

High Fiber Content in Hay does not insure Low Sugar Content

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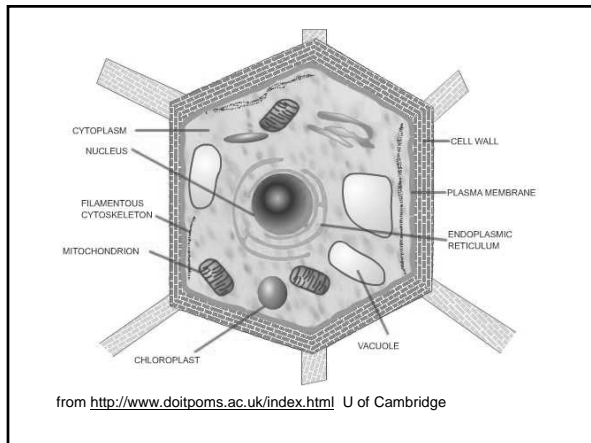
Common Myths

- Course, stemmy hay is low in sugar.
- Over mature hay is low in sugar.
- Brown hay is low in sugar.
- Older hay lower in sugar content.
- Rained on hay is lower in sugar.

These traits do not insure low sugar hay.

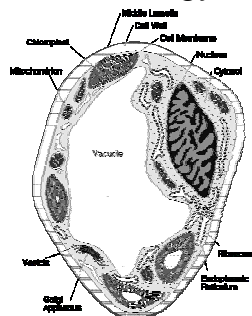
Carbs in Plants

- Structural carbs in plant cell walls are called fiber by nutritionists:
 - cellulose, hemicellulose, pectin
- Non Structural Carbs inside the cells are :
 - sugars and fructan stored in vacuoles
 - starch made and stored in chloroplast



The Warehouse Analogy

- Plant cells are like a warehouse with bins (vacuoles).
- The bins can be empty or full, without changing the mass of the walls.



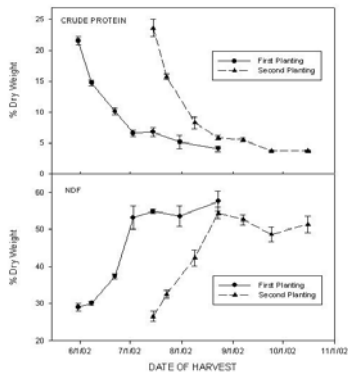
NSC are *independent* of fiber

- Expressing nutrients as % leads to errors in thinking.
- More of one does NOT mean less of the other
- Fiber is in the cell wall
- NSC are stored *inside* cells
- NSC and fiber do not occupy the same space.

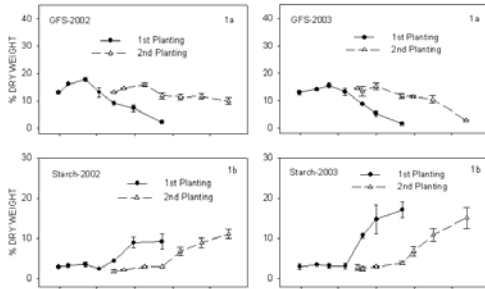
Stage of Growth vs. Environmental Conditions Non-structural Carbs in Oat Forage, J. Nut (2006) 136: 2111S-2113S

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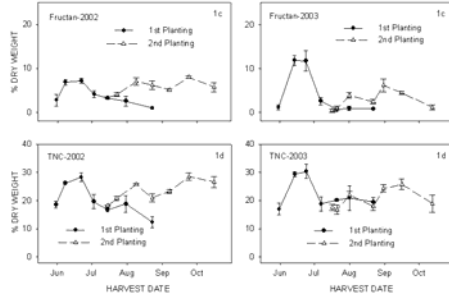
Stage of Growth vs. Environmental Conditions



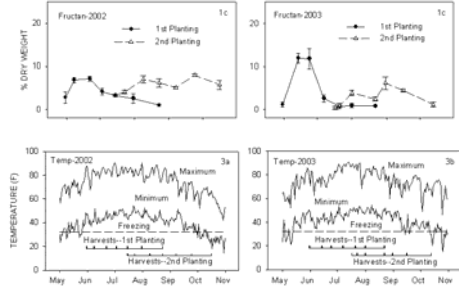
Stage of growth vs. Environmental conditions



Stage of growth vs. Environmental conditions



Stage of growth vs. Environmental conditions



Fiber vs. NSC, 2006

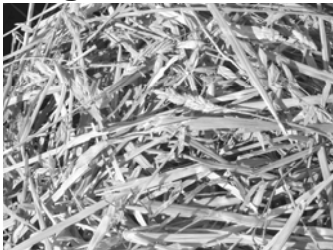
- 13 species, 4 reps
- Sampled 3-6 PM
- Fresh, frozen immediately, shipped frozen
- One month past optimum time for hay

Neutral Detergent Fiber vs. NSC July 24, 2006- 1 month past prime

Variety	NSC (dm)	NDF (dm)
Roadcrest crested wheatgrass	20.2 a	61.7 cd
Garrison meadow foxtail	19.9 a	57.3 e
Climax timothy	17.2 ab	59.6 de
Potomac orchardgrass	15.4 bc	61.9 cd
Cache meadow brome	13.8 bcd	66.5 abc
Sherman big bluegrass	13.4 bcd	67.5 a
Regar meadow brome	13.0 cd	64.7 abc
Ginger Kentucky bluegrass	12.8 cd	63.8 abc
Fawn tall fescue	12.8 cd	62.3 cd
Wideleaf orchardgrass	12.4 cd	61.9 cd
Manchar smooth brome	12.0 cd	63.3 bcd
Redtop	10.7 d	64.5 abc
LSD (p=.05)	3.55	3.37

Mean of 4 reps, Analysis by Dairy One
 Values followed by the same letter do not differ significantly. Correlation (r) = .66

Sugar is not Green



This oat, wheat, rye hay is very stemmy, mostly tan, and 27% dm WSC.

Affect of irrigation on WSC content of Hay



No rain = 30 % dm WSC





**.8 inch rain = 27% WSC
over 4 reps**

People think
old hay is
safe to feed
laminitic
horses

Who makes up
this stuff!



NSC in stored hay over time

- 6 bales each type hay
- baled dry, stored in shed
- cored day of baling
- + 14 days, +8 weeks, etc.

Aged hay is NOT lower in NSC

	0-day NSC (dm)	+14 day NSC (dm)	+8 weeks NSC (dm)
Alf/brome	13.6	14.8	
Italian Ryegrass	18.7	19.6	

testing error = +/- 1% Both hays at 8% moisture

General terms = misunderstanding

- Old hay is lower in some vitamins
- “lower nutritional value” does NOT = lower in NSC
- Hay put up at 20% moisture loses NSC.
- Moldy hay is lower in NSC.
- Hay put up at <12% moisture does not lose appreciable amounts of NSC.

Before feeding to a laminitic horse:

- High fiber hay needs to be tested for sugar.
- Brown hay needs to be tested for sugar.
- Rained on hay needs to be tested for sugar.
- Old hay needs to be tested for sugar.
