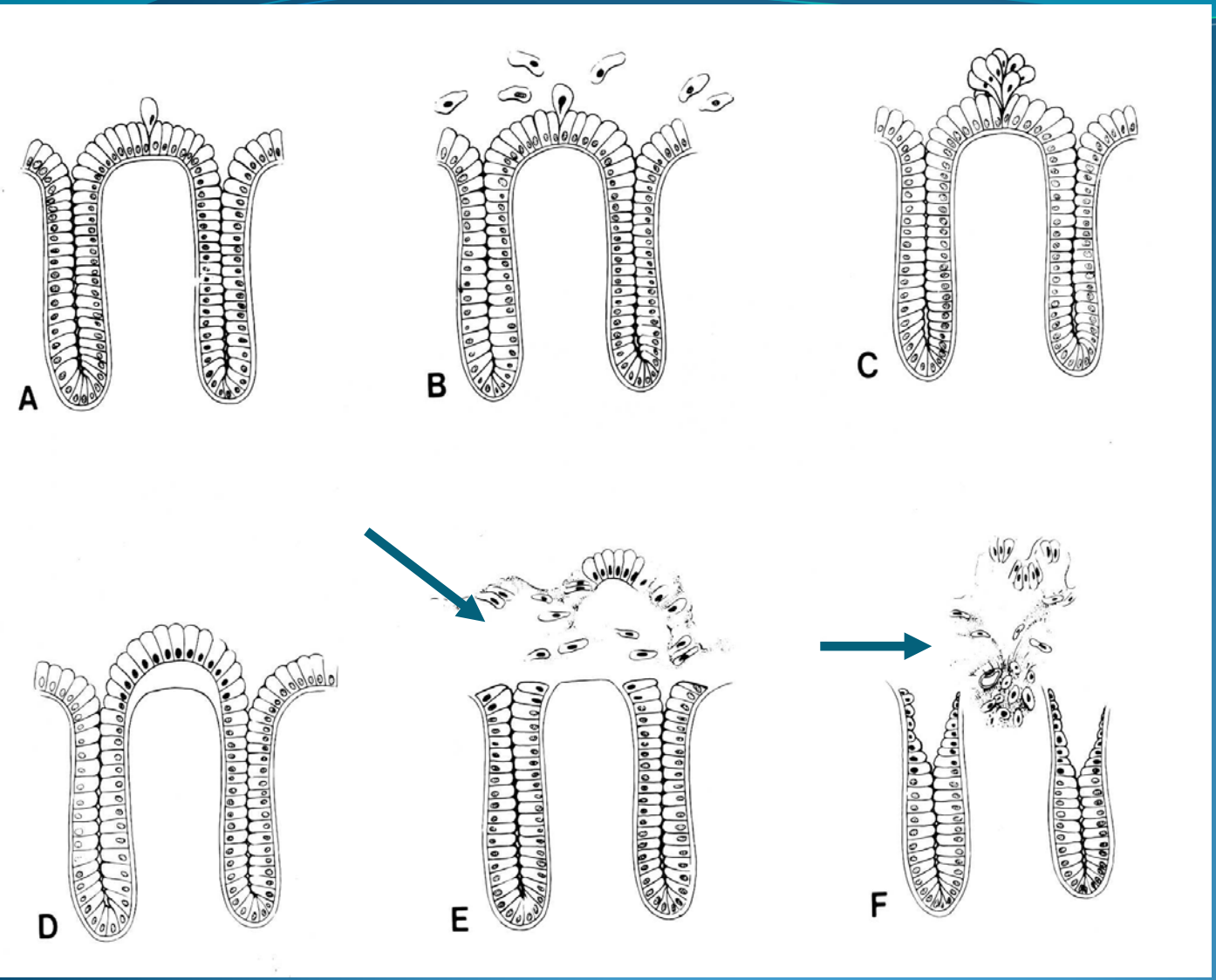

2711
3131

Not Normal: Mucin Casts





Sign of a past injury to the large intestine. Can be brown, gray, or almost black.



Damaging the lining of the large intestine creates mucin casts.

This can happen due to too much hindgut fermentation.

