

Corn Silage Processing Score & Visual Rating



Dr. Brian Marsh
Farm Advisor
UC Cooperative Extension – Kern County

University of California
Agriculture and Natural Resources



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Special Thanks



Garton Tractor, Inc. – New Holland
Lamb Chops, Inc. – trucks, driver, fuel
USCHI – sample analysis

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Materials and Methods

- NH FR9060
- Cut Length
 - 13 & 19 mm
- Processor Setting
 - 1.0, 1.5, 2.0, 2.5 & 3.0 mm



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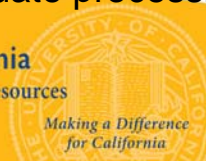


Materials and Methods

- CSPA – Dairyland Labs
- Visual Rating
 - 1 – 10 scale
 - 5 adequate processing



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Corn Silage Processing Score

Ro – Tap Shaker for 10 minutes. This unit oscillates 278 times per minute and “taps” the top of the sieves 150 times per minute to create an aggressive shaking action.



Coarse	Medium	Fine
> 4.75 mm		< 1.18 mm
> 0.19 in		< 0.05 in

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Corn Silage Processing Score

Corn Hybrid P33V14

Moisture	}	Not Significantly Different
Starch		
NDF		
pe NDF		

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Corn Silage Processing Score

Particle Fractions		Coarse	Medium	Fine
No Significant Interaction		> 4.75 mm		< 1.18 mm
		----- % -----		
Cut Length	13 mm	50.8	42.5	6.4
	19 mm	55.6	38.4	6.4
Significant at 0.05		*	*	ns
Processor Setting	1.0 mm	48.8 c	44.8 a	6.8
	1.5 mm	42.0 bc	41.8 ab	6.3
	2.0 mm	53.5 b	40.3 b	6.3
	2.5 mm	58.0 a	35.5 c	6.8
	3.0 mm	53.8 b	40.0 b	6.0
LSD _{0.10} [‡]		3.3	3.2	ns
C.V. % ^{††}		7.6	9.7	7.0

[†]Numbers followed by the same letter are not significantly different.

[‡]Least Significant Difference.

^{††}Coefficient of Variation.

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Cut Length	CSPS	Processor Setting	CSPS
13 mm	53.3	1.0 mm	57.5 a [†]
19 mm	44.2 *	1.5 mm	55.8 a
		2.0 mm	48.1 b
		2.5 mm	47.0 b
		3.0 mm	38.8 c
LSD _{0.05} [‡]			6.6
C.V. % ^{††}			11

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Cut Length	Processor Setting	CSPS
13 mm	1.0 mm	59.0 a [†]
	1.5 mm	59.0 a
	2.0 mm	54.5 a
	2.5 mm	53.5 a
	3.0 mm	40.5 b
19 mm	1.0 mm	56.0 a
	1.5 mm	52.5 a
	2.0 mm	41.6 b
	2.5 mm	40.5 b
	3.0 mm	37.0 b
LSD _{0.10} [‡]		7.7
C.V. % ^{††}		11

[†]Numbers followed by the same letter are not significantly different.

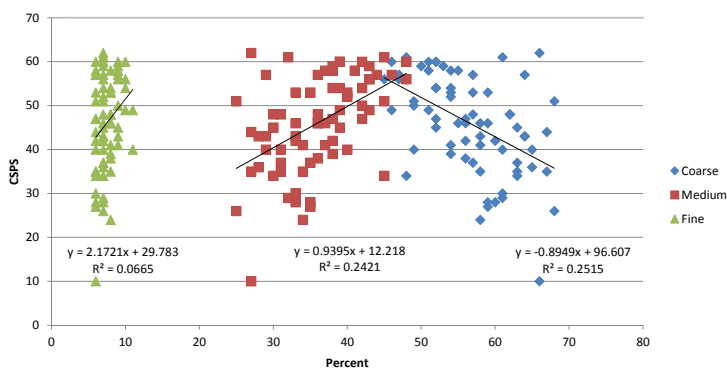
[‡]Least Significant Difference.

^{††}Coefficient of Variation.

