Summer Annual Forages: Quality, Feeding & Storage

Updated 2022

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Grazing Preferences Among Summer Forages

See footnotes or next slide.

Previous slide with swather:

What do you see?

This field is in Hockley County, Texas (8/14/2002; the year doesn't matter). Irrigated sorghum/sudan being swathed for forage. It appears there are only a few heads visible. There is some in boot stage. So, this is higher quality forage. With a swath date of Aug. 14, there will be significant forage regrowth, up to 8 weeks. Growth will be come very slow if any after about Oct. 10. Or the farmer could graze at the end of the season. There is about 6" of stubble remaining on the plants, and that should help drive regrowth. In general for sorghum/sudan, the happy medium between tonnage and forage quality is generally boot stage.


See footnotes
or next slide.

Previous slide of barren stalks:

What do you see?

A bamboo forest! And headed out sorghum/sudan. This is sorghum/sudan in southeast Terry County, Texas. What is the problem here? In this grazing situation it is evident the cattle were turned in several weeks too late, and many of the plants were too far advanced. The cattle couldn't consume the forage fast enough. Some headed out and developed grain. Cattle have stripped the leaves but not eaten the stalk (larger stalk, more mature, not as easy to eat). Regrowth will be marginal. Forage quality is lower. This field represents a big mistake.

Forage Grouping

- Harvested frequently for grazing or hay--
  - sorghum/sudans, sudans, pearl millet
- Harvested usually only once for silage and sometimes hay--
  - forage sorghum, grain sorghum

Forage Sorghums

- Often called ‘cane’, ‘sweet sorghum’, or ‘sorgo’
- Usually associated with sweet, juicy stems, and relatively small grain heads
- Tall growing, late-season maturity
- Good silage producers
- Harvested late to increase tonnage

Sorghum/Sudan Hybrids (Haygrazers)

- One parent is a sudan crossed with sorgo (sweeter) or sorghum
- Higher yielding than sudans, less than 50% leaf, coarser stems
- Sudan enhances regrowth and tillering after multiple cuttings or grazings (best producer for hay & grazing due to hybrid vigor)

Sorghum/Sudan Hybrids

- Longer season maturity
- Many, many hybrids
- Sweet Sorghum/Sudan crosses
  - sorgo-sorghum/sudan or sorgo/sudan additional sweetness for increased consumption and palatability
  - fast regrowth, drought tolerant

Hybrid Pearl Millets

- More leafy than sorghum/sudan (>50%)
- Forage production somewhat less than sorghum/sudans on good soils
- Requires warmer temperatures for planting (70 F)
- Drought tolerant
- Sensitive to overgrazing (leave ~8” stubble)

Hybrid pearl millet, Hale Co., Texas. Note the leafiness.

Hybrid Pearl Millets

- Iron-deficiency tolerant--favorable for caliche soils
- Very small seed hence low seeding rate
- No prussic acid problems (could move livestock onto millet after sorghums are frosted)
- OK for horses

Planting Considerations

- Soil temperature
  - most sorghum/sudans and forage sorghums, 10-day average at 4” depth at ~62 F
  - millets near 70 F
- If emphasis is grazing, consider plugging drill holes to drill at about 20-24” wide
  - cattle won’t tromp forage (walk between rows)

Initial Grazing

- Grazing too early may delay root establishment or pull plants out of ground
- When early grazing is desired:
  - pearl millet may begin grazing at 18-20”;
  - sorghum/sudan at ~24”
  - photoperiod sensitive forages later


AUG 14 2002

Cutting Height for Regrowth

- To foster regrowth and tillering after grazing or haying:
  - sorghum/sudan, 6” of stubble
  - hybrid pearl millet, 8” of stubble

- Pearl millet is especially sensitive to overgrazing and short cutting whereby tiller regeneration will not occur

"Still" New Summer Annual Forage Types in West Texas

- What is a BMR?
  - Brown mid-rib (BMR)--forage sorghums and sorghum/sudans
- What is a photoperiod-sensitive forage?
  - Photoperiod-sensitive (PS)--forage sorghums, sorghum, sudans, and hybrid pearl millets

Identification:

Color varies from reddish-brown to dark brown and is visibly evident on leaves and stems

Color is only a marker!

Intensity of color is NO indication of quality!!!

Brown-Mid Rib Forages

- Visually, has brown rib in leaves and brown layer around stem (rind)
- Chemically, lignin content of stems is reduced by 25 to 60% (higher digestibility)
- Sweeter forage, higher Total Digestible Nutrients (TDN) by 2.0 to 2.5%, and better palatability to livestock
- Anticipate ~5-10% lower yield than conventional sorghum/sudans (or forage sorghums)
- BMR is non-GMO.

Brown Midrib Trait

Commercially, in corn silage hybrids, sorghum/sudangrass & forage sorghums, and hybrid pearl millet.

Differences in genetics, thus *bmr* phenotype does not guarantee better quality or agronomics.

Brown Mid-Rib Forages

- Lodging may be a problem if allowed to head out
- Management similar to comparable forages though seeding rate might be reduced slightly
- Companies are culling high lodging hybrids

The Electorate in Free Choice Grazing Preference

Scurry County

- In 2000, we were just hearing about “Brown Midrib” (BMR) sorghum/sudan…
- It was new, it cost more, we saw those cool pictures from Indiana or Nebraska or Georgia…

Max Drum Farm, Fluvanna

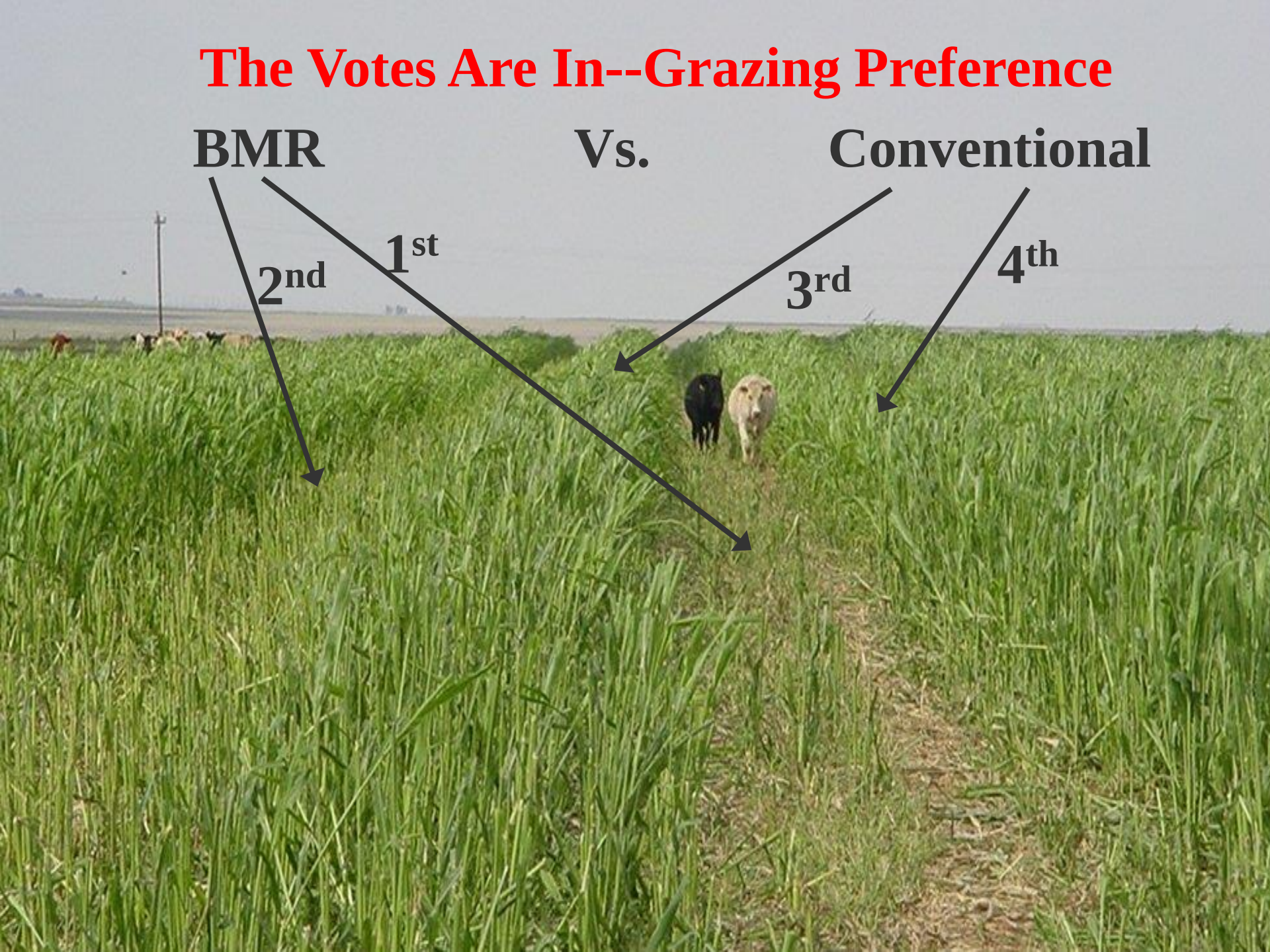
- 11 acres total
- Five summer annual forage strips
  - two BMR sorghum/sudans
  - one forage sorghum
  - one photoperiod (non-heading) sorghum/sudan
  - one local “favorite” sorghum/sudan (Sweeter ‘N Honey)
- Cows on field near boot stage
- What did they do? They figured out there was something they liked better within 4 days. Eventually cows were eating BMR stalks when there was still leafy material on the non-BMR hybrids.
  - This was before cell phones with cameras. We don’t have pictures.

Mitchell Co. Extension (John Senter)

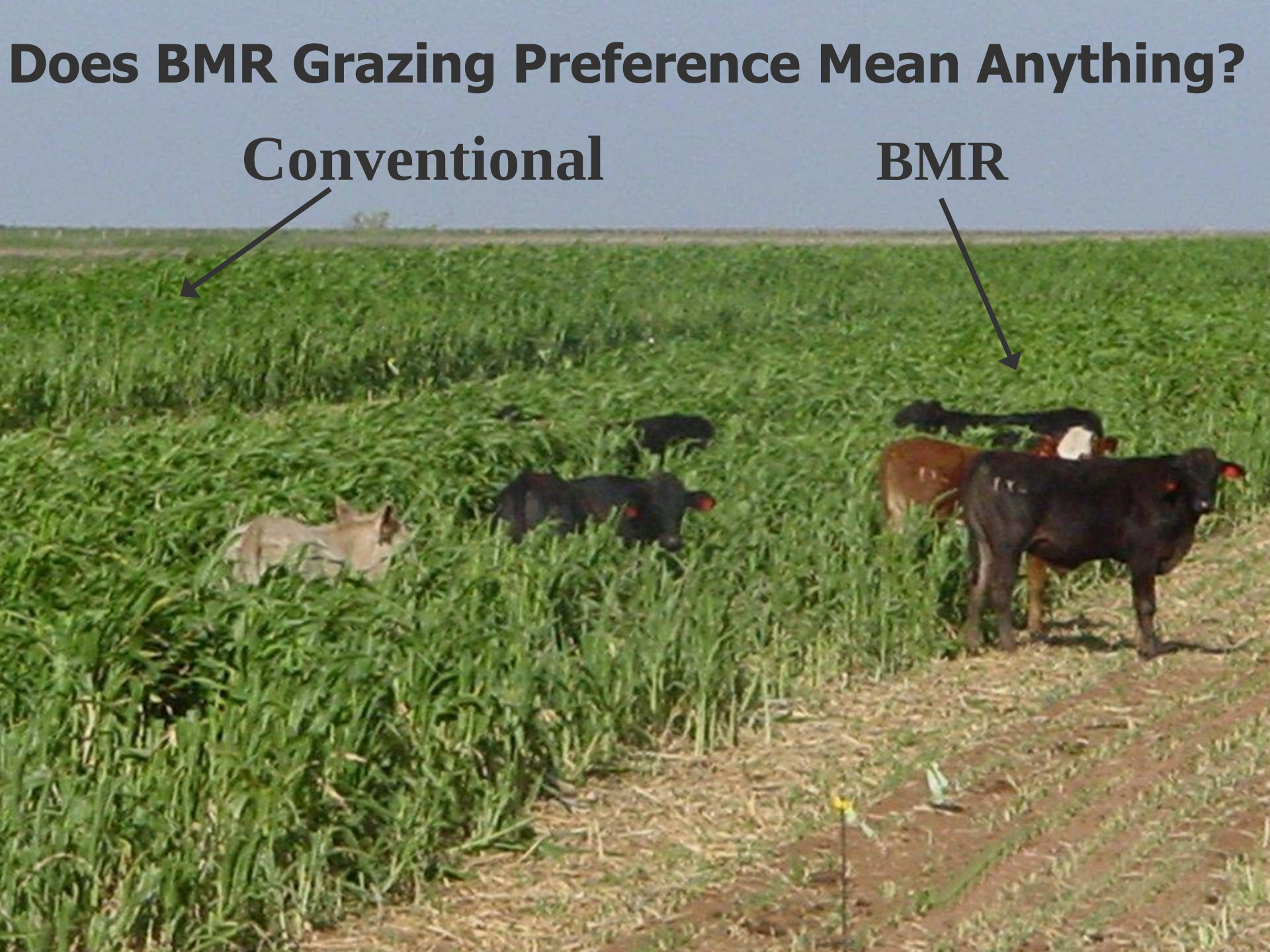
(Grazing Preference: 0 = none to 5 = complete)

Hybrid	Type	Grazing Preference	(Wet Yield) Lbs./A
Sweeter N Honey (Richardson)	Sorgo-sorgh/sud	1.8	12,600
TE Grazer II (Golden Acres)	Sorghum/sudan	1.8	16,900
Sweeter N Honey II (Richardson)	Sorghum/sudan	3.8	16,100
SX-17 (DeKalb)	Male-sterile sorghum/sudan	3.0	15,600
Sweeter N Honey BMR (Richardson)	Brown midrib sorghum/sudan	5,0	12,400
22050 (Garrison & Townsend)	Brown midrib sorghum/sudan	3.0	10,000
Surpass BMR (Coffey)	Brown midrib sorghum/sudan	4.0	10,600
Maxi-Gain (Coffey)	PS sorghum/sud	3.8	14,800

The Votes Are In--Grazing Preference



Does BMR Grazing Preference Mean Anything?



