Options for Harvesting Corn Stover for Supplemental Feed

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Introduction

- Why consider corn stover :
  - ✓ High feed costs
  - ✓ Abundant – 10 million tons in WI
  - ✓ Relatively low cost
  - ✓ High in effective fiber
  - ✓ Reduces residue

Introduction

- Important issues with corn stover :
  - ✓ How to harvest, store and feed
  - ✓ Cost
  - ✓ Right feed additives

Introduction

- How corn stover can be used :
  - ✓ Effective fiber source @ 2 – 5% of dietary DM
  - ✓ Feed for non-lactating and beef animals
  - ✓ Bedding
  - ✓ Biomass feedstock

Introduction

- What are stover yields?
  - ✓ Rough rule of thumb:
    - 1 : 1 ratio with grain weight
    - Every 35 bu ~ 1 ton stover
    - 140 bu/ac ~ 4 ton/ac

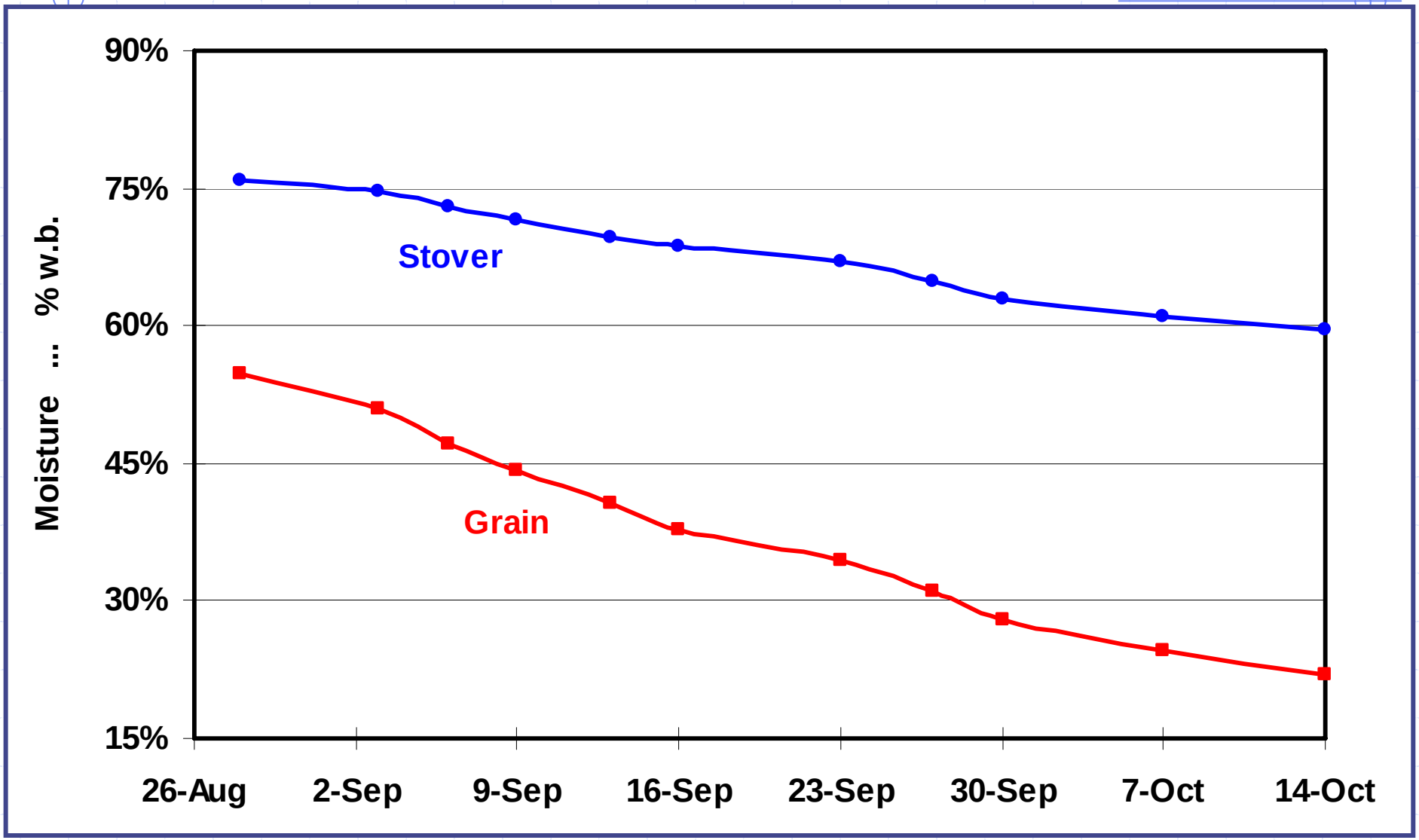
Dry Bale Harvesting

Dry Stack Harvesting

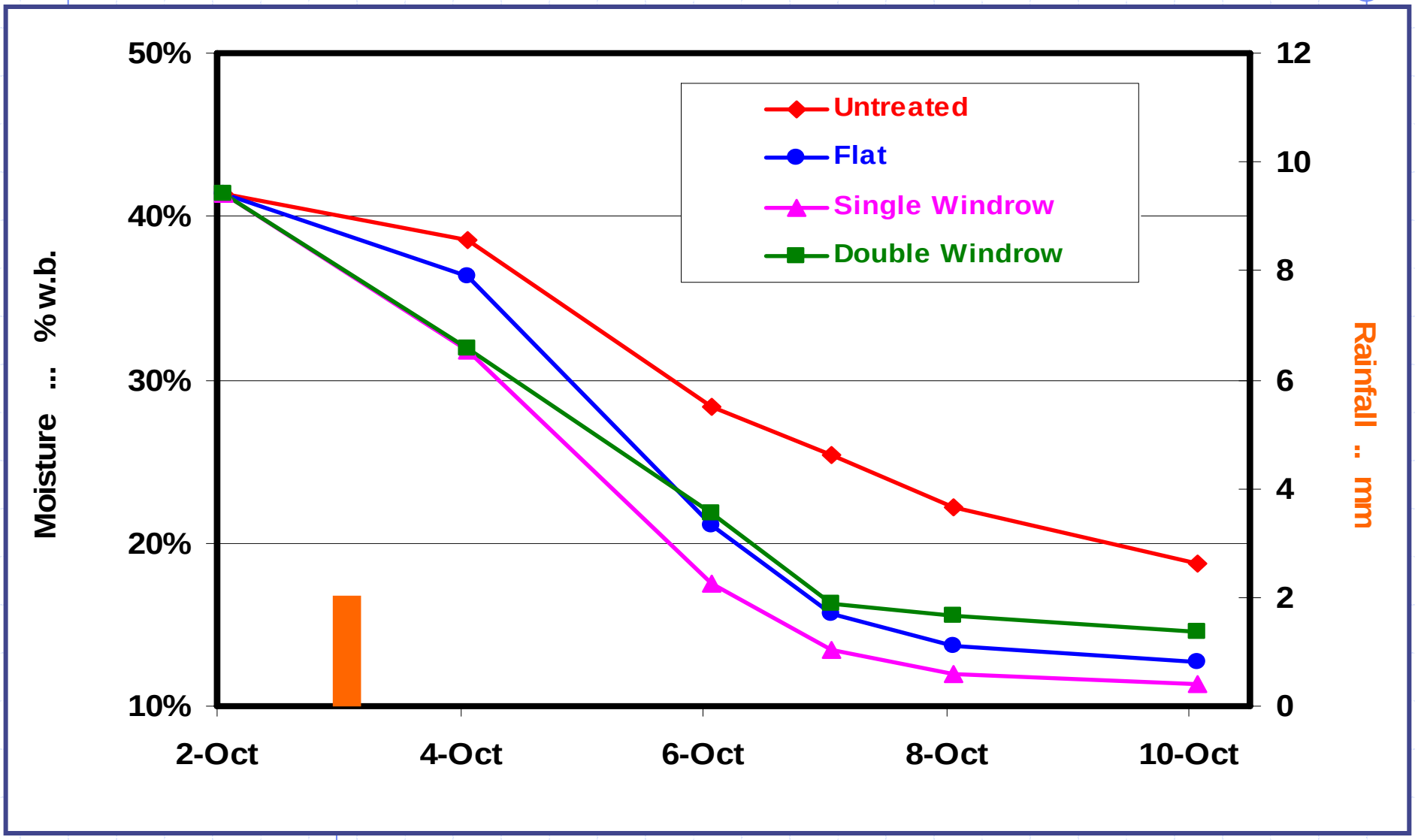
Dry Stover Issues

- Issues with bale and stacker systems:
  - ✓ Slow field drying :
    - Low ambient temps, short day length
  - ✓ Short harvesting window
  - ✓ Frequent weather delays