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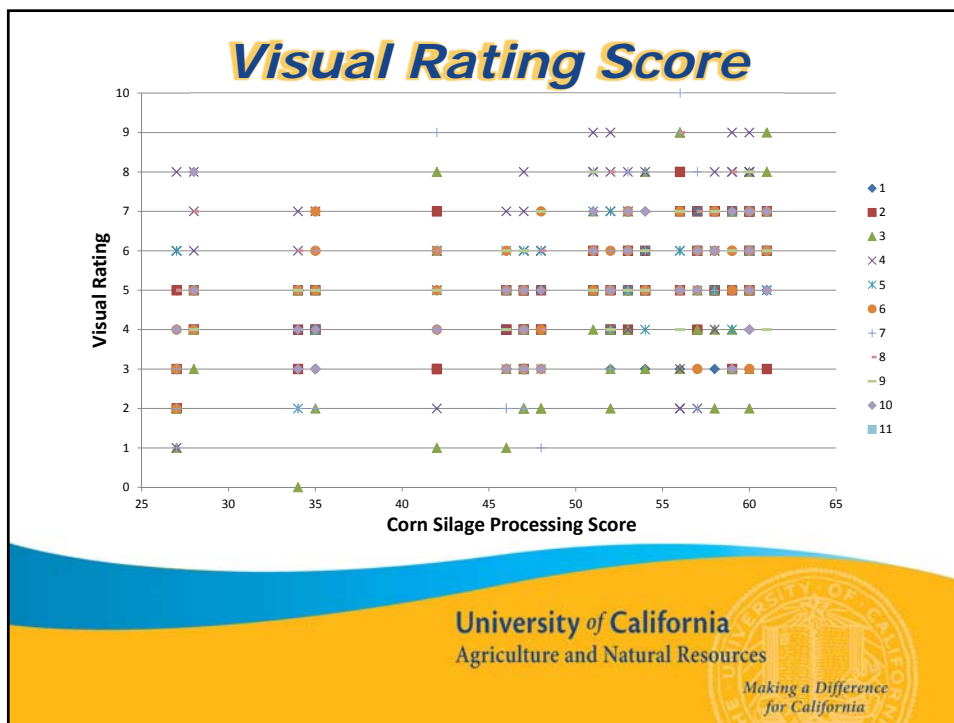
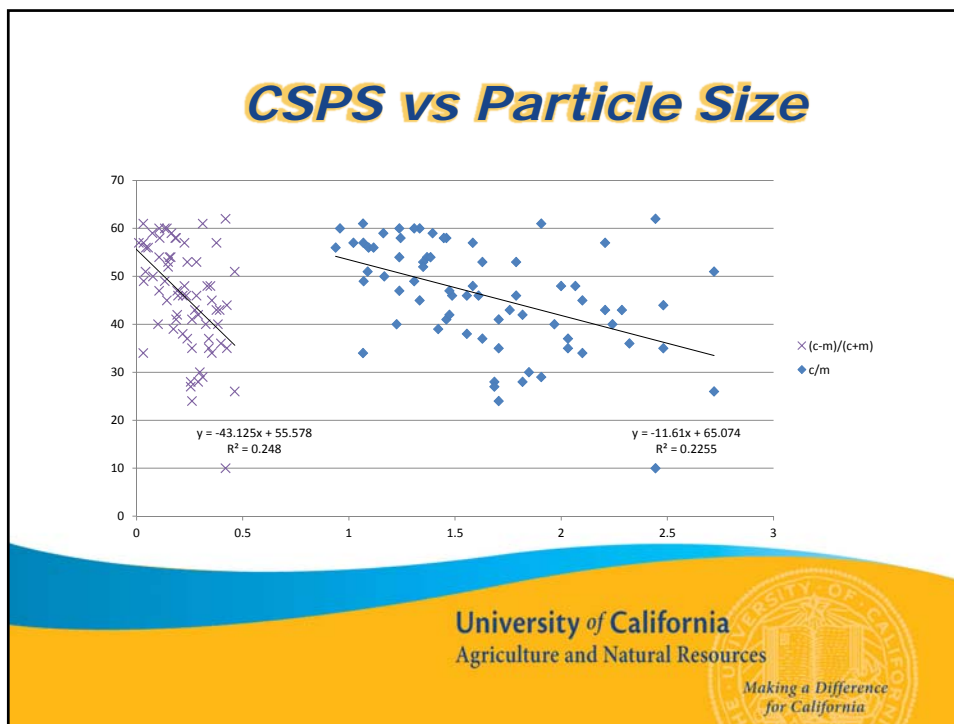
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CSPS vs Particle Size



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Visual Rating Score

	Average	Range
1	4.2	3-6
2	4.8	2-8
3	4.3	1-9
4	6.6	2-9
5	5.3	3-7
6	5.1	2-7
7	4.7	1-10
8	6.1	4-9
9	5.0	3-8
10	5.1	3-8
11	5.0	2-8
LSD _{0.05} [‡]	0.6	
C.V. % ^{††}	26	