Forage Consumption 10 Days Later after Stock Release onto Forage

Does this grazing preference mean anything?

- Obviously if there is a forage the livestock prefer to eat that is a good thing.
- Does this translate into better animal performance?
- This may not be certain, but the grazing preference is encouraging and certainly shows the potential for improved animal performance.

Bushland, TX
AgriLife Results

Performance of steers grazing non-brown midrib and brown midrib sorghum X sudan hybrids

Item	Non-BMR	BMR	P
Daily gain, lbs	2.62	2.94	0.065
Gain/acre, lbs	300	337	0.12
Initial weight averaged 531 lbs.			

Stocking rates were 2.7 to 2.1 head/acre; grazing 41 to 59 days; AgriBio Tech (Seed Resource) SS200 BMR & DeKalb SX-17. *These hybrids are identical except for the BMR trait in SS200, so the only difference is the BMR.*

BMR Cost of Seed (2022)

- Companies “A” & “B”
  - Conventional sorghum/sudan @ $24-28 & $24-30/bag
  - BMR S/S—both $60/bag
  - Photoperiod Sensitive S/S, $50/bag
  - PS/BMR combination hybrids, $64 & $72/bag
  - Hybrid pearl millet (5X seed per bag, seeding rates about half of S/S) @ $125 & ??/bag
  - Recommendation: Try a single bag or two of BMR from two different companies, especially if grazing. See if the livestock tell you they like it.

Poison Problems

- Prussic acid
  - Droughty conditions in the summer
  - Frost/freeze in the Fall
  - Dissipates in properly cured hay
  - 200 ppm is toxic
  - Learn more online, search for "*Nitrates and Prussic Acid in Forages—Sampling, Testing and Management Strategies*," E-543 (2012)
  - Call ahead to properly collect, transport sample as prussic acid changes in the sample. For Texas High Plains I recommend calling the Texas Veterinary Medical Diagnostic Lab, Canyon, 888.646.5624, for instructions. They may have you send the sample to the College Station lab. http://tvmdl.tamu.edu

Poison Problems

- Prussic acid—new information
  - Texas A&M, Kansas State, and other universities are re-evaluating long-time recommendations on prussic acid.
  - Some of what we have told livestock and forage growers for decades may not be accurate. The question is "Where is the research that is the basis of our long-time recommendations about animal health and safety & sorghum forage management?"
  - Anticipate revisions in management—cattle are consuming the compounds that create prussic acid regardless of a frost, freeze, or drought. So is this the issue we have always thought?
  - Advice for now: play it safe. We do know that prussic acid does occasionally kill livestock. We may be less sure how.

Poison Problems

- Nitrate
  - Concentration is higher in lower stalk
  - Often occurs in droughty conditions--though plants are not growing, nitrate continues to accumulate; also watch out for high N rates
  - Maximum of 1.0% nitrate for healthy animals, higher in lower stalk; high in weeds
  - Does not dissipate in hay once cut (locked in)
- Refer to AgriLife Extension's "Nitrates and Prussic Acid in Forages—Sampling, Testing and Management Strategies," E-543 (2012)

Growing for Quality Forage

- For grazing and baling, energy level decreases with maturity, i.e., maximum TDN is at or just before boot stage
- Vegetative forage quality steadily decreases once the forage begins to head
- For silage, forage sorghum has highest TDN and optimum cutting at early-medium dough

Savvy Consumers Want Good Quality Hay

Growing for Quality Forage

- Feeding vs. selling?
- Type of animal?--cows vs. stockers
- Low quality forage often costs more to feed
- Does a potential buyer appreciate quality and is willing to pay for it?

- Key: Harvest at proper stage to meet your goals

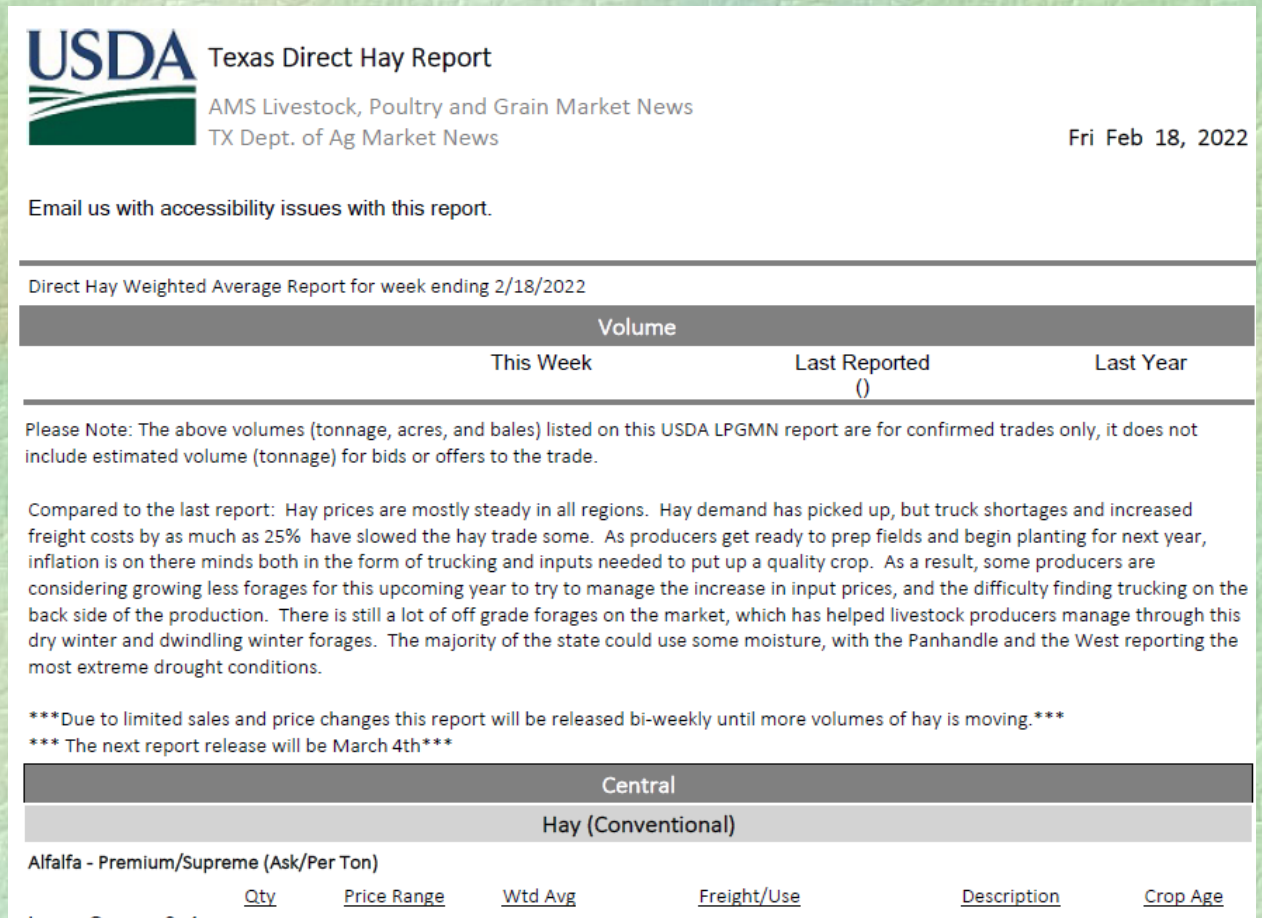
A note about buying & selling hay

- AgriLife Extension recommends hay sales be conducted by weight, not bales.
- Hay bale size varies. Estimates of tonnage, lbs. per bale, etc. sometimes are in error more than 10%.
  - Is that big round bale 1,100 lbs.? 1,350 lbs.?
- Sales by weight, when possible, eliminate the guesswork and are fair to all parties.

USDA Texas Direct Hay Report—Bi-weekly Current Hay Prices

USDA publishes a summary of current Texas hay prices every two weeks. This is useful for hay growers and buyers for a snapshot of current prices. See https://www.ams.usda.gov/mnreports/ams_2707.pdf

Reports divide Texas into four regions for pricing: Panhandle, Central, South, and West. The current edition provides current market prices for alfalfa (including different grades of supreme/premium/good), bermudagrass, sorghum (meaning sorghum/sudan, not grain sorghum stalks), and wheat hay.



USDA Texas Direct Hay Report

AMS Livestock, Poultry and Grain Market News
TX Dept. of Ag Market News

Fri Feb 18, 2022

Email us with accessibility issues with this report.

Direct Hay Weighted Average Report for week ending 2/18/2022

Volume

This Week	Last Reported ()	Last Year

Please Note: The above volumes (tonnage, acres, and bales) listed on this USDA LPGMN report are for confirmed trades only, it does not include estimated volume (tonnage) for bids or offers to the trade.

Compared to the last report: Hay prices are mostly steady in all regions. Hay demand has picked up, but truck shortages and increased freight costs by as much as 25% have slowed the hay trade some. As producers get ready to prep fields and begin planting for next year, inflation is on there minds both in the form of trucking and inputs needed to put up a quality crop. As a result, some producers are considering growing less forages for this upcoming year to try to manage the increase in input prices, and the difficulty finding trucking on the back side of the production. There is still a lot of off grade forages on the market, which has helped livestock producers manage through this dry winter and dwindling winter forages. The majority of the state could use some moisture, with the Panhandle and the West reporting the most extreme drought conditions.

Due to limited sales and price changes this report will be released bi-weekly until more volumes of hay is moving.
*** The next report release will be March 4th***

Central

Hay (Conventional)

Alfalfa - Premium/Supreme (Ask/Per Ton)

Qty	Price Range	Wtd Avg	Freight/Use	Description	Crop Age

Hay Price Reports for Texas & Nearby States

- For Texas: https://www.ams.usda.gov/mnreports/ams_2707.pdf

- New Mexico Direct Hay Report is published late April to early November. Divisions include East (Clovis/Portales), Southeast (Hobbs/Artesia/Carlsbad), and South (Las Cruces). See https://www.ams.usda.gov/mnreports/ams_2939.pdf
- Oklahoma Direct Hay Report is active in the winter every three weeks, more in the summer. See https://www.ams.usda.gov/mnreports/ams_3095.pdf Divisions include Southeast, Southwest, West, and Northwest. It is not clear which division would include the Oklahoma Panhandle.

- Arkansas and Louisiana do not have these reports.