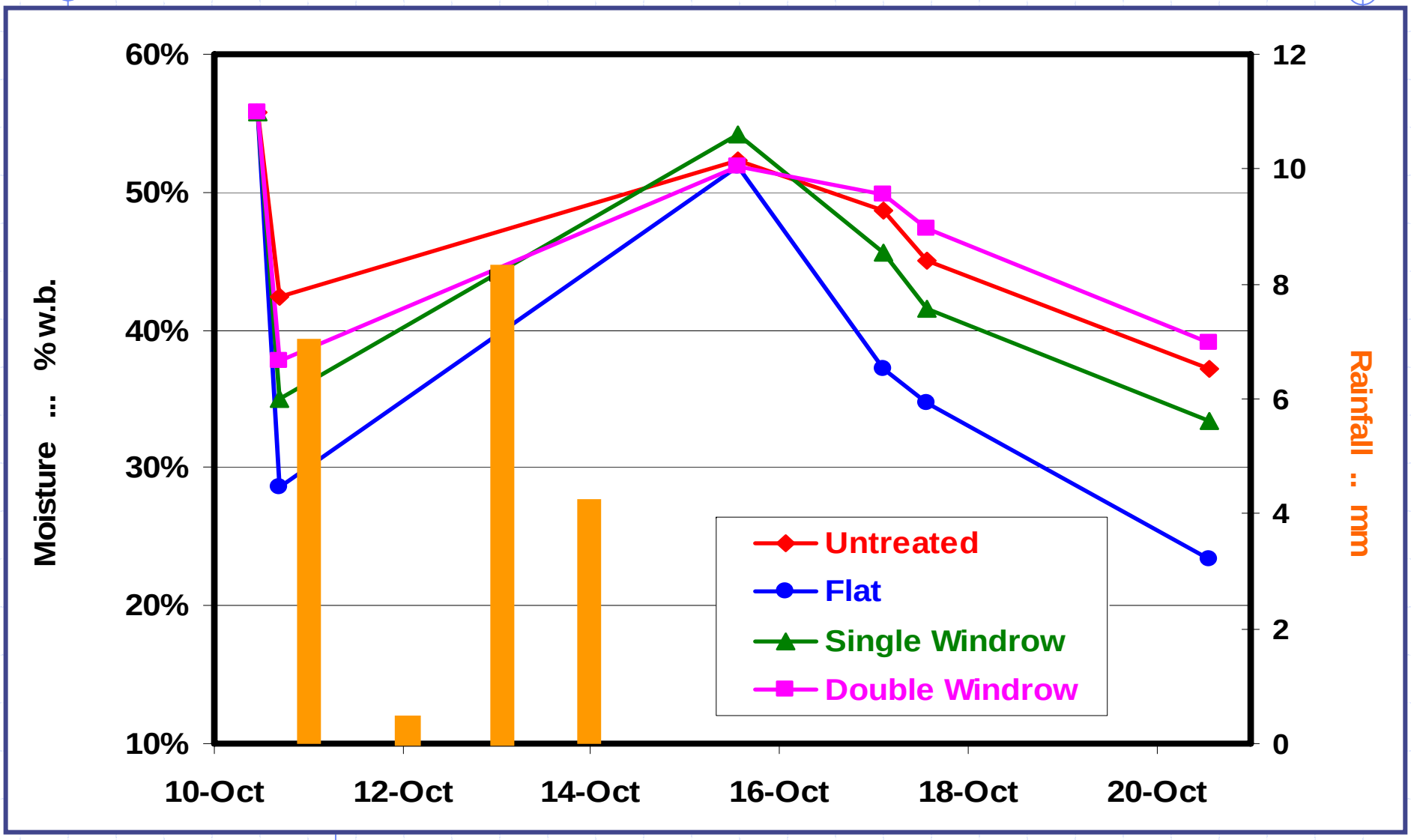
Stover Moisture



Stover Drying



Stover Drying



Dry Stover Issues

- Issues with bale and stacker systems:
  - ✓ Low productivity
  - ✓ Low density package
  - ✓ High ash content

Dry Stover Harvesting

	Stack	LRB	LSB
Productivity			
tons / h	~5	~10	~16
Density			
lb. / ft^3	~3	~6	~8

Dry Bale Harvesting

Ash .. % of DM	
Standing	3.5
Baled	7.9

Dry Stover Issues

- Issues with bale and stacker systems:
  - ✓ High storage losses
  - ✓ Non-uniform product

Outdoor Storage of Bales

Storage Losses

	Wet Year	Dry Year
Indoors	2%	5%
Outdoors on Soil		
Net Wrap	11%	11%
Plastic Twine	20%	14%
Sisal Twine	37%	29%
Stacks		34%

