Corn silage after BMR

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Objectives

- Discuss strategies to improve fiber digestibility in corn silage
- Discuss the potential impacts of yeast counts on corn silage nutritive value
- Short corn

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Nutrient composition of corn hybrids

Item	CON	BMR	P-value
DM Yield, ton/acre	9.2	8.2	0.001
DM, % as fed	37.7	37.1	0.45
CP, %DM	7.3	7.7	0.06
NDF, %DM	37.1	36.6	0.47
Starch, %DM	39.5	37.8	0.01
ivNDFD, %NDF[1]	55.6	62.0	0.001
uNDF, %DM	9.8	8.5	0.001
Milk/ton (MILK24)	3069	3140	0.001

30 h and 240 h of incubation for NDFD and uNDF

Diepersloot et al,.; abstract submitted to ADSA 2024

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Forage NDF digestibility and cow performance

For every 1 percentage-unit increase in NDF digestibility

- +0.40 lb/d DMI
- +0.55 lb/d 4%FCM (Oba and Allen, 1999)

>40% corn silage in diet

- +0.26 lb/d DMI
- +0.31 lb/d 3.5%FCM (Jung et al., 2010)

Slide courtesy of Dr. Rick Grant, Miner Institute

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More recent BMR research

Study	DMI, lb/d	Milk, lb/d	ECM, lb/d	Fat, %
Lim et al., 2015	NS	+4.9	+4.6	NS
Cook et al., 2016	NS	+8.6	+6.4	NS
Hassanat et al., 2017	+3.5	+7.1	+6.4	-0.11
Coons et al., 2019*	+2.7	+7.7	+6.9	-0.15
Miller et al., 2020	+1.3	+5.1	+3.1	NS
Miller et al., 2021	+3.3	+6.4	+6.2	-0.07

Data presented as difference to control treatment (BMR – Conventional)

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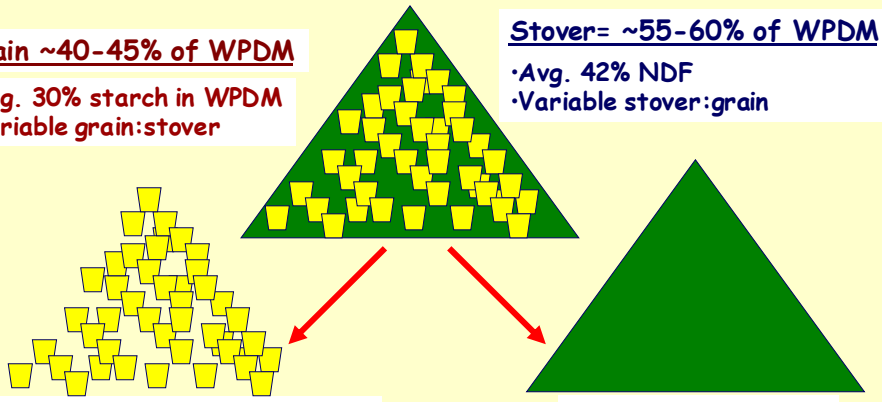
Whole-Plant Corn Silage

Grain ~40-45% of WPDM

- Avg. 30% starch in WPDM
- Variable grain:stover

Stover= ~55-60% of WPDM

- Avg. 42% NDF
- Variable stover:grain



80 to 98% StarchD

- Kernel particle size
- Duration of silage fermentation
- Kernel maturity
- Endosperm properties
- Additives

52 to 66% IVNDFD

- Lignin/NDF
- Hybrid Type
- Maturity
- Chop Height

Variable peNDF as per chop length

Adapted from Joe Lauer, UW Madison Agronomy Dept.

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Whole-plant material

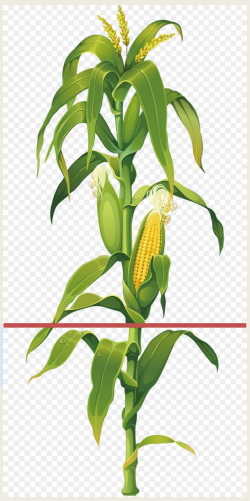
Whole-plant CS

8 in

High-cut CS

16 to 24 in

Toplage



45 in

Stalklage

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Whole-plant material

Whole-plant CS

Plant part	NDFD, % NDF	Lignin, % DM
Ear	42.3	1.46
Leaves	46.8	4.30
> 55.1 in	40.6	4.77
31.5 – 55.1 in	31.1	5.31
25.6 – 31.5 in	28.0	6.00
15.7 – 25.6 in	29.6	6.48
7.9 – 15.7 in	28.3	6.59
0 – 7.9 in	28.3	6.96

Grigoletto et al., unpublished

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Normal vs. high chop height

	Average of 7 studies	
Cutting height, inches	7	21
NDF, %	40	37
ivNDFD, % of NDF	52	56
Starch, %	32	35
Yield, ton of DM/ac	7.7	6.8
Milk, lb/ton	3291	3422