Tips for Buying & Selling Hay

- See the Texas A&M AgriLife “Texas Row Crops Newsletter”
- https://agrilife.org/texasrowcrops/news/
- Search “Previous Articles” for USDA Texas Direct Hay Report, March 4, 2022

Sorghum/Sudan Hay Forage

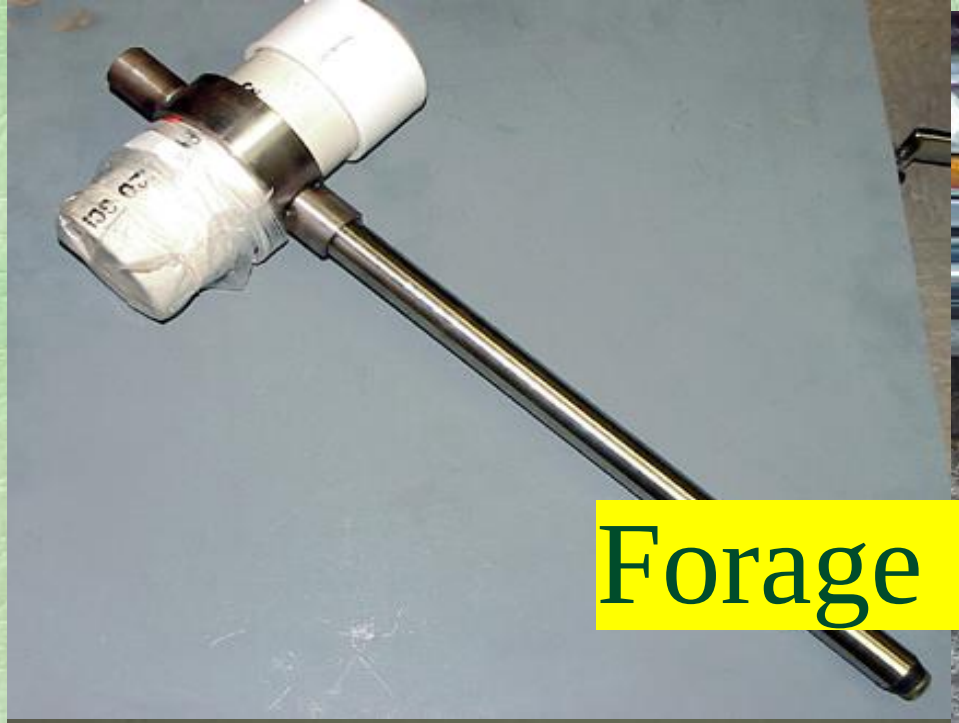
Stage of Maturity vs. Forage Quality

Stage of Maturity	% TDN	% Crude Protein
Early Veg.	71.5	19.7
Late Veg.	70.9	16.6
Boot	67.7	13.6
Heading	65.3	12.6
Bloom	61.5	11.0
Dough	58.8	7.8

Sorghum/Sudan for Forage Hay

Swisher Co., 2-week intervals

Stage of Maturity	Wet tons per Acre	% Crude Protein
Begin:	August 13th	
Mid-boot	10.0	15.1
Full head	12.9	13.0
Post-flower	15.7	10.6
Dough	18.2	8.8



Forage Sampling

Reduce Storage Losses

Left: Stored on the dirt.

Right: One bale stored on gravel, the other on the soil. Notice decomposition losses.

Dumb Things We Do

- Forage Losses in Round Bales during One Year—How Much?
  - 5%
  - 10%
  - 15%
  - 20%
  - 25%

Hay Losses in Round Bales
Depends on Storage Conditions

- Assumes moisture in bale is low:

- After 1 year (Northeast Kansas):
  - Stored inside, 8% loss
  - Stored outside on rock bed, 15% loss
  - Stored outside on dirt, 24% loss
  - Outdoor precipitation annually is about double of West Texas so losses are likely more pronounced in NE Kansas.

Dumb Things We Do (#2)

- Feeding loose hay on the ground
- Not using big round bale racks
- Baling when leaves are falling off (especially for legumes)
- Maintaining our feedbunks (fiberglass may be your best bet)

Dumb Forage Things We Do

- Poor storage or lack of storage of hay, etc.
- Giving up forage quality
- Feeding loose hay on the ground
- Baling when leaves are falling off (especially for legumes)

Savvy Buyers Want Good Quality Hay

- Look for weeds
- Ask for a forage analysis, or take your own
  - If they won't allow it, find someone else to do business with
- Is it headed out?
- Is it BMR?
- Cut in morning or afternoon?
- Price vs. storage method (including wrapped big round bales)?
- Leaves missing? (a loss of nutritive value)

General Target Seeding Rates

- Suggested dryland seeding rate, Texas High Plains
  - Dryland, ~15 lbs./A; (if field conditions are dry and drilling may not work, use a planter at ~5-10 lbs./A)
  - Irrigated, 25 lbs./A (drilled)
  - Further east into the Rolling Plains: seeding rates can increase with rainfall potential, but it seems like 1 bag (50 lbs./A is always excessive)
- Might be yield drag for BMR, but higher quality in general can be measured by a forage test
- Try a bag of BMR, especially if you are grazing—see what the cattle do.

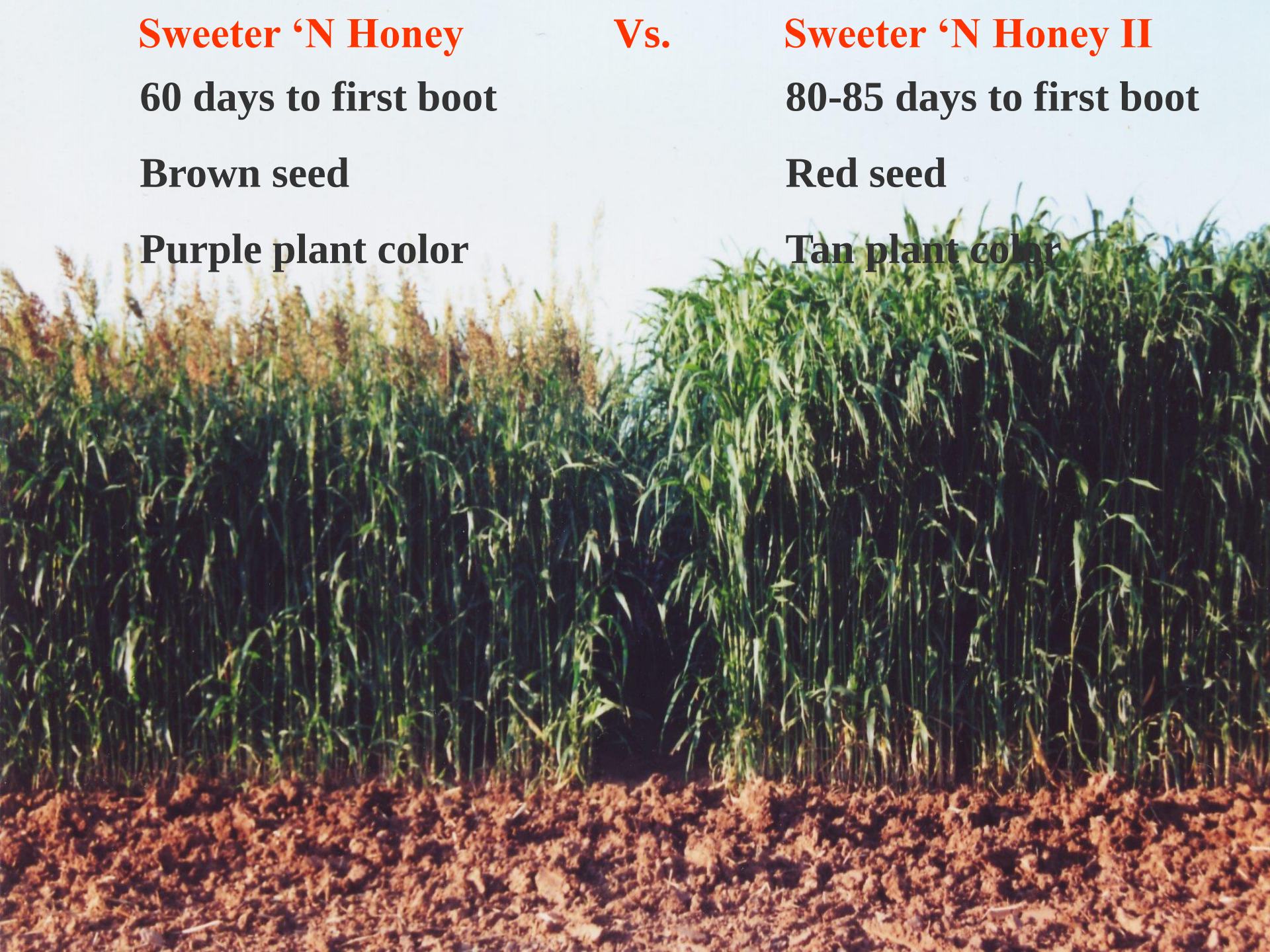
TX High Plains: Sorghum Family Forages
Seed Size & Seeding Rate (Dryland)

Type	Seeds./lb. (1000s)	Row Spacing >20”	Row Spacing 6-20”
Sorghum/sudan	16-17	10	15
Forage sorghum-Conv.	16	5-8?	----
Forage sorghum-BMR	16	4-5?	----
Hybrid pearl millet	70-90	5	8

TX High Plains: Sorghum Family Forages
Seed Size & Seeding Rate (Irrigated)

Type	Seeds./lb. (1000s)	Row Spacing >20”	6-20”
Sorghum/sudan	16-17	15	25
Forage sorghum-Conv.	16	10-12?	----
Forage Sorghum-BMR	16	8-10?	----
Hybrid pearl millet	70-90	8	15


Conventional 3-way S*S
Vs.
Late Maturing S*S
60 days to first boot
80-85 days to first boot
Brown seed
Red seed
Purple plant color
Tan plant color


Sweeter 'N Honey
Vs.
Sweeter 'N Honey II
60 days to first boot
80-85 days to first boot
Brown seed
Red seed
Purple plant color
Tan plant color

Photoperiod Sensitive Forage

- Remain in vegetative state until daylight drops below a certain amount (12 h, 20 min)
  - Planting date doesn't matter, May 1 or July 15, will head about the same time
- Then enters reproductive phase (heads ~4 weeks later)
- Puts producer in control—if you hit rainy weather, it will not head out on you (but forage quality typically is lower for PS)

Photoperiod Sensitive Forage

- Forage yield potential is higher due to long-season growth
- Whereas conventional forages head out PS materials add more leaves
- Otherwise, management is same as conventional varieties
- Overall, test suggest the extra high tonnage has lower forage quality.

Combo Hybrids

- **Photo Sensitive**
- **Brown Midrib**
- **Multi-purpose**
  - Grazing
  - Hay
  - Silage
  - Green chop

General Fertility

- Soil testing is highly recommended
- Approximate nutrients removed per 1 ton of dry matter per acre--
  - Nitrogen (N) 32 lbs.
  - Phosphate (P) 6 lbs.
  - Potash (K) 24 lbs.
  - Similar to 1,600 lbs./A grain sorghum crop

Fertility-Nitrogen

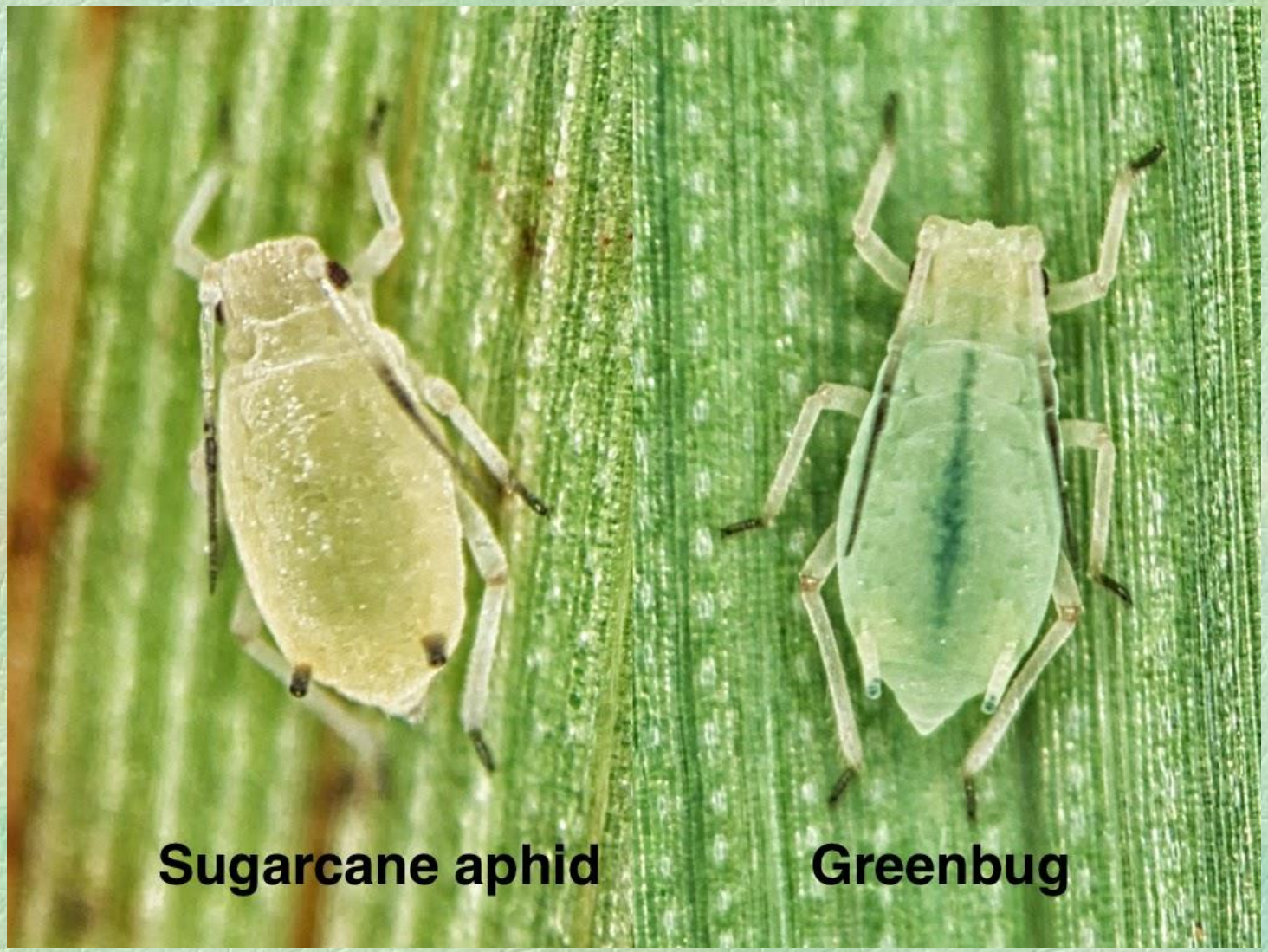
- Forage nutrient requirements similar to grain sorghum
- In the absence of a soil test, anticipate 7 to 10 lbs./A actual N per ton of 70% moisture forage produced. Split applications are suggested (dryland, apply all at once)
- Each cutting may require 30-50 lbs./A