Non-Uniformity of Bales

Chopped Wet Stover

Harvesting Wet Stover

- Advantages of harvesting stover wet:
  - ✓ Eliminates field drying
  - ✓ Harvest right behind combine
  - ✓ Reduced soil contamination
  - ✓ Higher productivity
  - ✓ Easier to mix additives

Chopped Wet Stover

	Typical WPCS	Corn Stover
Productivity ... **tons / h**	20 – 80	25 – 35
Silo Density ... **lb. / ft³**	9 – 16	8 – 10

Chopped Wet Stover

Chopped Wet Stover

	Typical WPCS	Corn Stover	
Moisture	60 – 65%	55%	42%
DM Loss	6 – 10%	3.8%	1.4%
pH	3.8 – 4.2	4.1	4.5
Acids			
Acetic	1 – 3%	0.9%	0.6%
Lactic	5 – 10%	3.3%	1.7%

Stover Particle Size

	Particle – Size .. in.
Round Bales and Stacks	8 – 10
Chopped	¾ – 1

Baled Wet Stover

Baled Wet Stover

Baled Wet Stover

	Late	Early
Moisture	29%	44%
DM Loss	1.2%	2.9%
pH	5.1	4.4
Acids		
Acetic	0.5%	2.3%
Lactic	0.4%	0.8%

Wet Stover Systems

- Compared to dry systems, wet stover offers:
  - ✓ Less weather concerns
  - ✓ More uniform product
  - ✓ Easier mixing & feeding
  - ✓ Fewer storage losses
  - ✓ Potentially lower costs

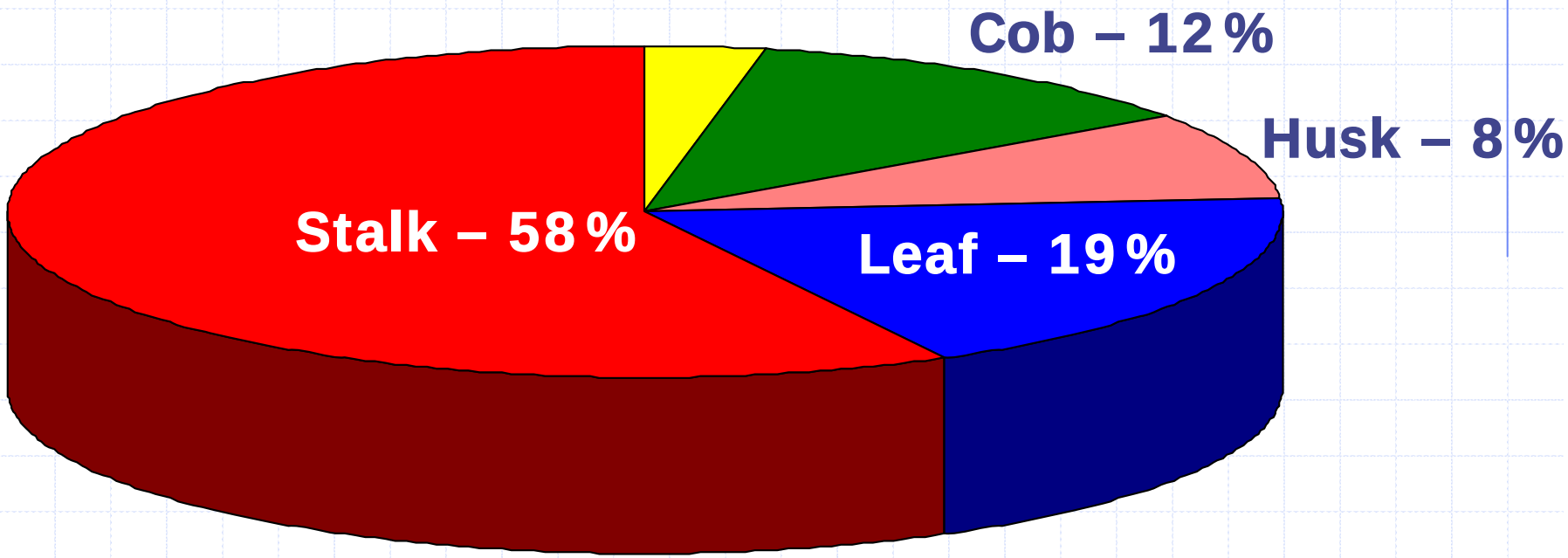
Stover Costs

Approximate cost per dry ton	
Harvest	
Round Bales	$28
Chopped	$14
Storage	
Bales – Indoors	$14
Bales – Outdoors	$9
Chopped – Bag	$14

