## Don't make your cows eat dirt: Reducing ash in hay and haylage

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#### What is ash?



Ash in forages from two sources:

- Internal sources (e.g. minerals like calcium, magnesium, potassium, phosphorous).
- External sources (e.g. dirt, sand, bedding).



#### Why should ash content be a concern?



- Ash provides minerals to the diet, but no calories (i.e. energy).
- Takes the place of nutrients on almost a 1:1 basis.
- Ash content above that contained in plant is dirt contamination



# What about research looking directly at the effect of % ash in the forage in milk production?

"While there have been few dairy research trials in this area, it is highly likely that cows do not milk well when fed dirt."

> Pat Hoffman, Dairy Scientist, Marshfield ARS, 2002



# What levels of ash should you expect in a forage test?





#### Ash Content of Forage Samples

- Plant content of ash:
  - ♦ 6% for grass
  - ♦ 8% for alfalfa
- rest of ash is dirt contamination

| Ash Content of Forage Samples,  |         |         |         |  |  |
|---------------------------------|---------|---------|---------|--|--|
| UW Marshfield Lab, 2005 to 2009 |         |         |         |  |  |
|                                 | % Ash   |         |         |  |  |
| Туре                            | Average | Minimum | Maximum |  |  |
| Haylage                         | 10.7    | 4.0     | 27.0    |  |  |
| Нау                             | 9.4     | 3.2     | 25.7    |  |  |



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| Ash Content of Forage Samples, |         |         |         |  |  |
|--------------------------------|---------|---------|---------|--|--|
| 2009 World Dairy Expo          |         |         |         |  |  |
|                                | % Ash   |         |         |  |  |
| Туре                           | Average | Minimum | Maximum |  |  |
| Haylage                        | 11.5    | 9.4     | 15.6    |  |  |
| Dairy Hay                      | 11.6    | 9.6     | 15.2    |  |  |
| Commercial<br>Hay              | 11.9    | 9.6     | 13.9    |  |  |
| Baleage                        |         |         |         |  |  |

Ash Content of Earone Complee



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| Baleage                        | 13      | 10.9    | 18.2    |  |  |

Ash Content of Earona Complea





#### Lodged Alfalfa





#### Disk Cutterbar

#### Cutting height



#### Disc Mower knife type



Those knives that "pick up hay" better, also pick up more ash



## Cutting height

- Lower cutting results in more yield
  - 0.5 t/a per year for each inch of alfalfa
- Lower cutting height shortens stand life of grasses
  - Especially smooth bromegrass, orchardgrass, timothy
- Lower cutting height reduces forage quality
  - 5 points RFV per inch
- Lower cutting height increases ash with disc mowers
  Best compromise is generally 2.5 to 3 inches cutting height



#### Wheel Rakes

- Least Expensive
- High ash potential
  - Adjust wheel float to minimum needed to pick up hay.







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#### **Rotary Rakes**

- Powered
- High maintenance
- Can ted/rake/merge windrows
- Most expensive







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### Rake properly





#### Windrow Merger

# Picks up hay to move across groundExpensive







#### Rake properly

- Keep forage on top of stubble
- Rake so tines do not touch ground
- Move horizontally across ground with rake as little as possible
  - i.e. move two swaths on top of third in middle rather than rake all to one side as shown in previous slide.
- Merger will result in less as on forage than rake.



Picking up soil when harvesting





Hay & Silage on the ground





#### What can you do?

- Cut hay onto layer of stubble
- Keep hay off ground
  - Wide swath
- Set rake not touch soil
- Merge rather than rake