Fertility-P and K

- Base P, K, and other nutrients on soil test recommendations; in particular, for best results, P should be incorporated
- K is high in most Texas South Plains soils whereas P may be tied up by high pH
- If no soil tests are available, fertilize similarly to prior crop applications

SORGHUM: THE SMART CHOICE®

Sugarcane aphid: A new pest in Texas sorghum family crops beginning in 2014.



KSU Scouting Card

Source: USCP

Grain Sorghum & the 500-lb.Gorilla…

Previous Slide

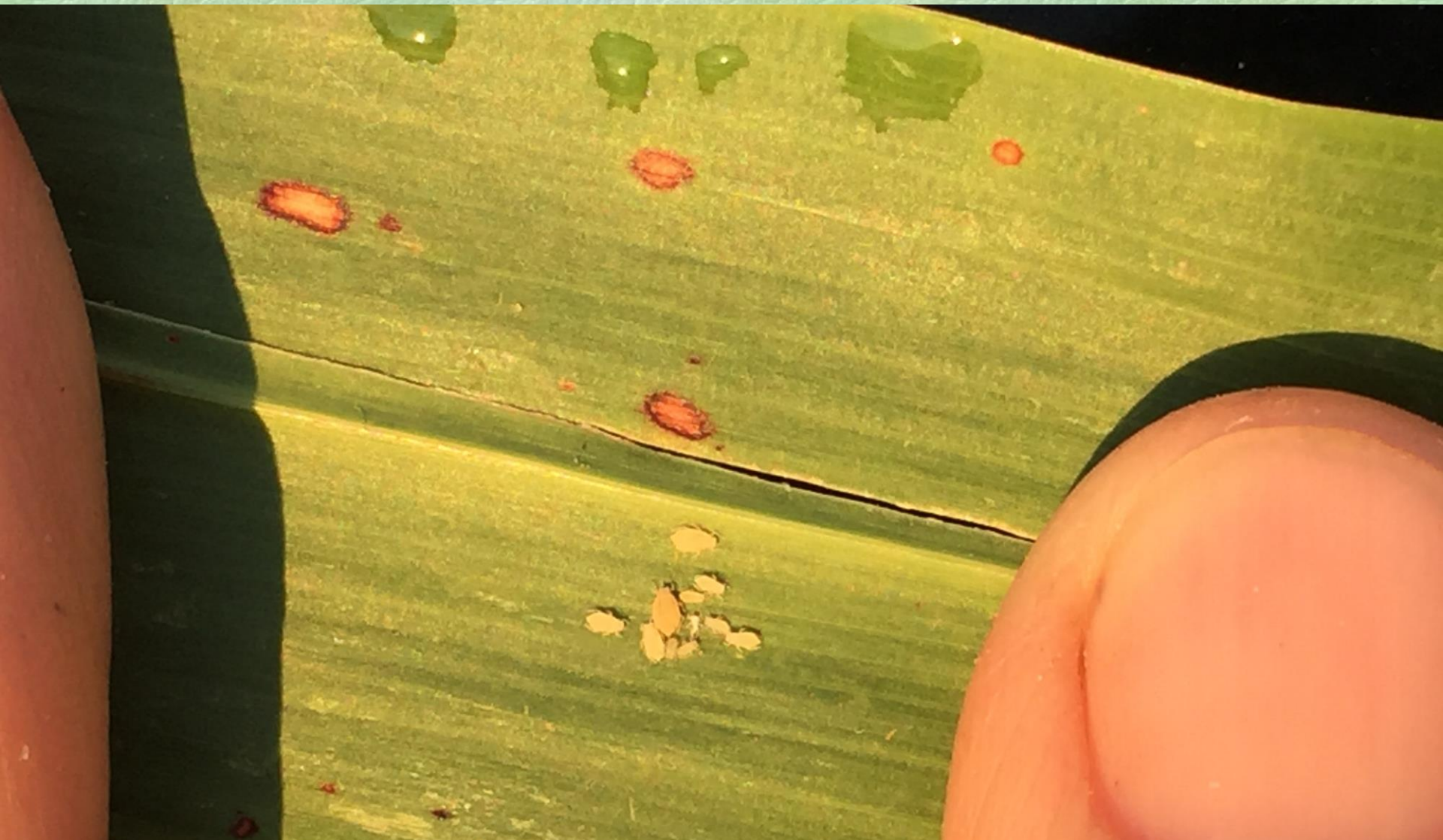
- Upper left: sugarcane aphid colonies on grain sorghum;
- Right: grain sorghum that is all but dead due to sugarcane aphid feeding (leaves brown, poor head emergence, little seed set);
- Lower Left: the natural predators on sugarcane aphid—adult lady beetles (lady beetle larvae consume even more SCA per day; also green lacewings and syrphid flies are common predators on SCA).

Sugarcane Aphid—A Quick Review

- This insect became a major pest of Texas sorghums in 2014
- The insect can reproduce exceptionally fast
  - When an adult gives birth, the newborn aphid is already pregnant
  - This newborn, under favorable (warm) conditions can then itself give birth in as little as five days
  - "This is the first insect I have ever worked with that can go from 'barely there' and seven days later is "Oh my god!" --Dr. Angus Cachet, Mississippi State Univ.

Honeydew tastes good!

The first SCA in Scurry Co., June 26, 2017



Forthcoming new AgriLife Extension website for insects, http://extensionentomology.tamu.edu

- Below is the legacy page…

Sorghum - Extension Entomolog

https://www.texasinsects.org/sorghum.html

AGRILIFE EXTENSION

Sorghum Insects

Publications

Managing Insect and Mite Pests of Texas Sorghum (new
includes biology, scouting and control for every sorghu

Field Guide to Pests and Beneficials in Texas Grain Sorg
beneficial insects easy.

Sugarcane Aphid

Texas Sugarcane Aphid News (primary place for new developments and control information)

Recognizing the sugarcane aphid

Fact sheets, seminars, other information

Revised Threshold for Texas High Plains

Grain Sorghum Action Threshold

Growth Stage	Decision threshold specific to the sugarcane aphid
Pre-Boot	20% of plants with presence of aphids
Boot	20% of plants infested with 50 aphids per leaf
Flowering Milk	30% of plants infested with 50 aphids per leaf
Soft Dough	30% of plants infested and localized areas with heavy honeydew and established colonies
Dough	30% of plants infested and localized areas with heavy honeydew and established colonies
Black Layer	Heavy honeydew and established aphid colonies. Only treat to prevent harvest problems. Observe Preharvest Intervals

This threshold was revised from a threshold originally from Mississippi State University.

Control Measures

- Scout once a week until SCA is found
- Then scout at least every five days
- Have your arrangement for how you will spray in advance (and locate where insecticide will be)
- Ground rig is preferable, minimum 15 gal/A, with high pressure especially if you have a closed canopy
- Airplane?—don’t like it, especially if canopy is closed; minimum 5 gal/A (even if you have to pay extra)

Keys for Managing Sugarcane Aphid

- Early planting (mid to late April Lubbock & south; early May in NW South Plains) to reduce potential exposure to SCA
  - Ensure soil temps are sufficient—average 60ºF at 2” depth for five days
- Insecticide seed treatment (control/suppression)
  - Several products
  - Control to at least 30 days
  - Suppression for another ~15 days
  - Low cost ($2/A for dryland)
  - More important for later plantings

Keys for Managing Sugarcane Aphid

- Tolerant hybrid (how to know if the level of tolerance is substantial?)
- Timely spray based on threshold
  - "A good first shot can eliminate the need for a second spray" (Kerry Siders, Texas A&M AgriLife IPM agent)
  - Sivanto Prime (and two other formulations)
  - Transform (awaiting annual exemption approval?)
  - Safina from BASF on the market in 2020
- Preserve beneficials (mix Lorsban?—No!)
- Spray again if needed

Sources of Label Information

& AgriLife Extension Weed Scientists

- Labels for herbicides, insecticides, fungicides, seed treatments, growth regulators, etc.—access through http://www.cdms.net, click 'Label Database' then 'Search' then conduct either of two searches:
  - **A)** Enter product name then choose the specific product then its label or supplemental label (most common use)
  - **B)** Click "Other Search Options" (register for a free password) to search by active ingredient (looking for a generic?), find a class of chemicals (herbicides, fungicides, insecticides) labeled for a particular crop, etc.
- Texas High Plains—Dr. Pete Dotray, Lubbock, (806) 746-6101, pdotray@ag.tamu.edu
- Central & Texas—Dr. Scott Nolte, College Station, (979) 845-4880, scott.nolte@ag.tamu.edu
- South Texas—Dr. Josh McGinty, Corpus Christi, (361) 265-9203, joshua.mcginty@ag.tamu.edu

SCA Tolerant Sorghum/Sudans

- Sorghum/sudans—Lubbock (initial testing 2018)
  - Richardson Seeds: *Sweeter-N-Honey II
  - Warner Seeds: Grow-N-Graze Defender
- Other Sorghum/sudan testing—AgriLife Dallas & Univ. of Georgia (2017)
  - Richardson Seeds: *Sweeter-N-Honey II
  - Gayland Ward Seed: Super Sugar DM

*This only applies to "II" and not other original or BMR hybrid versions of Sweeter-N-Honey

- Forage sorghums? Bushland AgriLife trials (Dr. Jourdan Bell, jourdan.bell@ag.tamu.edu)
- Also, hybrid pearl millet is considered a poor host of SCA, 0.7-3.0% of SCA in adjacent sorghums (2016)

Summer Annual Forages… Bottom Line #1

- How you manage your forage—timely grazing or timely haying—to meet your goals is probably more important than which hybrid you choose.

- This is closely related to growth stage.