Henrikson et al., 1989. Laboratory Investigation 60:72-87

Not Normal: Fibrin Casts

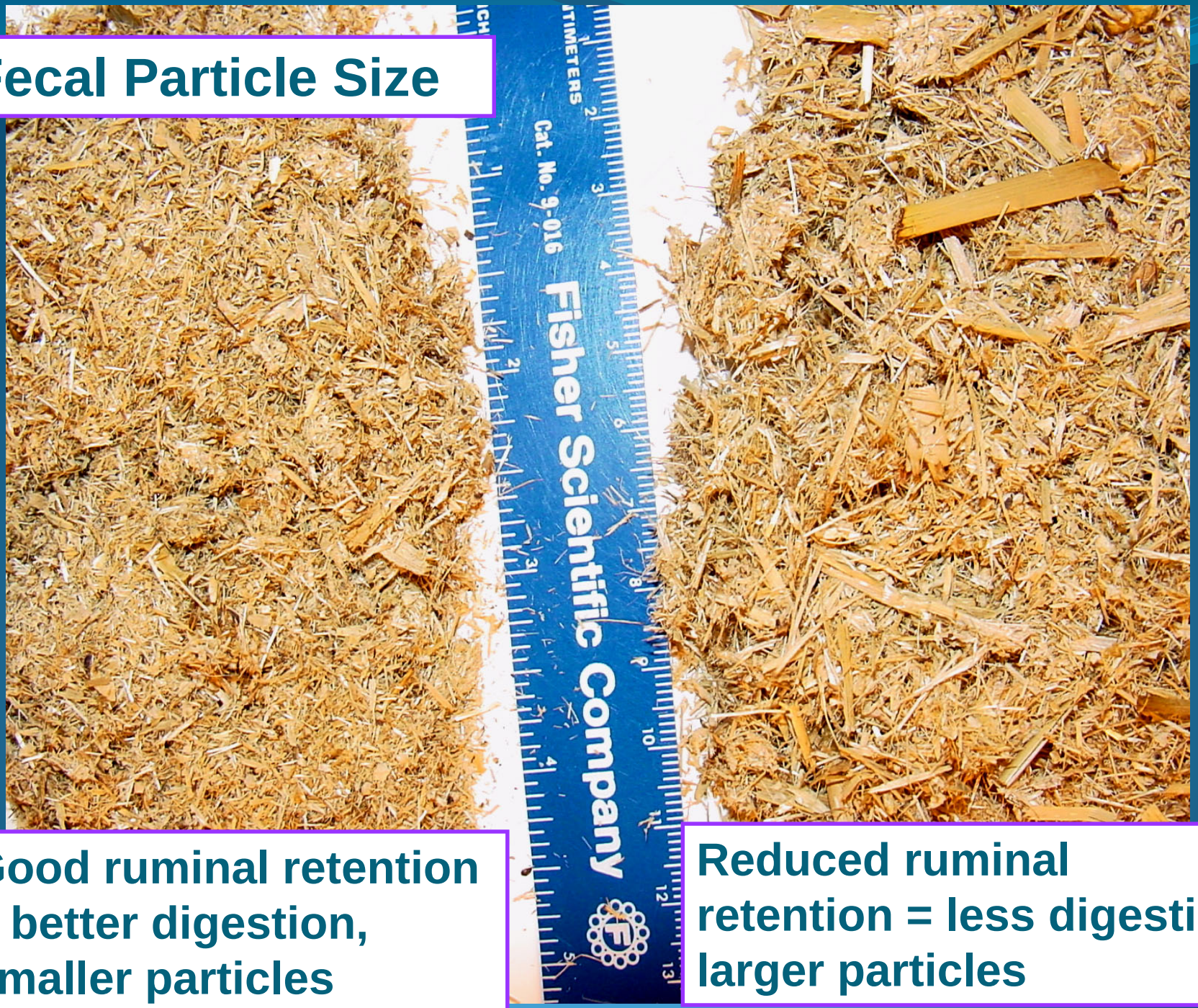
Courtesy of Dr. Sheila McGuirk, UW School of Vet. Med.

These are a lot tougher in texture than mucin casts, and rarer.

Still a sign of past damage to the large intestine.

Looking at Particle Size

Fecal Particle Size



Good ruminal retention = better digestion, smaller particles

Reduced ruminal retention = less digestion, larger particles

Coarse, undigested feed 1

33.5% roughage:
19% corn silage
5.5% ctsd hulls
9% alfalfa hay

Coarse, undigested feed 2

Found in a pool of bubbly diarrhea.