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Visual Rating Score

	Average	Range	
1	4.2	3-6	Nutritionist
2	4.8	2-8	Brandon Lamb
3	4.3	1-9	Scott Lamb
4	6.6	2-9	Dairyman
5	5.3	3-7	Dozer Operator
6	5.1	2-7	Me
7	4.7	1-10	Dan Lamb
8	6.1	4-9	Manufacture Rep.
9	5.0	3-8	Manufacture Rep.
10	5.1	3-8	Manufacture Rep.
11	5.0	2-8	Manufacture Rep.
LSD _{0.05} [‡]	0.6		
C.V. % ^{††}	26		

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Visual Rating Score

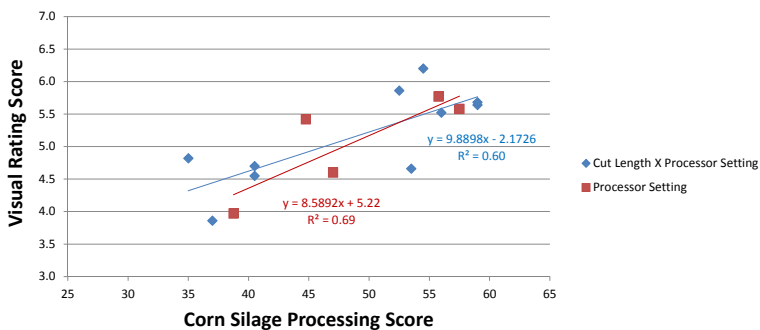
Cut Length	VRS	Processor Setting	VRS
13 mm	5.2	1.0 mm	5.58 a [†]
19 mm	4.9	1.5 mm	5.77 a
	*	2.0 mm	5.42 a
		2.5 mm	4.60 b
		3.0 mm	3.97 c
LSD _{0.05} [‡]			0.39
C.V. % ^{‡‡}			26

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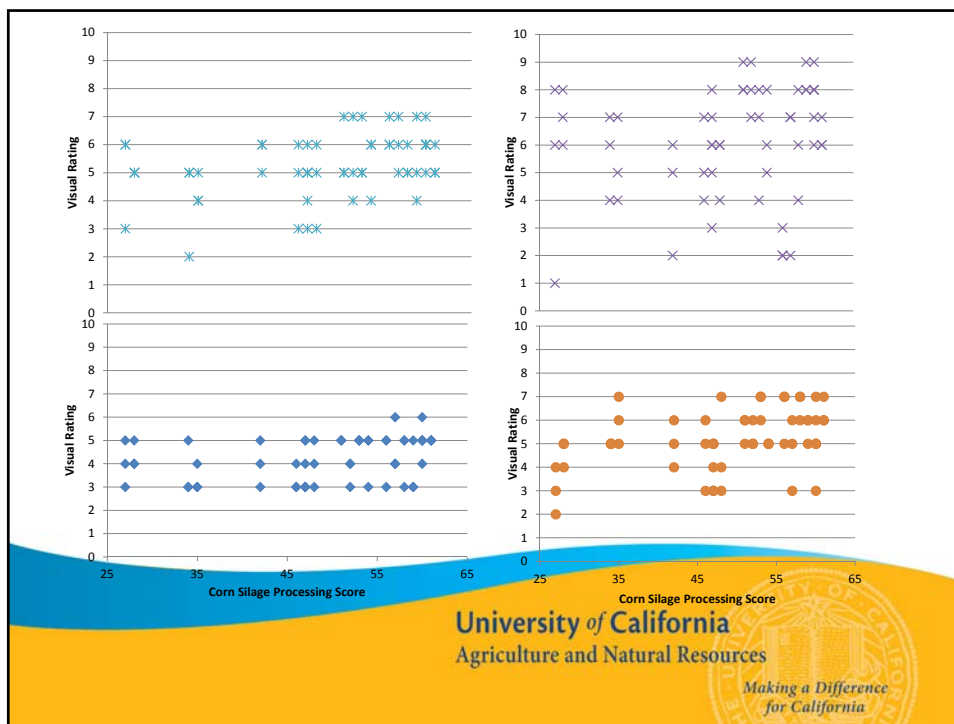
Visual Rating Score