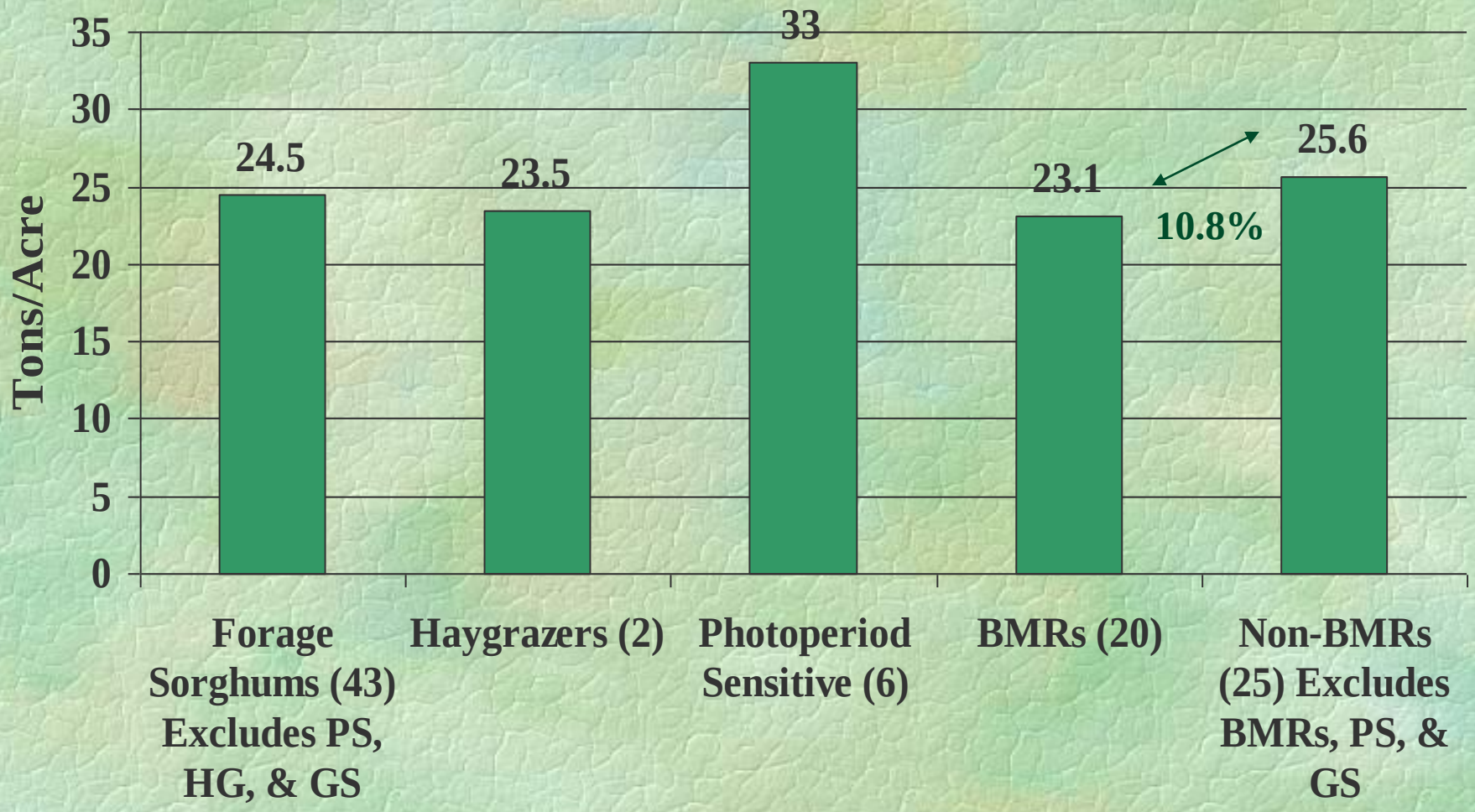
Summer Annual Forages… Bottom Line #2

- Sugarcane aphid is new and can be a problem, but don't let it alter your forage program.
- If they do develop in sorghum/sudan where spraying might be futile due to canopy then A1) pour the cattle in to graze it down, or A2) cut for hay immediately, then B) you can control the aphids in the regrowth with a spray by 12" tall
  - *If you are concerned about SCA then grow hybrid pearl millet, which is a poor host of SCA (inquire with AgriLife Extension for production resources)*

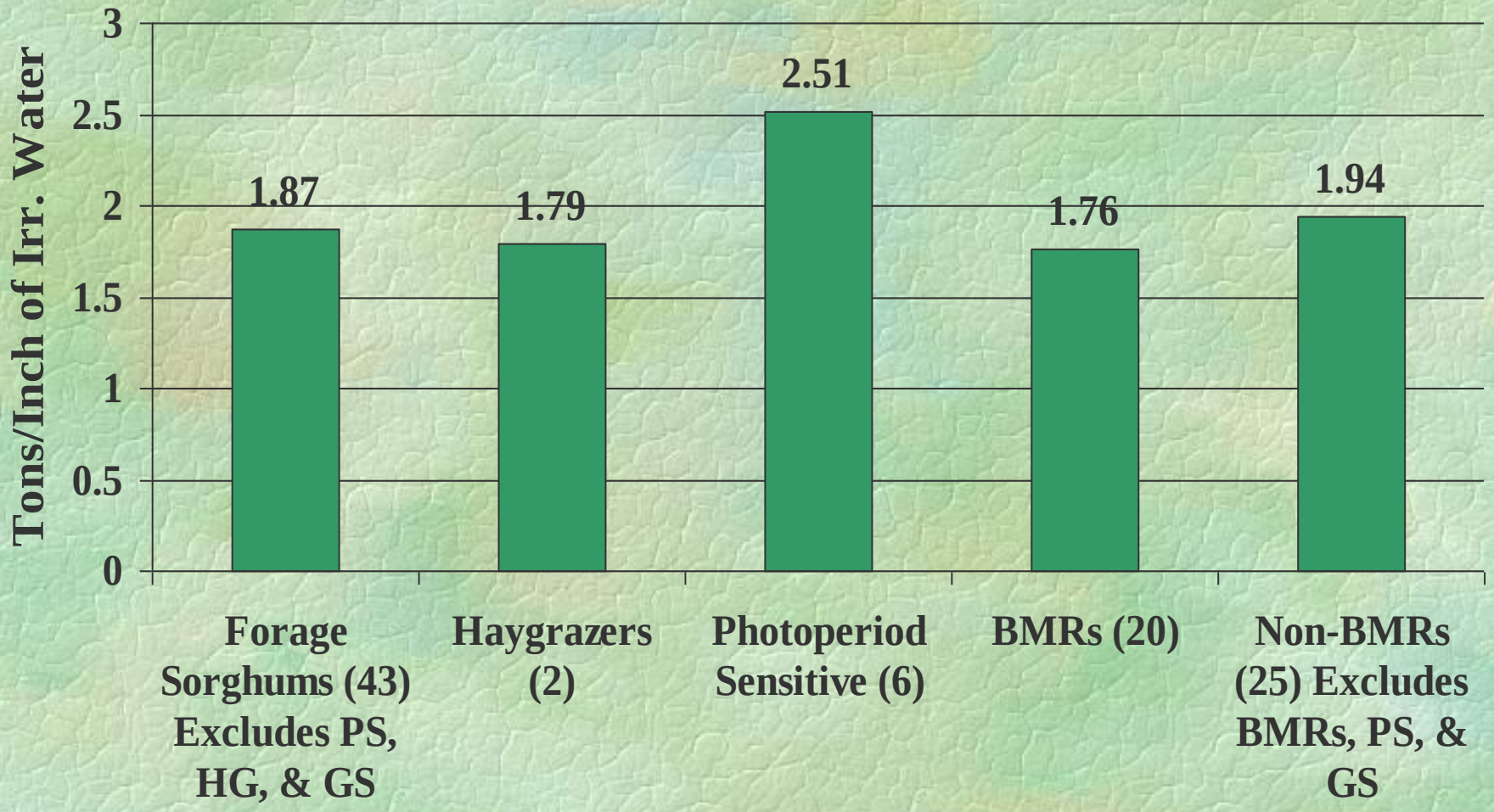
A&M Forage Sorghum Comparisons

The following data are examples that generally compare forage quality parameters for conventional and BMR sorghum/sudan forages (2001; data repeated many years since with similar results).

2001 Irrig. Sorghum Silage Yields



2001 Irrigated Sorghum Silage
Tons Produced per Inch of Irrigation

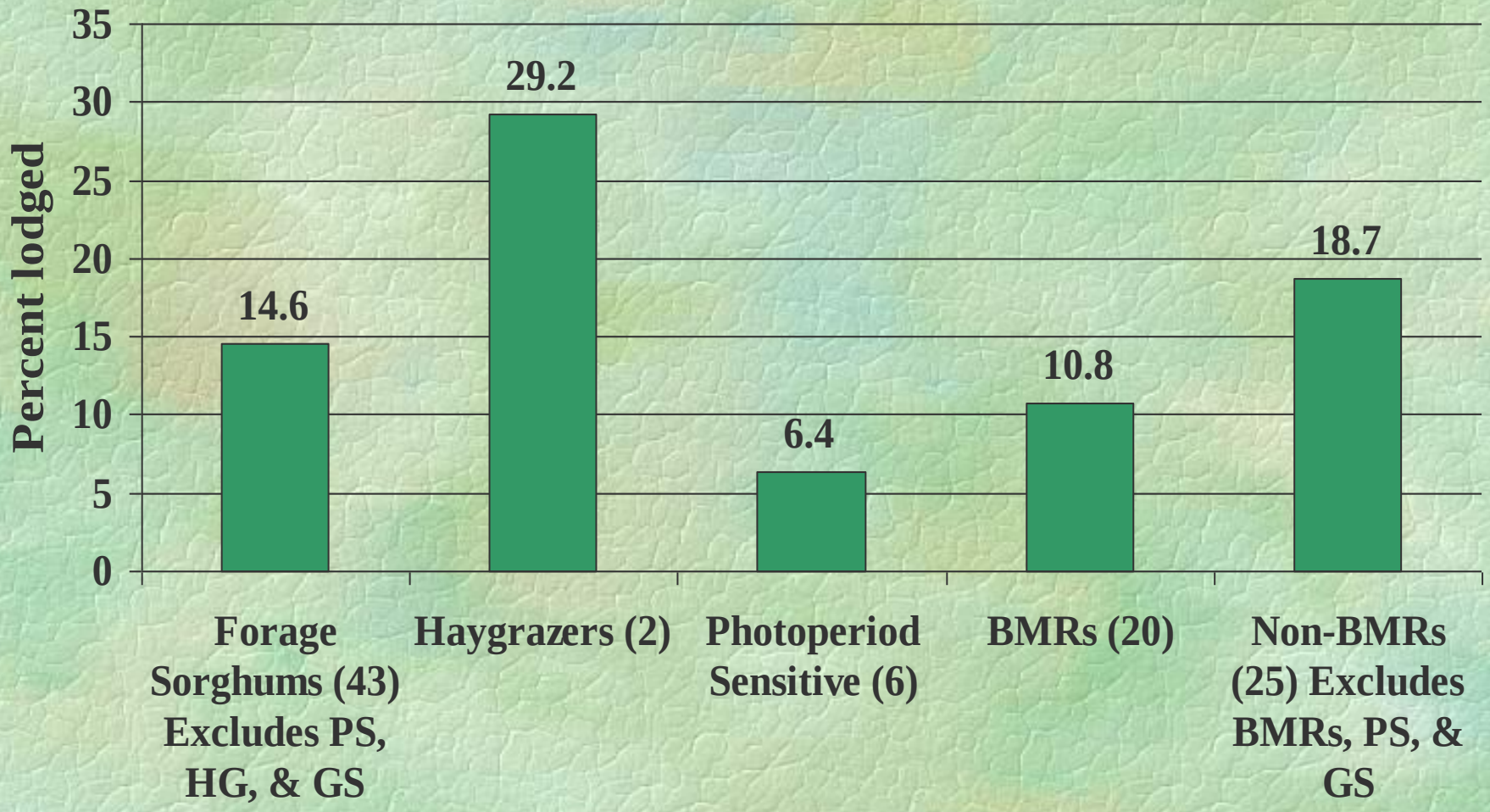


Bushland, TX, 2001

Non-brown midrib and brown midrib sorghums and sorghum X sudan hybrids harvested for silage