Coarse, undigested feed 3

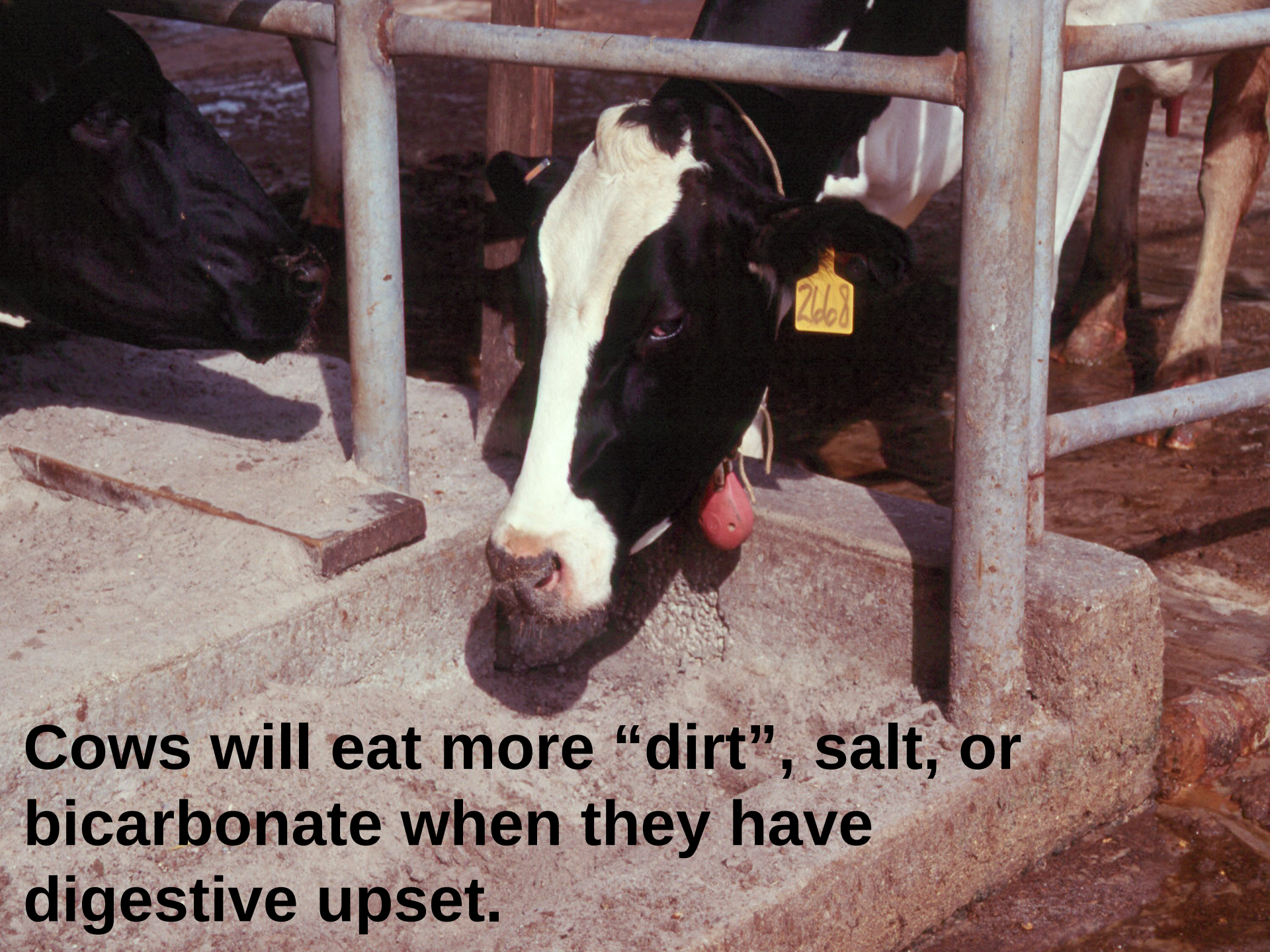
Before corn processors were popular….. Milk production increased when ground corn was added to the ration.

Walking the cows

- Get an idea of the variation
  - In groups
  - Between groups
  - Between rations
- Sample 4-6 pies/group for particle size
- ~5% of manure will not look like the rest.

