Alternative forages: One cut doesn't fit all

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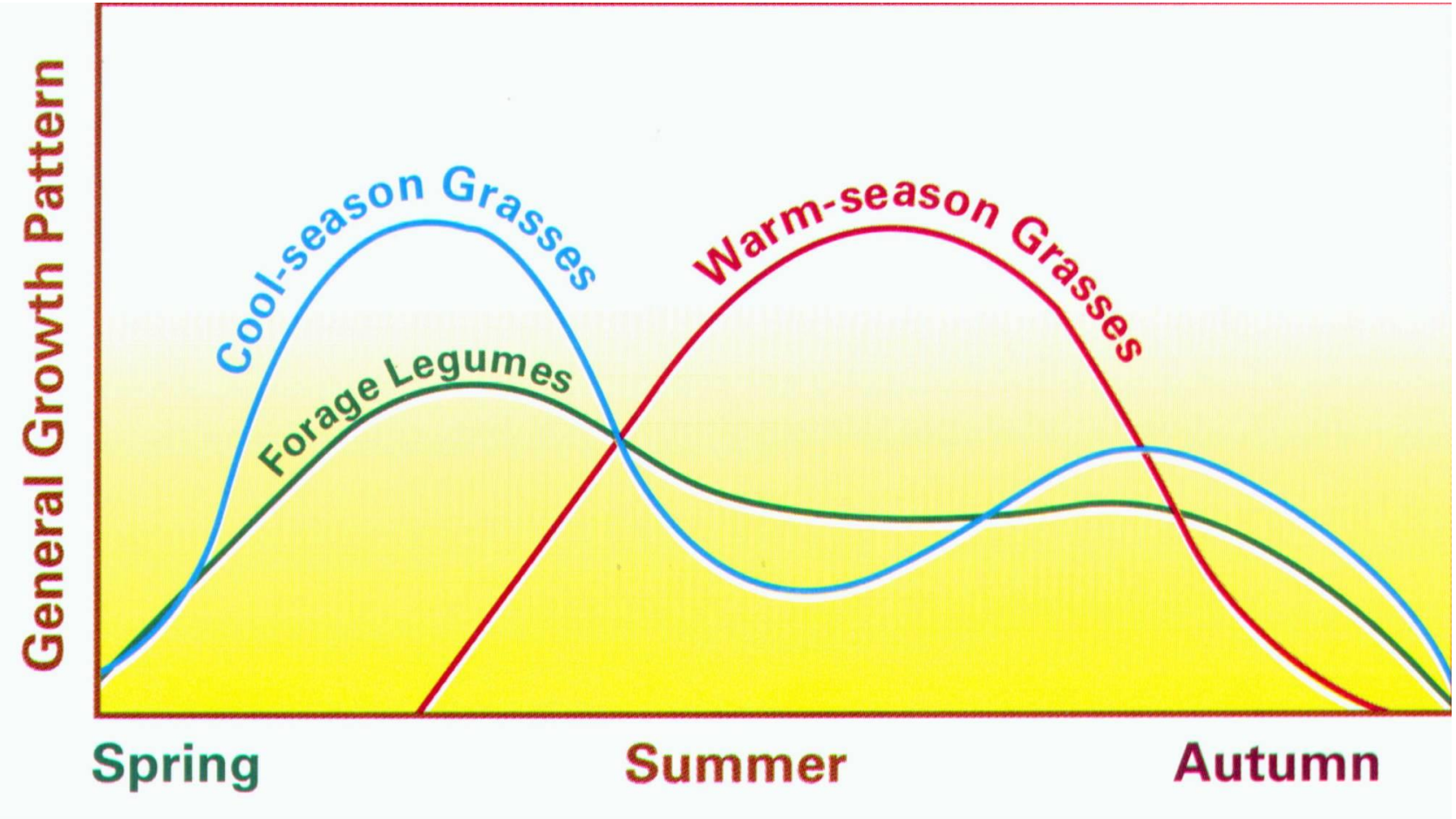
Alternative forages – When plan A fails

- **Critical Decisions – Forage Growth and Development**
  - **Fast Forage – fill the bunker June**
  - **High tonnage season long forage**
  - **Forage Options**
    - Spring Cereals
    - Cool Season grass
    - Warm Season grass
    - Summer annuals
  - **Getting the right cut**
    - Processing sorghum berries
    - Grasses cut length

Forage Growth and Temperature



Courtesy: Farmers Forage Research (FFR)