Individual Points
 $y = 0.0546x + 2.387$
 $R^2 = 0.11$

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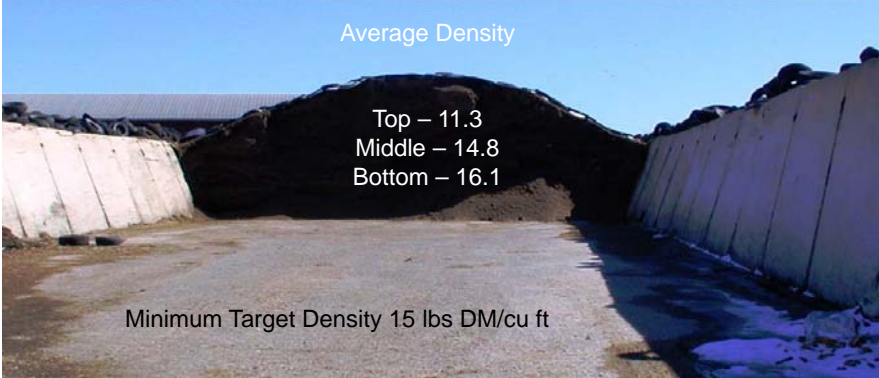
Silage Pile Compaction



Dr. Brian Marsh
Farm Advisor
UC Cooperative Extension – Kern County

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Penn State Bunker Silo Density Study



Average Density

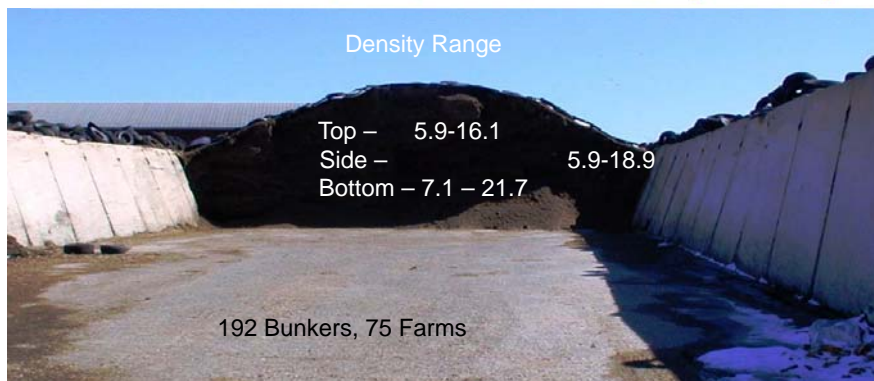
Top – 11.3
Middle – 14.8
Bottom – 16.1

Minimum Target Density 15 lbs DM/cu ft

Paul Craig
Greg Roth

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Penn State Bunker Silo Density Study

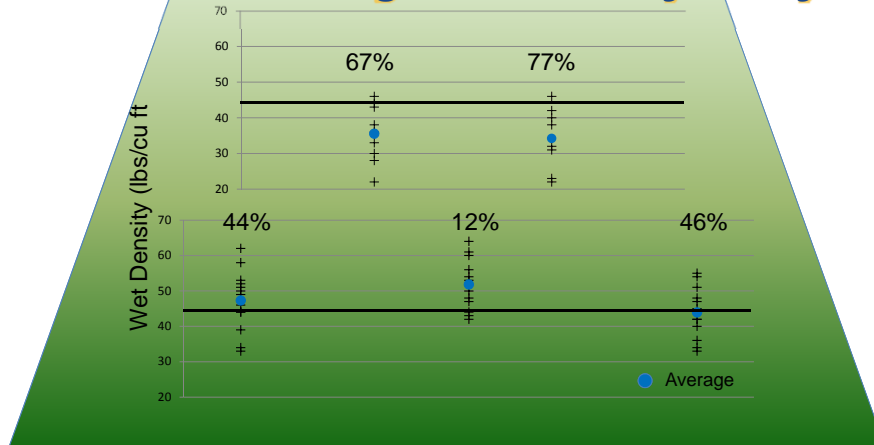


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 Greg Roth

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California Silage Pile Density Study



Noelia Silva-del-Rio
 UCCE Tulare Co.

% - Not Meeting Minimum

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What about piles of unknown dimensions?

Spreadsheet tools for DM density

It is still an average across the pile.

Packing Recommendations

- 6 inch layers
- Heavy tractors
- Multiple passes

Do you measure compaction during packing?

Can it be measured during packing?