Ferraretto et al., 2018; JDS

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Cutting height feeding trials

Study	DMI, lb/d	Milk, lb/d	FE	Fat, %	NDFD, % NDF
Neylon and Kung, 2003	NS	+3.3	+0.05	NS	+5.0
Bernard et al., 2004	NS	NS	NS	-	-
Kung et al., 2008	NS	NS	NS	-0.12	-
Vieira et al., 2025	+2.9	+2.4	NS	NS	+2.5

Data presented as difference to control treatment (High chop – Low chop)

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Corn Silage Cutting Height Calculator

Cole Diepersloot, Randy Shaver, and Luiz Ferraretto
Dept. of Animal and Dairy Sciences, UW-Madison

Legend
Required Inputs
Calculated Outputs

Cost of Silage Production	
Normal $/ha	1000.00
Normal $/Mg	57.80

Estimated Price Difference	
$/Mg	+4.31

Cost of Silage Production	
High Cut $/Mg	62.11

Corn Silage Cutting Height, cm	
Normal	20
High	40
Difference	20

Normal Corn Silage Nutrient Composition	
DM, % as fed	36.9
CP, % DM	7.4
NDF, % DM	35.6
NDFD, % NDF	64.2
ADF, % DM	20.8
Lignin, % DM	3.5
uNDF, % DM	12.4
Starch, % DM	37.1
Ash, % DM	3.98

Estimated Differences With Cutting Height Change	
DM, % as fed	+1.0
CP, % DM	+0.2
NDF, % DM	-1.8
NDFD, % NDF	+1.6
ADF, % DM	-1.6
Lignin, % DM	-0.2
uNDF, % DM	-1.0
Starch, % DM	+1.8
Ash, % DM	-0.2

High Cut Corn Silage Nutrient Composition	
DM, % as fed	37.9
CP, % DM	7.6
NDF, % DM	33.8
NDFD, % NDF	65.8
ADF, % DM	19.2
Lignin, % DM	3.3
uNDF, % DM	11.4
Starch, % DM	38.9
Ash, % DM	3.8

Normal Corn Silage Yield	
DM Yield, Mg/ha	17.3

Estimated Yield Difference	
DM Yield, Mg/ha	-1.2

High Cut Corn Silage Yield	
DM Yield, Mg/ha	16.1

https://go.wisc.edu/CSCH-Calc

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Short corn

Hybrids carrying the brachytic2 (br2) mutation

Shorter internodes

More erect leaves

Changes lignin distribution within the stalk

Short corn / smart corn / Preceon

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Short corn

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CERZOO feeding trial

- All cows fed the same diet during the covariate period (2 weeks). Cows were fed treatment diets for 10 weeks:
  - CON: conventional corn silage - 32,500 seeds/acre and row space 29.5 inches
  - BR2: short corn silage - 54,600 seeds/acre and row space 19.6 inches

Corn silage was 38.5% of the diet

Catellani et al.,; JDS in press

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Nutrient composition of corn hybrids

Item	CON	BR2
DM, % as fed	36.6	37.6
CP, %DM	8.2	8.5
NDF, %DM	40.5	35.9
Starch, %DM	28.4	30.3
ivNDFD, %NDF[1]	60.6	66.7
uNDF, %DM	9.3	6.5

30 h and 240 h of incubation for NDFD and uNDF

Catellani et al.,; JDS in press

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Lactation Performance

Item	CON	BR2	*P* - Value
DMI, lb/d	57.5	59.6	0.30
Milk, lb/d	94.8	98.8	0.05
ECM, lb/d	96.1	102.5	0.13
Fat, %	4.28	4.29	0.96
Protein, %	3.34	3.26	0.43

Catellani et al.,; JDS in press

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CERZOO hybrid trial

- CON: 2 conventional corn silage hybrids- 5 plants per square meter
- BR2: 3 short corn silage hybrids – 9 plant per square meter

Silage harvested at 5 maturities

Mastroeni et al.,; JDS in press

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CERZOO hybrid trial

Item	CON	BR2	P-value
DM Yield, ton/acre	11.0	11.1	0.85
DM, % as fed	35.9	36.1	0.55
CP, %DM	8.8	8.6	0.78
NDF, %DM	44.5	40.7	0.001
Starch, %DM	31.6	35.6	0.01
ivNDFD, %NDF[1]	37.2	40.7	0.01
uNDF, %DM	11.2	8.9	0.001
Milk/ton (MILK24)	2861	3025	0.001

30 h and 240 h of incubation for NDFD and uNDF

Mastroeni et al.,; JDS in press

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Conclusions

- More digestible corn silage increase intake and allow for the establishment of high-forage diets
- Yeast contamination is an under looked factor but create challenges for fermentation and nutritive value
- Short corn is a new technology but with limited information. Initial results are very promising.
- Cover crops may be a great option, but more research is needed

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Questions

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