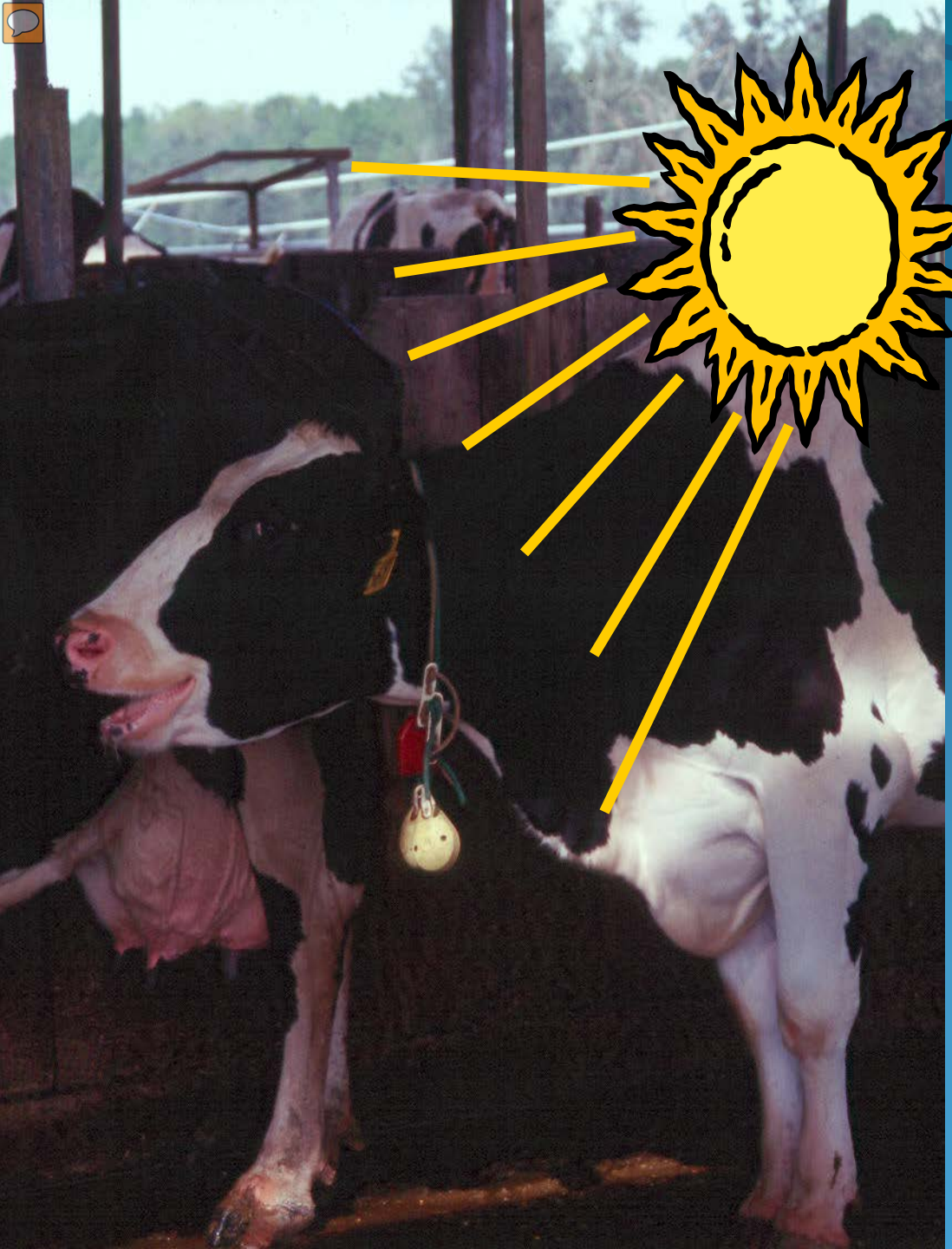
Qualitative Not Quantitative

- Manure probably varies somewhat over 24 h.
- No way to know amount produced to precisely quantify what you sampled.



Cows will eat more “dirt”, salt, or bicarbonate when they have digestive upset.

Uterine infection or gut irritation?



Heat Stress causes digestive upset.

- Panting
- Decreased rumination
- Drooling
- Slug feeding
- Sorting

In Context

- Manure appearance
- Fecal particle size
- Undigested feed
- % Rumination
- Eating behavior
- Animal health
- Production
- Environment
- Management
- …….

➢ Use these together to build a case as to what ration or management changes are needed.

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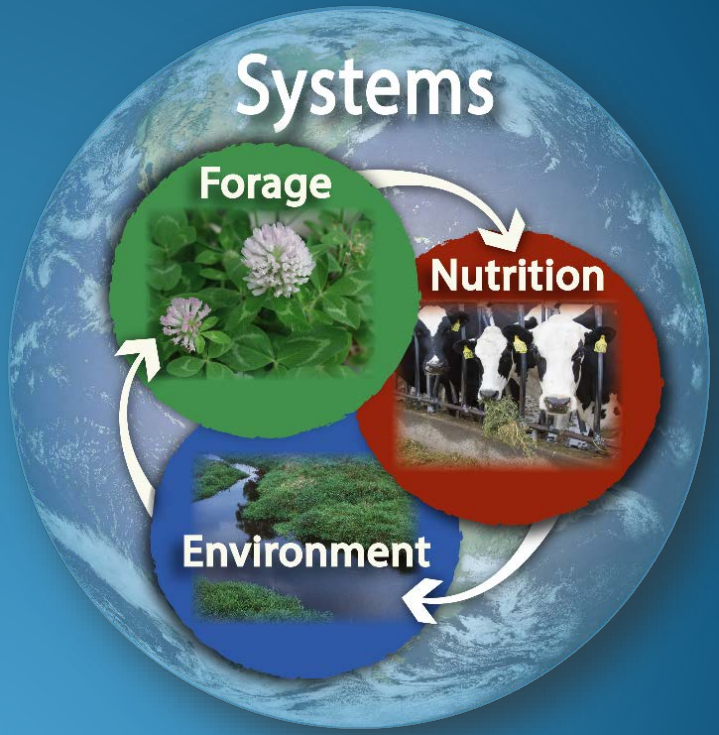
Questions?



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