Harvesting for Quality

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Topics to be covered

- Select forage species/variety carefully
- Harvest at optimum plant stage for quality and yield
- Minimize loss of yield and quality during harvesting and storage

Change is U.S. Milk Production



National Milk Production Record

Produced a 305-day record of \$31,767 liters of milk, with 1,264 kg of fat 972 kg of protein.



Ever-Green-View My 1326-ET, owned by Thomas J. Kestell of Waldo, Wisc.

Yield difference between top and bottom alfalfa entries in Wisconsin Alfalfa Trials, 1985 to 2012



Aphanomyces Resistance helps get good stands!

Alfalfa seed - coated

Most alfalfa seed is coated

- Coating includes rhizobium, Apron, Stamina, clay/polymer & other
- Coloring is red or green; purple for Roundup Ready



Selecting Grass varieties -Yield difference among varieties in UW Trials

Annual difference between top and bottom variety



Selecting Grasses

Orchardgrass and tall fescue Want winterhardy types



HarvXtra – Reduced Lignin Alfalfa

Lignin Biosynthesis Pathway



HarvXtra Dairy Demo Results

Normal Harvest

Dairy State	Non-HarvXtra [®] alfalfa trt ECM <i>l</i> /day	HarvXtra [®] alfalfa trt response ECM <i>l</i> /day	Harvest Management					
PA	44.1	0.8	Normal – 26 days					
WI	45.4	2.4	Normal – 28 days					
VT	44.5	-0.1	Normal*					
WI	49.7	2.3	Normal – 28/30 days					
PA	48.9	0.7	Normal – 28 days					
WI	44.4	2.9	Normal					
WI	48.0	4.2	Normal – 28/30 days					
Average	46.4	1.9						
A normal harvest schedule is based on outting HarvYtro® alfalfa at roughly a 28 day schedule, with								

A normal harvest schedule is based on cutting HarvXtra® alfalfa at roughly a 28 day schedule, with non-Harvxtra alfalfa comparison cut on the same harvest schedule.

* The VT dairy did not have enough HarvXtra® alfalfa to feed for the full treatment period.

Harvest Schedules – 2016 NDF Digestibility (<u>season</u> <u>average</u> across 6 states)



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Strategies for Reduced Lignin Alfalfa



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Rate of Alfalfa Forage Quality Change per Day

Component	Mean
Crude Protein, % DM	-0.25
Acid Detergent Fiber, % DM	0.36
Neutral Detergent Fiber, % DM	0.43
Neutral Detergent Fiber Digestibility, % NDF	-0.43
RFV, points	-2.9
RFQ, points	-3.6

Source: Undersander, 2009 unpublished



Measure from soil surface.

Measure to top of stem tip, not tip of highest leaflet.

Estimates are made at 4 to 5 locations in a field.

The tallest stem may not be the most advanced in maturity.



Harvest First Cutting by Height or Bud Stage (whichever come first)

71 cm

76 cm

late vegetative	stem is more than 12 inches tall, no visible buds or flowers				
early bud	1 to 2 nodes have visible buds; no flowers or seed pods present				
late bud	more than 2 nodes have visible buds; no open flowers or seed p				
early flower	1 node with at least one open flower				
late flower	2 or more nodes have open flowers				

stage of most mature ster

height of tallest stem	late vegetative	early bud	late bud	early flower	late flower		
(inches)	relative feed value						
16	234	220	208	196	186		
17	229	215	203	192	182		
18	223	211	199	188	178		
19	218	206	195	184	175		
20	213	201	191	181	171		
21	209	197	187	177	168		
22	204	193	183	173	165		
23	200	189	179	170	161		
24	196	185	175	167	158		
25	191	181	172	163	155		
26	187	178	169	160	152		
27	184	174	165	157	150		
28	180	171	162	154	147		
29	176	167	159	151	144		
30	173	164	156	148	141		
31	169	161	153	146	139		
32	166	158	150	143	136		
33	163	155	147	140	134		
34	160	152	145	138	132		
35	156	149	142	135	129		
36	154	146	139	133	127		
37	151	144	137	131	125		
38	148	141	134	128	123		
39	145	138	132	126	121		
40	142	136	130	124	118		

Source: Derived from equations developed by R.W. Hintz, V.N. Owens, and K.A. Albrecht at the University of Wisconsin-Madison, Department of Agronomy.

Harvesting High quality

- When forage is cut it is at the highest quality it will every be
- Objective: to prevent yield and quality loss during harvesting



Quality Loss During Harvesting



Wheel Rakes

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





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Windrow Merger

- Picks up hay, moves on conveyer across ground
- Expensive





Rotary Rakes

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



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.



Leaves

Relative Feed Value (RFV) 480
Relative Forage Quality (RFQ) 551

Stems

- Relative Feed Value (RFV) 80-100
- Relative Forage Quality (RFQ) 70-80

Alfalfa Leaf Loss Effect on Forage Quality

Leaves higher in quality than stems



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Leaves left in field





Three-state rake/merger trial, 2015



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Leaf Content at Harvesting Stages



Retaining leaves increases yield

Reduced leaf loss 5 to 20% yield reduction



Forage quality losses during harvesting

- Ash content
- Leaf loss
 - Disease on standing crop



Leaves on ground prior to mowing



Leaves on ground after mowing

Tedding, Raking, Merging



Leaf Loss during harvesting







Poor soil packing



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Poor stand Oval pattern – likely biological



Poor stand Angular - Likely soil related



Poor stand in rows – seeding depth



Pattern in straight line - Operator issue



Alfalfa 2011 Corn 2012

Prior Rotation

Continuous Corn

Sulfur deficiency



Forage production and Sulfur

forages require 5 lb sulfur/ton hay Deficiency Reduces yield Reduces stand life Soil test not accurate Tissue test at harvest

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