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Electrical
Conductivity
Meter



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Soil
Compaction
Tester



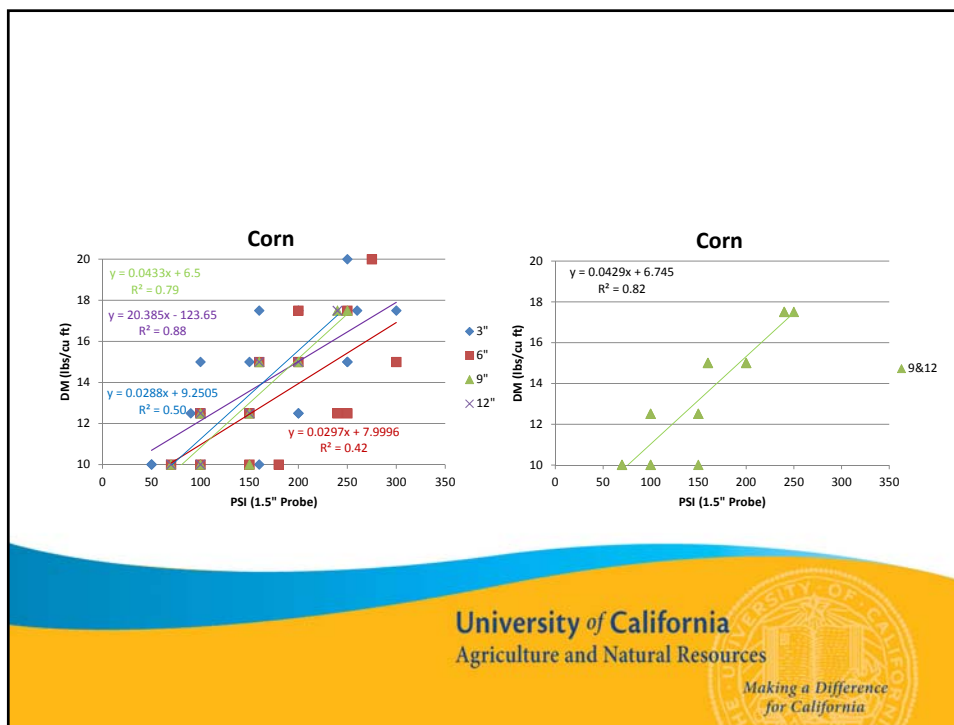
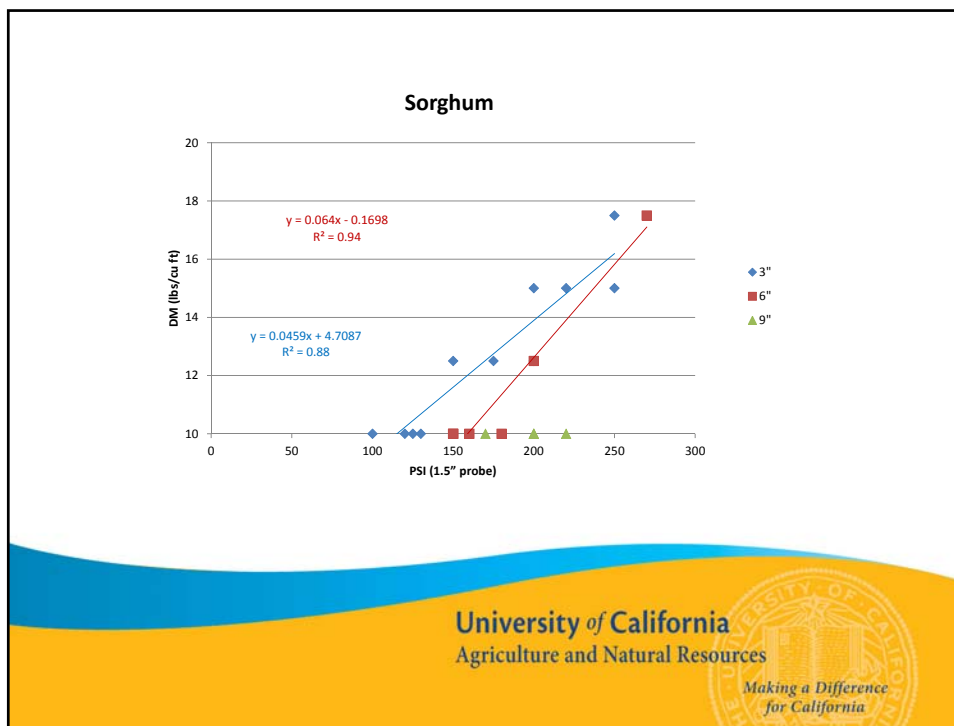
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- Known weight
- Compress to know volume
 - 10, 12.5, 15, 17.5, 20 lbs DM/cu ft
- Use probe to measure PSI

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Record PSI with depth

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Corer
4" Diameter
12" Length



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13.4 lbs DM per cubic foot

$$y = 0.04\text{PSI} + 6.7 \quad 9 - 12'' \text{ model}$$

$$13.4 = 0.04\text{PSI} + 6.745$$

$$\text{PSI} = 167.5$$

Depth	PSI
3"	130
6"	165
9"	215
12"	255

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