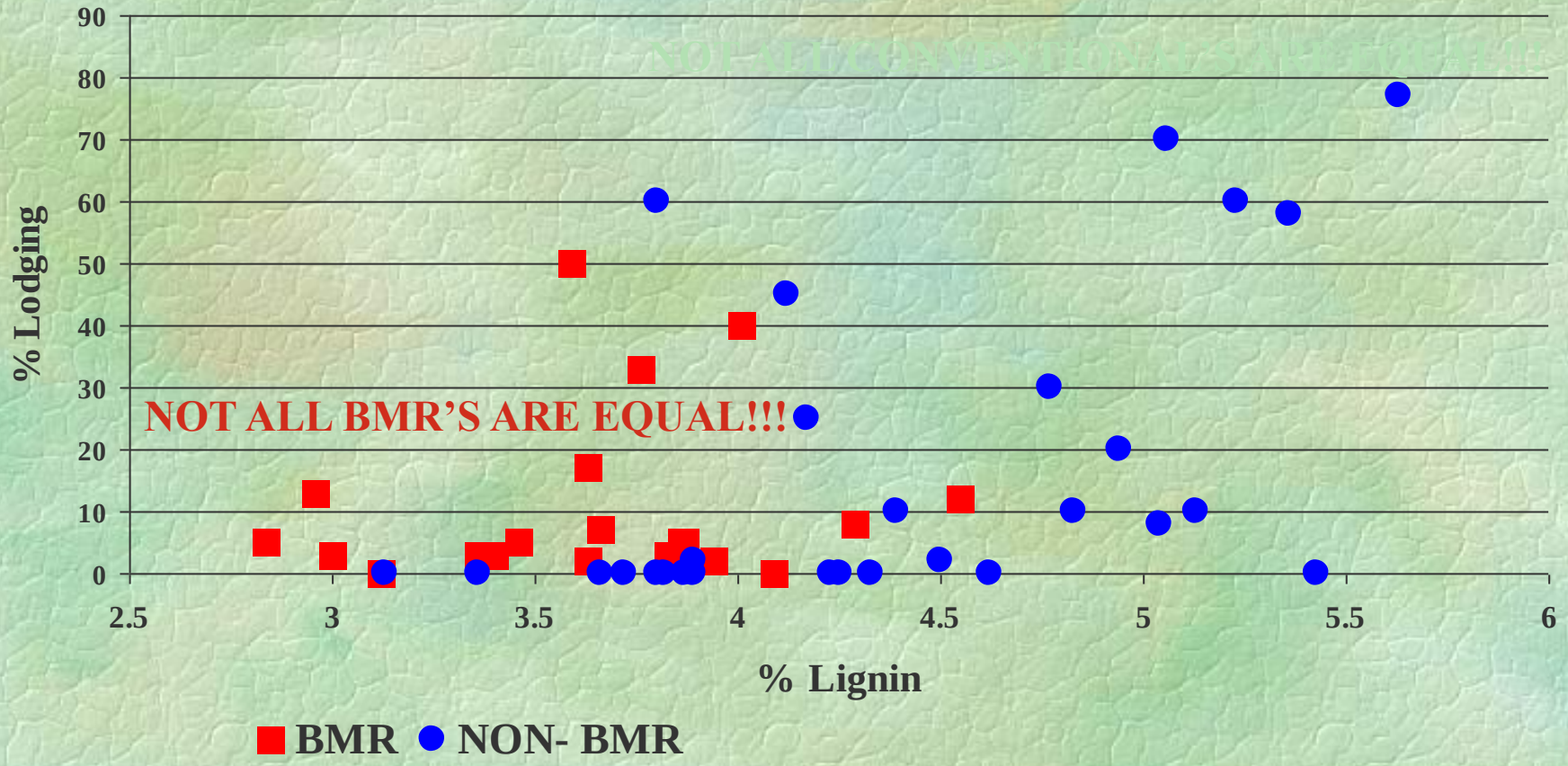
Character	Non-BMR	BMR	P
Crude protein, %	8.3	9.2	0.0001
NDF, %	49.1	45.9	0.01
ADF, %	29.9	27.6	0.02
Lignin, %	4.4	3.6	0.0001
In vitro true digestibility, %	75.5	81.3	0.0001

2001 Irrigated Sorghum Silage
% Lodging at Harvest



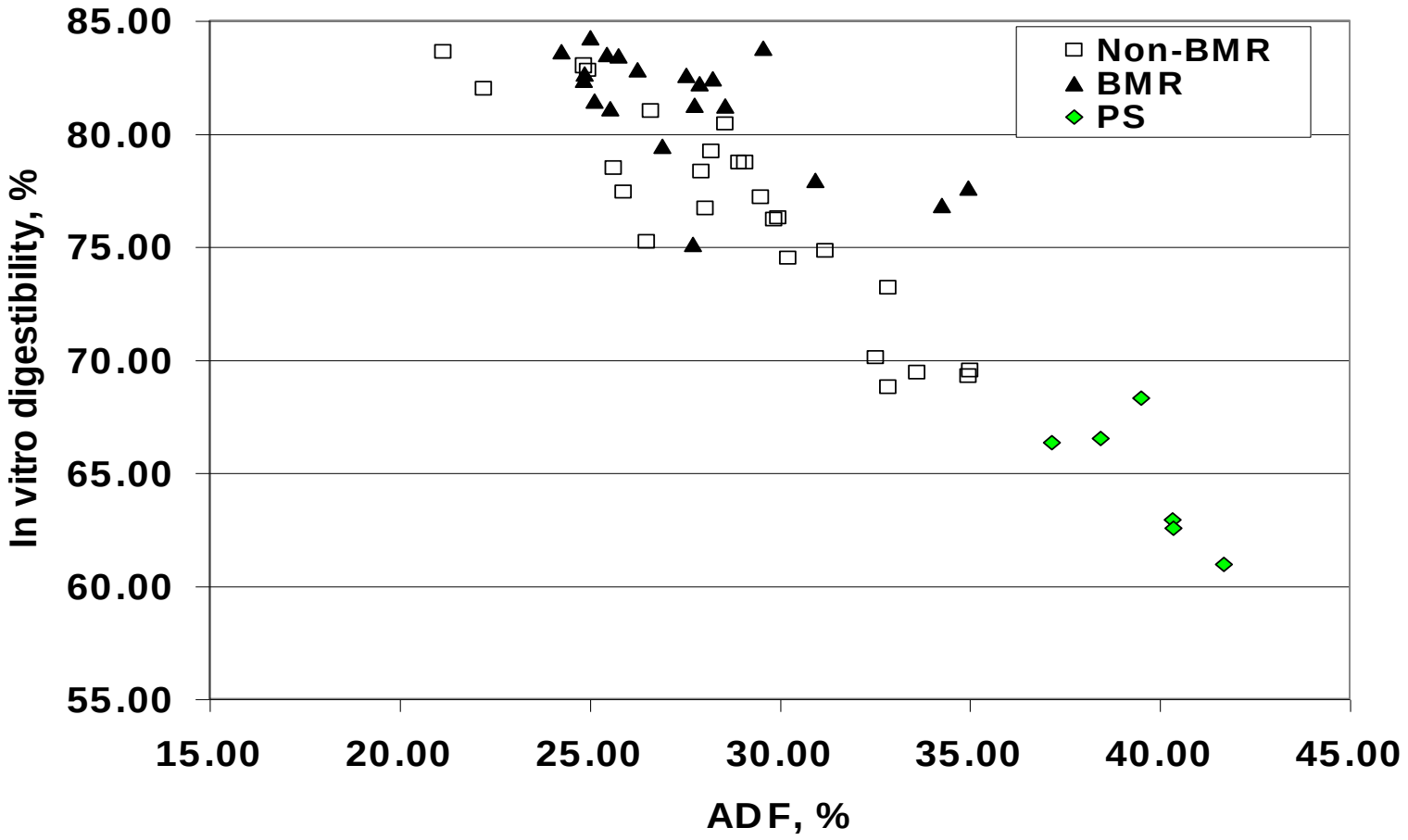
Comparison of %Lodging vs. %Lignin among BMR and Conventional Forage Sorghums

Bushland, 2001



Courtesy of TAMU Research Center, Bushland, TX

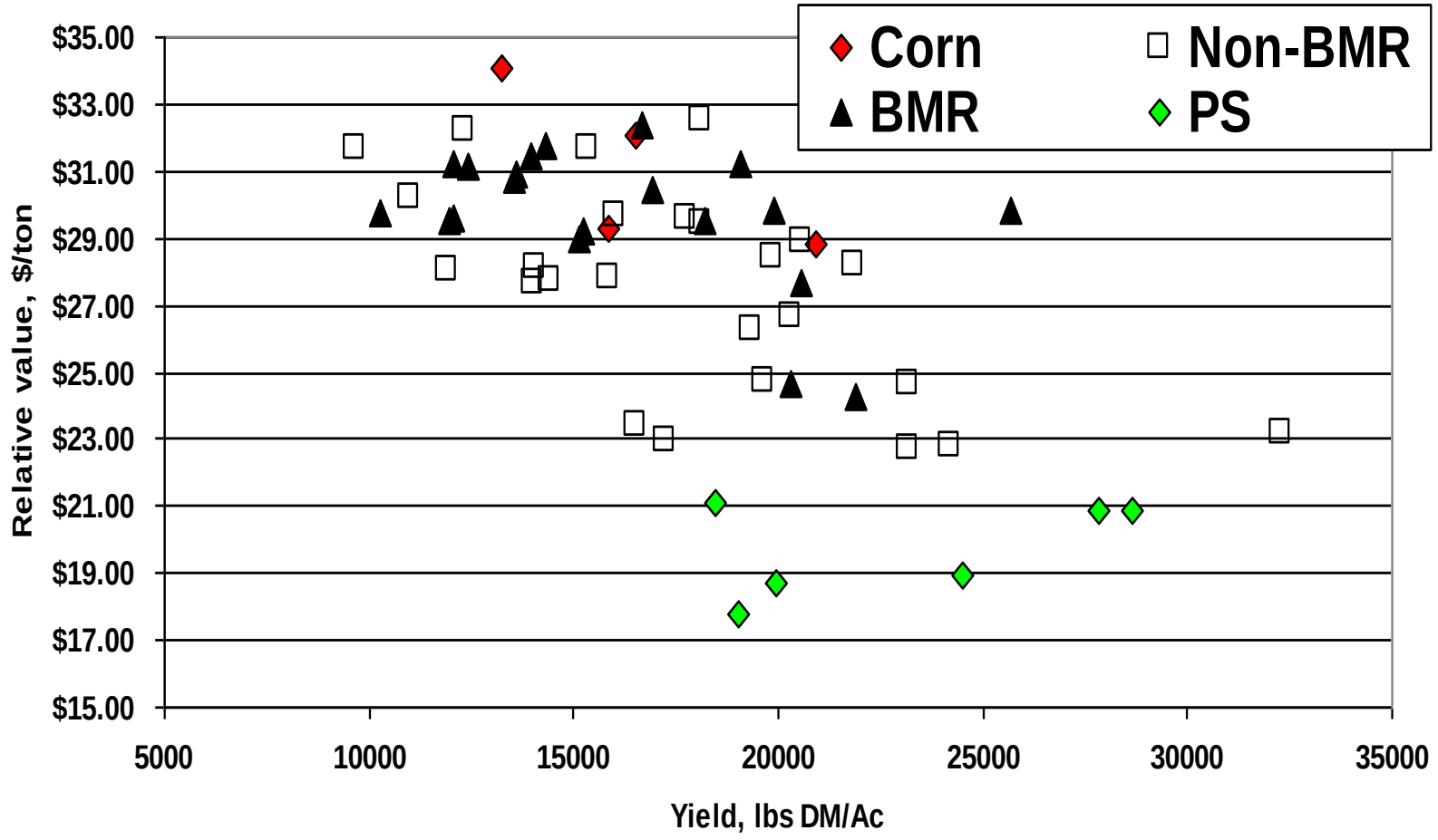
ADF and In vitro digestibility distributions for non-brown midrib, brown midrib, and photoperiod sensitive sorghum hybrids harvested for silage (2001)



