



# The Effect of Hay Rake-type on Exogenous Ash of Alfalfa Hay

Abby Neu

Graduate Student, Dept. of Animal Science

Research Update

University of Minnesota



United States  
Department of  
Agriculture

National Institute  
of Food and  
Agriculture



UNIVERSITY OF MINNESOTA



PennState



WISCONSIN  
UNIVERSITY OF WISCONSIN-MADISON

# Introduction



- Forage can represent highest expense in ration for livestock
- For every 1% increase in ash, there is 1% decrease in TDN
- No digestible energy
- Findings not currently published, preliminary statistics for ash only
- Objectives
  - Determine effect of hay-rake type on exogenous ash content
  - Improve alfalfa quality as animal feed
  - Improve alfalfa harvesting systems which optimize economic return

# Materials and Methods



- MN, PA, WI
- 4 phases of harvest
  - Standing field (control)
  - Post-cutting
  - Post-raking
  - Post-baling/chop
- 4 treatments (top left, clockwise)
  - Wheel Rake
  - Sidebar
  - Rotary Rake
  - Merger

# Results – 1<sup>st</sup> cutting, 2015



	Minnesota				Pennsylvania				Wisconsin			
	Standing	Post Cut	Post Rake	Post Bale	Standing	Post Cut	Post Rake	Post Bale	Standing	Post Cut	Post Rake	Post Bale
Merger	11.2	12.8	11.1 <sup>b</sup>	11.4 <sup>b</sup>	9.8	10.2	9.6 <sup>b</sup>	9.8 <sup>b</sup>	9.4	9.4	9.0	9.2
Side			13.6 <sup>a</sup>	13.0 <sup>ab</sup>			9.9 <sup>b</sup>	10.5 <sup>b</sup>			9.7	9.3
Rotary			13.5 <sup>a</sup>	13.2 <sup>a</sup>			9.5 <sup>b</sup>	9.8 <sup>b</sup>			9.1	9.0
Wheel			15.3 <sup>a</sup>	14.6 <sup>a</sup>			10.6 <sup>a</sup>	11.1 <sup>a</sup>			10.3	9.5
P-value			0.0002	0.0034			0.0003	0.03			0.28	0.34

\*Within a column, means without a common superscript letter differ ( $P < 0.05$ ).



United States  
Department of  
Agriculture

National Institute  
of Food and  
Agriculture



UNIVERSITY OF MINNESOTA



PennState



WISCONSIN  
UNIVERSITY OF WISCONSIN-MADISON

# Conclusion



- Differences between rakes found in MN & PA
- Wheel rake had greatest % ash
- Merger had least % ash

## Next Steps

- Finalize analysis of 2<sup>nd</sup> harvest
- Analysis of forage quality (NDF, CP, RFQ)
- Publication and Extension programming for national audience