Fast Forage – Cool Season Grass

- Italian ryegrass (winter annual) spring planting
  - Remains vegetative for maximum forage production
  - Required cold period for reproduction vernalization similar to winter wheat
  - High quality, leafy, palatable forage
  - Adaptation cool, moist soils
- Inter seeding or new stand establishment
  - Good seeding vigor
  - Seed to soil contact essential
  - New stands 35-40#/acre
  - Inter seeding 15-30#/acre
- Under seeding with spring cereals
  - Season long forage strategy
  - Dry hay option

Fertilization Spring Cereals / Rye Grass

- **Fertilization**
  - **Manure credits**
  - **Nitrogen is critical component for protein creation**
  - **Nitrogen to meet your forage nutrition goals**
    - 100# N at seeding time
    - 50# N applied for each additional crop
  - **Sulfur to Nitrogen ratio to improve nitrogen efficiency**
  - **Potassium and Phosphate**

Table 3. Small grain silage recommendations for applied phosphate and potassium fertilizer*

	Soil Test Level						
	P_2O_5			K_2O			
Crop	Opt	H	EH	Opt	H	VH	EH
	----------amount to apply, lbs/a----------						
Small grain silage							
without alfalfa	30	15	0	120	60	30	0
with alfalfa	55	25	0	220	110	55	0

* from University of Wisconsin-Extension bulletin A2809, Soil test recommendations for field, vegetable, and fruit crops.

Oat forage quality values vs maturity stage

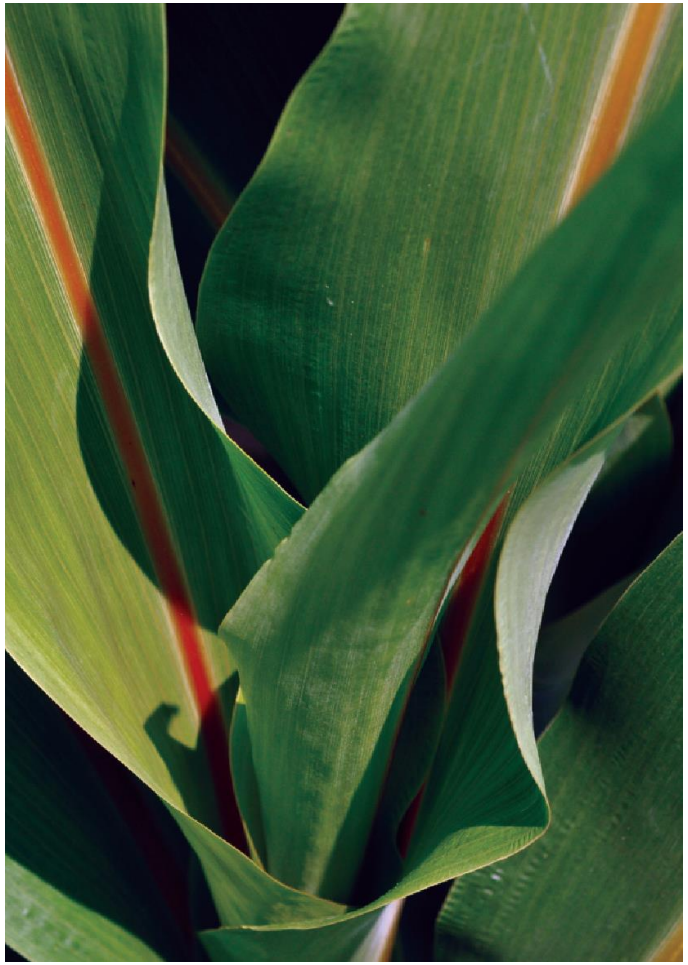
Harvest Stage	CP%	NDF%
Boot	16 - 18	52 - 54
Heading	14 - 16	56 - 58
Milk	12 - 14	59 - 61
Dough	10 - 12	59 – 61

(Rankin, UWEX-FDL, 2003)

Why - Sorghum for Forage

Management Diversity

- Excellent nutritional quality BMR 6 types
- Early maturity catch-crop following primary crop loss
- Rotational crop benefits
- Green-chop fresh forage
- High yielding and excellent fermentation silage
- High water use efficiency
- Cost ROI non traits seed



"Whole-plant sorghum provides a drought-tolerant alternative to corn if it is processed correctly"

Luiz Ferraretto

VITA PLUS

Sorghum-Sudan grass hybrids

- More tonnage than Sudan grass
- Excellent regrowth for multiple harvest systems
- Used for grazing and hay production
- For silage, allow crop to wilt before chopping to insure proper moisture content