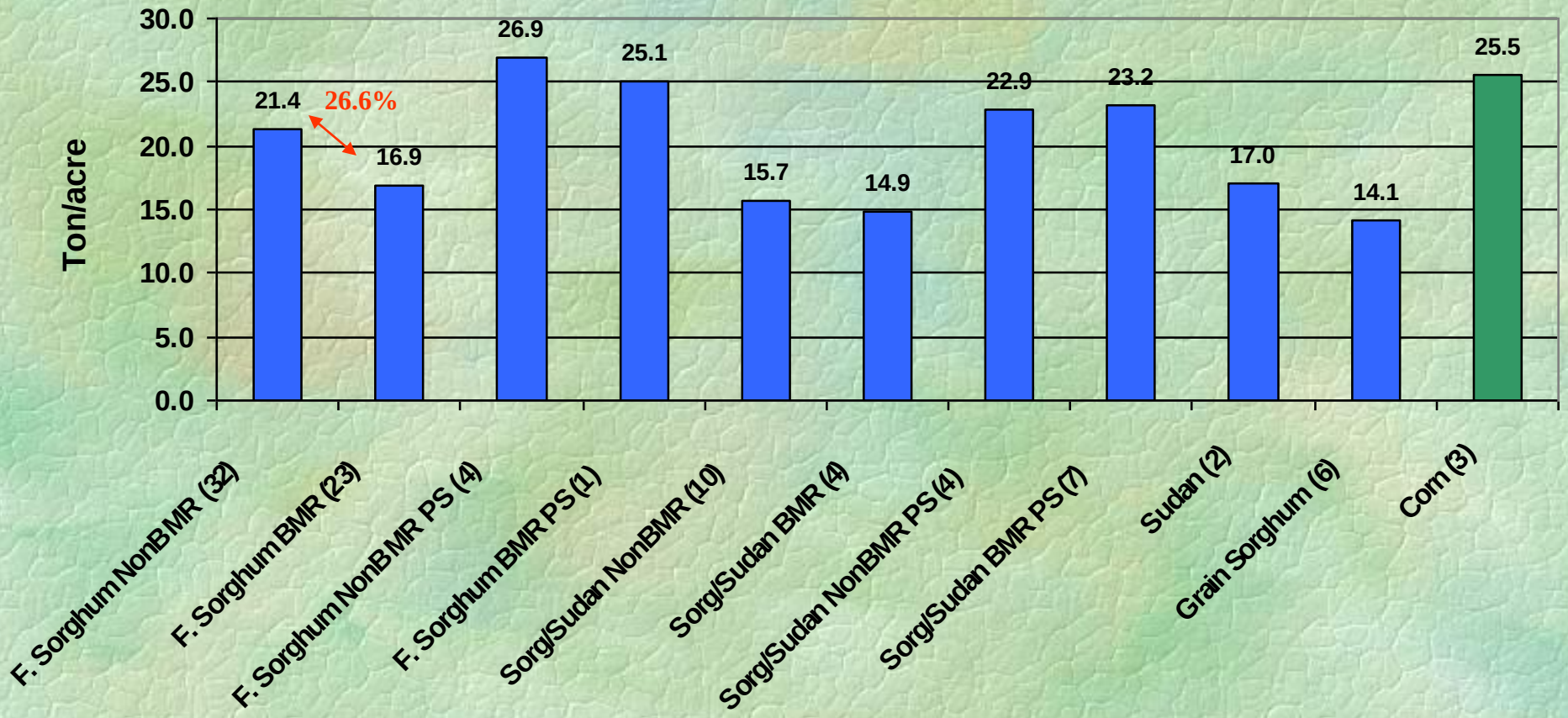
Nutrient analyses – 2001 Bushland

Type	CP, %	ADF, %	NDF, %	Lignin, %	IVTD, %
Corn	9.0	23.9	41.2	3.5	82.7
Range	8.4 to 9.7	18.2 to 27.4	33.7 to 45.8	2.7 to 4.2	78.3 to 88.1
BMR	9.2	27.6	45.9	3.6	81.3
Range	6.9 to 10.5	24.3 to 35.0	40.7 to 60.1	2.8 to 4.5	75.1 to 84.2
Non-BMR	8.3	29.9	49.1	4.4	75.5
Range	6.3 to 10.8	21.3 to 41.7	33.9 to 67.5	2.7 to 6.4	60.9 to 83.6

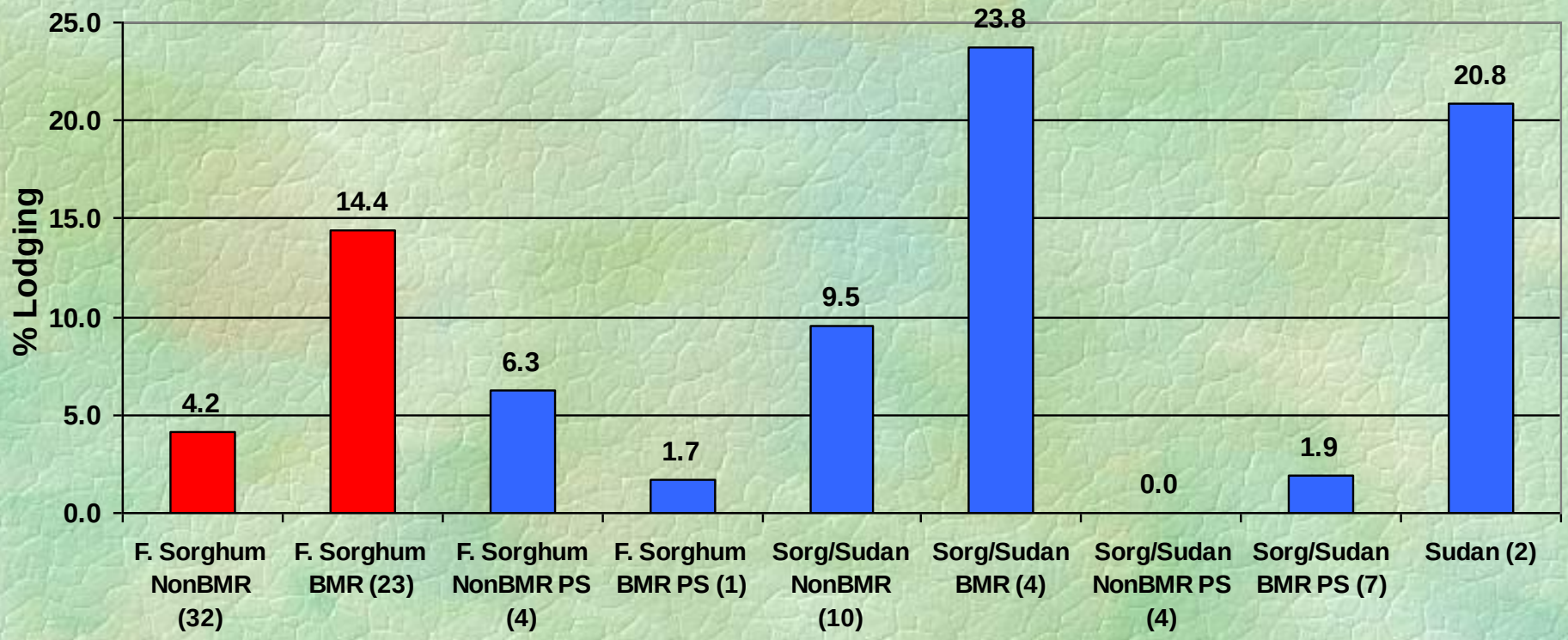
Yield and relative value distributions for non-brown midrib, brown midrib, and photoperiod sensitive sorghum hybrids harvested for silage (2001)