Feeding Stover

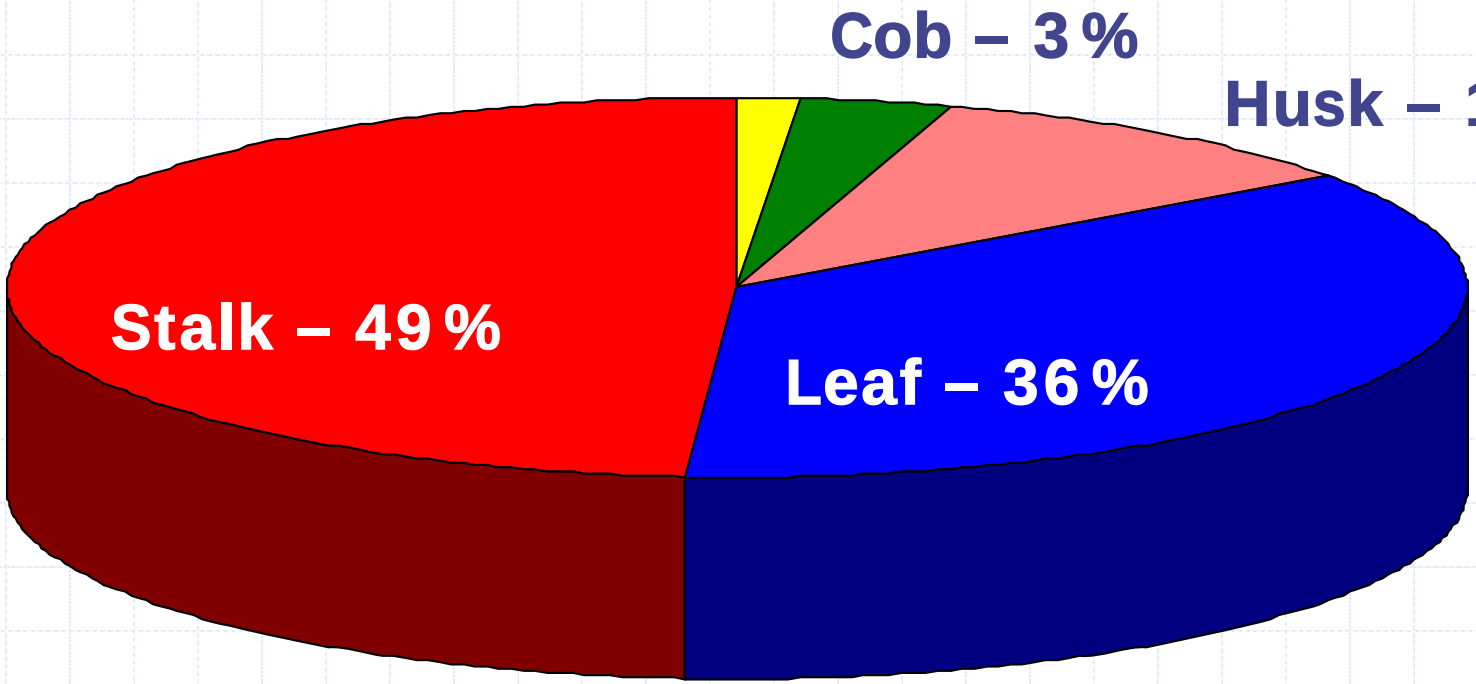
- How stover is fed :
  - ✓ Free-choice from bales or pasture
    - Sorting
  - ✓ Ground
  - ✓ TMR

Stover Fractions



After Grain Harvest / Before Stover Harvest

Dry Bale Harvesting



After Stover Harvest

After Storage Composition

	Baled	Chopped
Ash	7.7	–
CP	4.0	3.8
ADF	46.7	41.9
NDF	76.3	68.2

Stover Feed Additives

- To improve protein and digestible energy :
  - ✓ Wet and dry distillers grains
  - ✓ Grain
  - ✓ Whole-plant corn silage
  - ✓ Ammonia

Feeding Stover

	Stover	Stover + Corn*	Stover + DDG*
Ash	12.3	7.0	8.4
CP	8.3	8.3	14.4
ADF	45.0	25.2	30.0
NDF	70.2	43.0	57.5

* - 50% of diet
After Summer and Trenkle - 1998

Feeding Stover

	Stover	Stover + Corn*	Stover + DDG*
Intake .. lb. / day	5.7	6.7	6.4
Digestibility .. %	39.1	53.7	59.4

* - 50% of diet
After Summer and Trenkle - 1998

Future of Stover Harvest

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Future of Stover Harvest

Ear Snapper Head

Future of Stover Harvest

Whole-plant Head

Future of Stover Harvest

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