Courtesy: Sorghum for Forage Field Guide

Additional Summer Annual Options

- Millet
  - No prussic acid risk
  - Multiple cut
  - Faster dry down

- Teff Grass
  - Fine stem – High digestibility
  - Higher crude protein and TDN
  - More productive cool season

High Tonnage Season-long yield

- Corn Silage (King) everyone know how to grow
  - Best high tonnage option
  - Correct planting and harvesting equipment
  - Keep it simple
- Forage Silage
  - Sorghum
  - Sudan grass
  - Sorghum / Sudan grass hybrids
  - Millets
  - Excellent nutritional quality BMR 6 types
  - Multiple harvest and grazing regrowth
  - Early maturity catch-crop
  - Excellent fermentation silage

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Re-evaluating berry processing score

- **Industry standards**
  - KPS corn silage 4.75mm
  - Improved degree KPS
  - Improves total tract starch digestibility
- **Improved measures BPS**
  - KSU in 2017 1.70mm sieve
  - Pass 50% starch adequate
- **Split berries**
  - 3-26% two and four pieces
  - Inability for berries to pass

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Re-evaluating berry processing score
2 studies – Luiz Ferraretto

BPS evaluate 25 hybrids berries

- **Various silage maturities**
  - Manual cut into 2 or 4 pieces
  - Only 3-26% passed 1.7mm
- **Proposed new sieve size**
  - 2.36 mm 51-86% passed
  - Represent better indication broken berries
  - Based on dataset 2.36 mm represent better indication of broken berries

Whole-plant sorghum silage

- **Processed with forage harvester**
  - Roll gap 1 mm [.04″] or 3 mm [.12″]
  - Cut lengths 15 mm [.59″] or 22 mm [.86″]
  - Processing settings standards for corn silage
  - Similar processing settings sorghum silage

Study results

- Processing aggressively improved BPS
  - All 4 treatments were "inadequate" values 19.7 to 25.6% passed 1.70mm
  - Further roll gap harvest slow harvest, boost fuel cost increase wear on processing rollers
- BPS estimates with 2.36mm
  - Wider range of scores
  - Most aggressive treatment was considered adequate
  - Berries retained below 2.36 mm
  - Were split in 2 pieces

Table 1. Particle size distribution, geometric mean particle size, surface area, and starch digestibility of unfermented sorghum berries after manual cutting[1,2]

Item	WH	2P	4P
Berries retained on each sieve, % as fed			
6.70	0	0	0
4.75	0	0	0
3.35	19.64	3.52	0
2.36	77.81	45.06	14.11
1.70	2.54	48.39	59.77
1.18	0	2.89	23.79
0.59	0	0.13	1.45
0.30	0	0	0.56
Pan	0	0	0.32
Geometric mean particle size, um^2	2,152	1,695	1,277
Surface area, cm^2/g	19	22	27
Effective ruminal starch disappearance, % of starch	15.2	22.6	39.7

[1]Adapted from McCary et al., (2019).
[2]WH = whole sorghum berries, 2P = sorghum berries manually cut in two pieces, and 4P = sorghum berries manually cut in four pieces.

5 C's of the Ensiling Process

"Consider, cut, crack, cram, cover – the five C's of quality silage. Infuse those five C's into your team's collective brain and instill the practices into your silage harvest team and you'll be the envy of every producer everywhere –hands down."

Hugo A. Ramírez Ramírez
Assistant Professor
Iowa State University
Department of Animal Science

- Consider (moisture content)
  - Ideal between 62-68 for grain silages
  - Optimal alfalfa and grass silages 58-64
  - Inoculant high quality bug
- Cut (theoretical length of cut)
  - Processed corn silage ¾"=19-22mm
  - Hay and small grains less than 5/8"=15mm
- Crack (kernel processing)
  - No whole kernels (1-3 mm roll gap)
  - KPS (50-70 adequate
- Cram (packing)
  - Critical for oxygen removal
  - 15# DM cubic foot
- Cover (nutrient retention and DM recovery)
  - Sealing with high-efficiency oxygen barrier film
  - Quality white/black plastic

Take Home Nuggets

- Cool Season grass fastest way to fill the silo
- Summer Annuals Versatility
  - Less expensive seed cost
  - Perform better under less than ideal conditions
    - Lower water requirements
    - High heat tolerance
  - Getting the right cut
    - Processing sorghum berries
    - Grasses cut length

Thank you


Crack
Stalk
Consider
Rumen
Livestock
Corn
Coarse
BACTERIA
Silage
PACKING
Moisture
COVER
Seepage
Cut
Cram
Oxygen
Kernel
Density
Milk line
Quality
Husks