Comparison of Sorghum Types for Silage Yield -- 2003

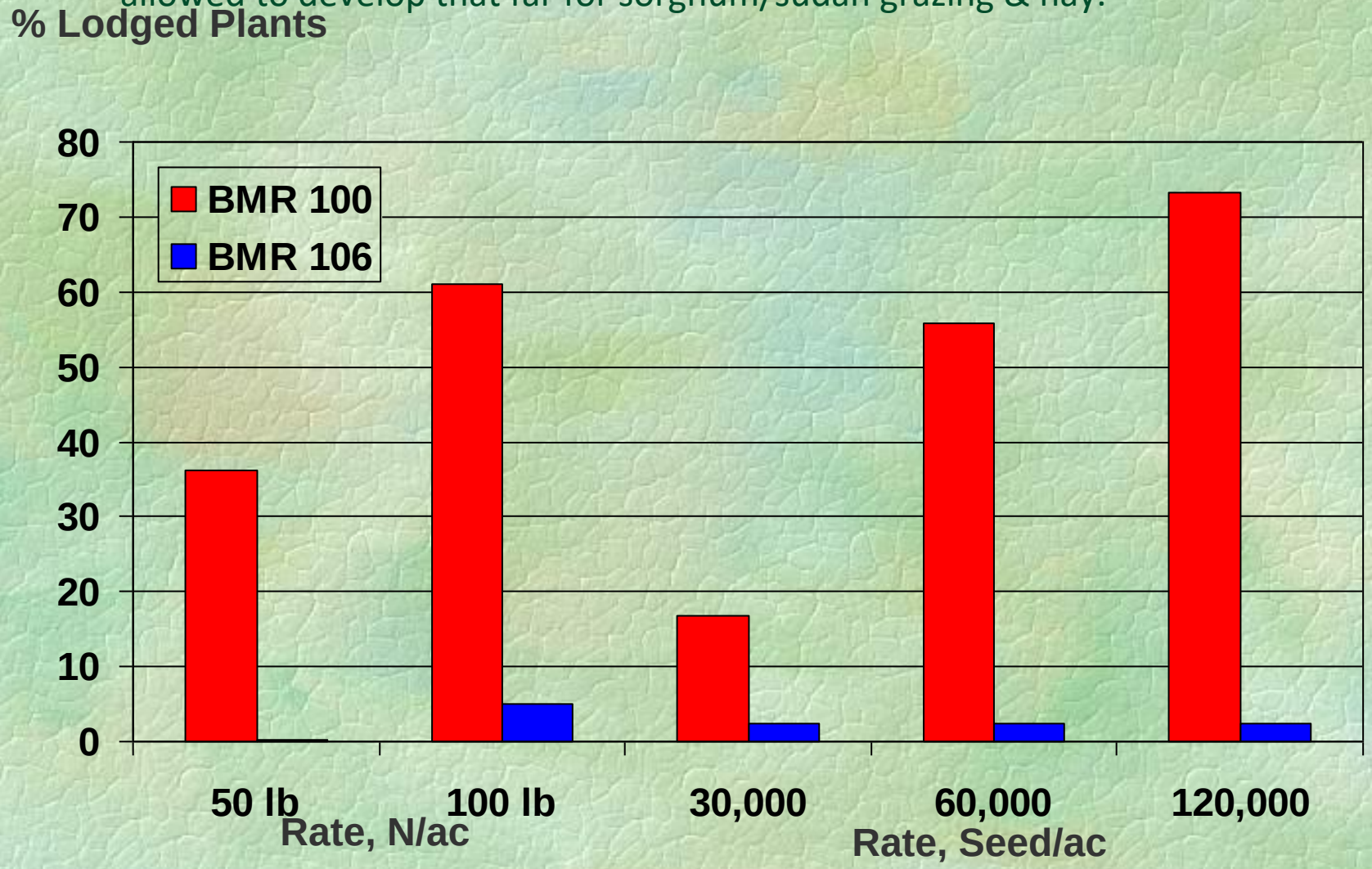


% Lodging by Sorghum Type 2003

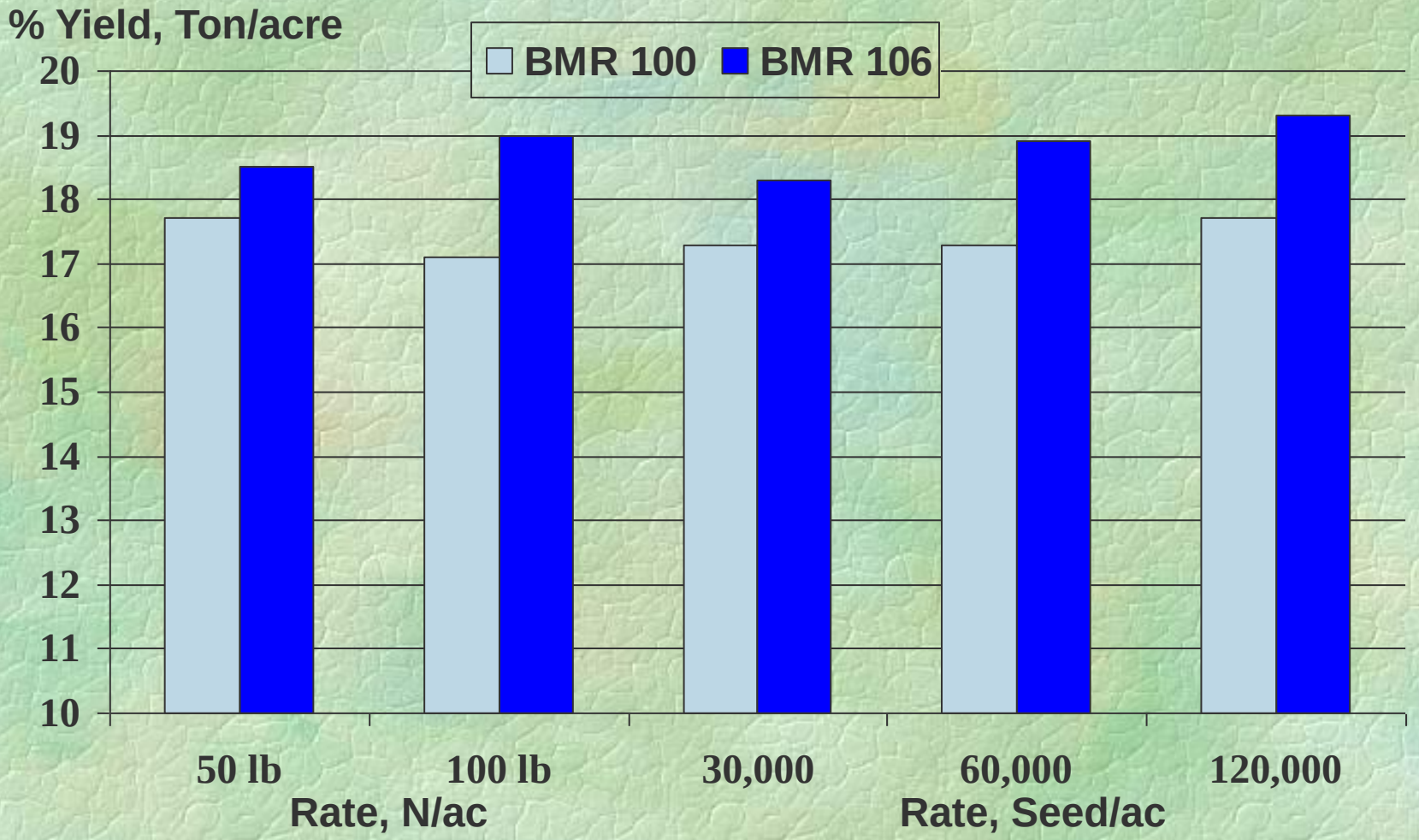


Hybrid, N, and Seeding Rate Effect on Lodging of F. Sorghum – 2003

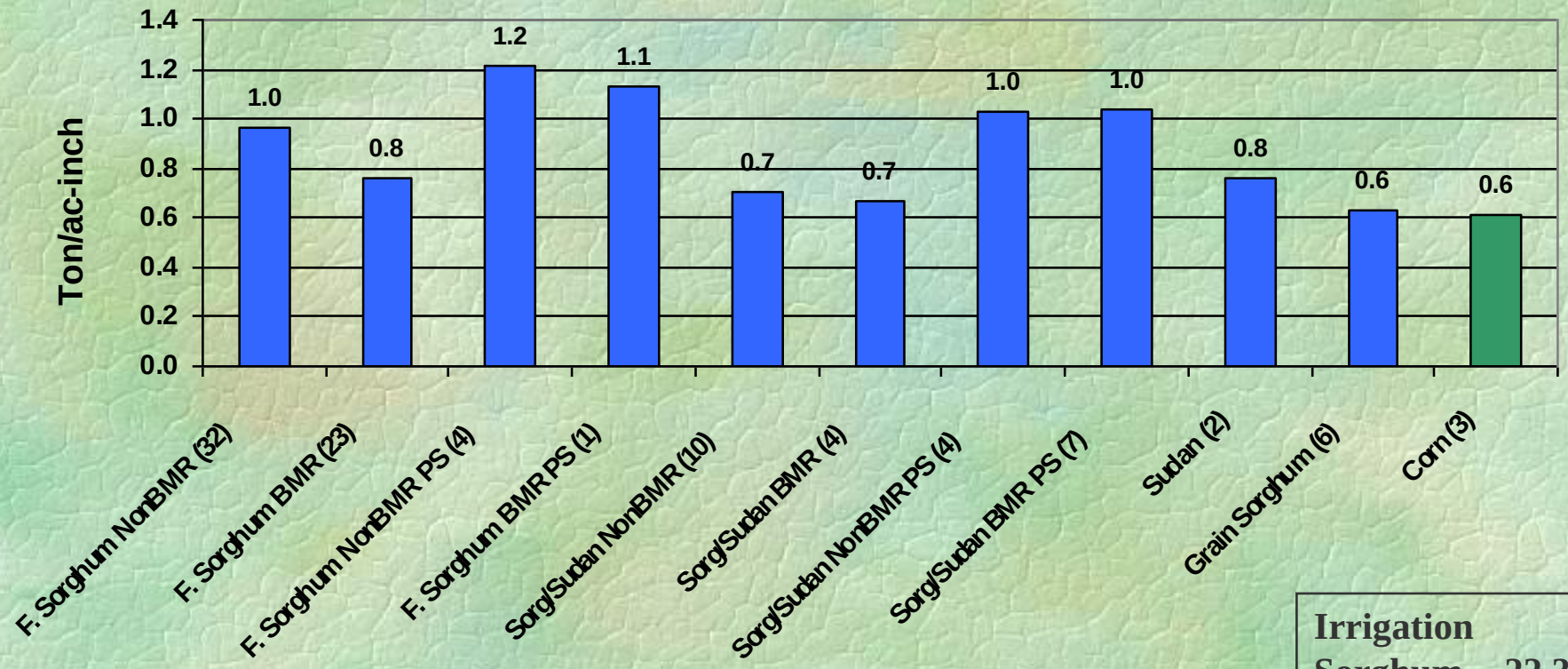
High lodging BMRs were removed from the market—In the 2020s lodging is not a common issue unless the forage is headed (top-heavy), which it should never be allowed to develop that far for sorghum/sudan grazing & hay.



Hybrid, N, and Seeding Rate Effect on Yield of F. Sorghum - 2003



2003 Irrigated Sorghum Silage Tons Produced per Inch of Irr.

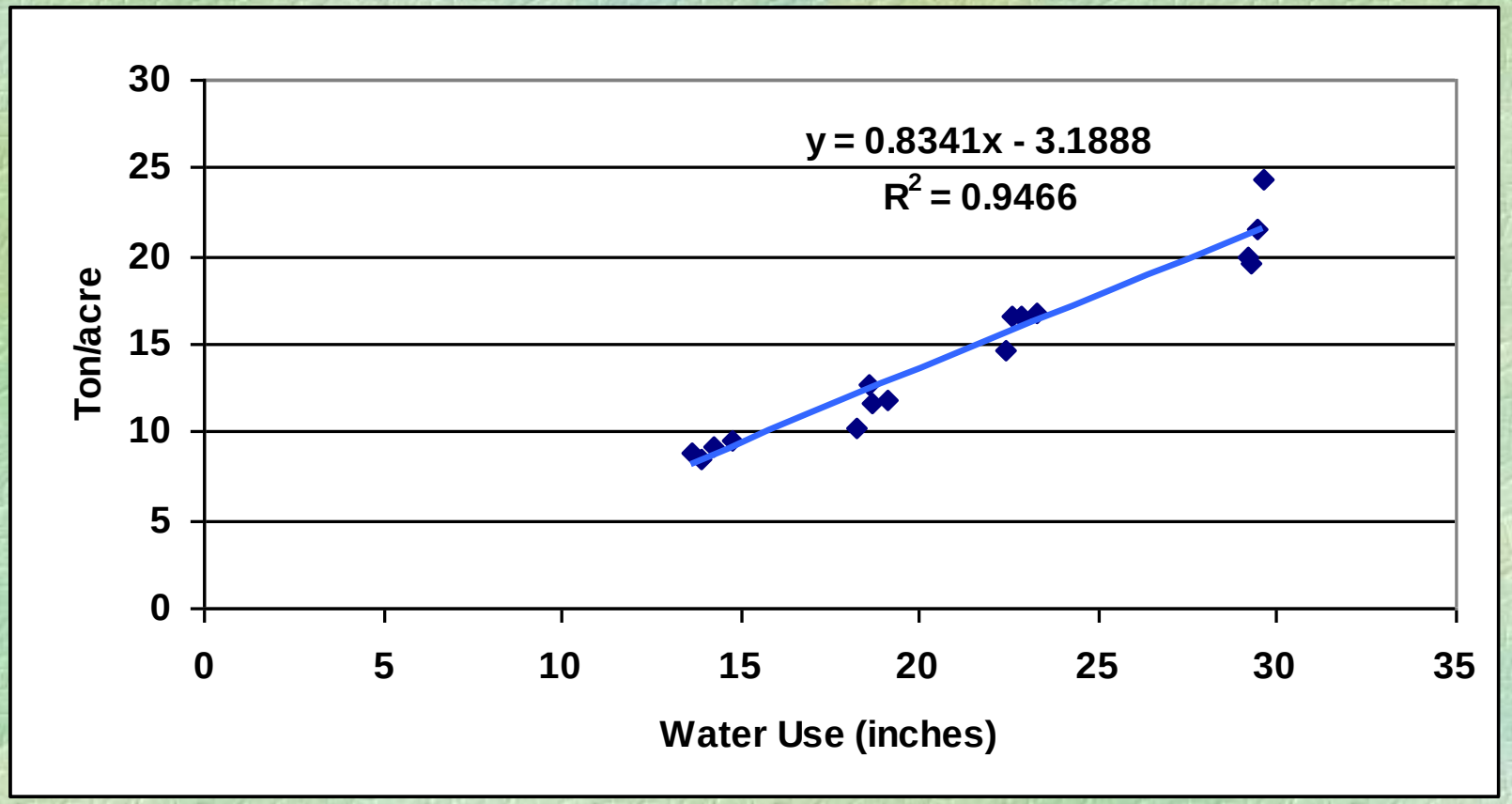


Irrigation Sorghum - 22.3 in.
Corn - 37.7 in.

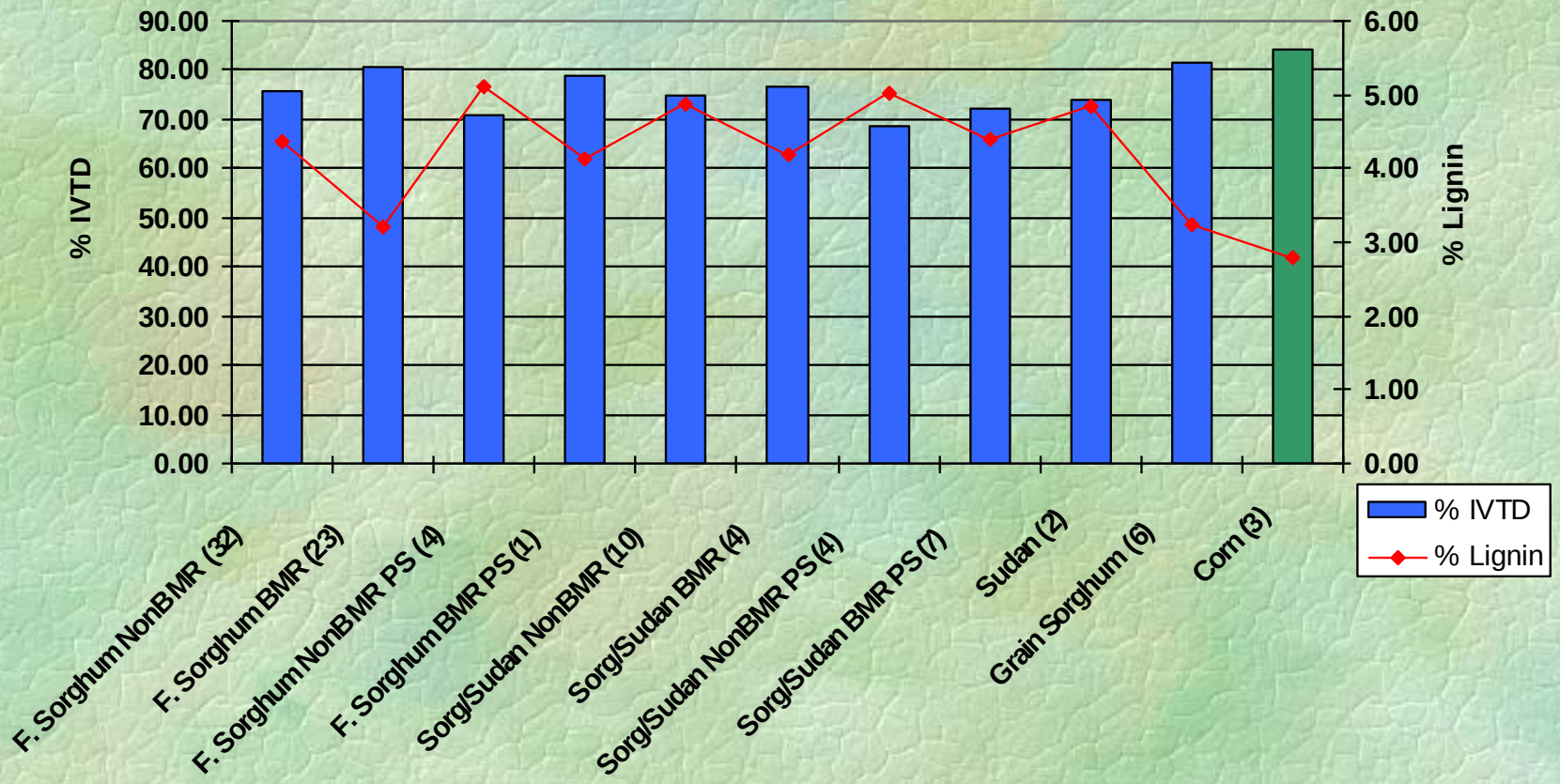
Response of Forage Sorghum Hybrids to Irrigation Amount

- Study
  - Four Hybrids
    - Two BMR F. Sorghums
    - One Non BMR F. Sorghum
    - One PS BMR F. Sorghum
  - Irrigation Levels
    - Dryland
    - 4 inches
    - 8 inches
    - 16 inches

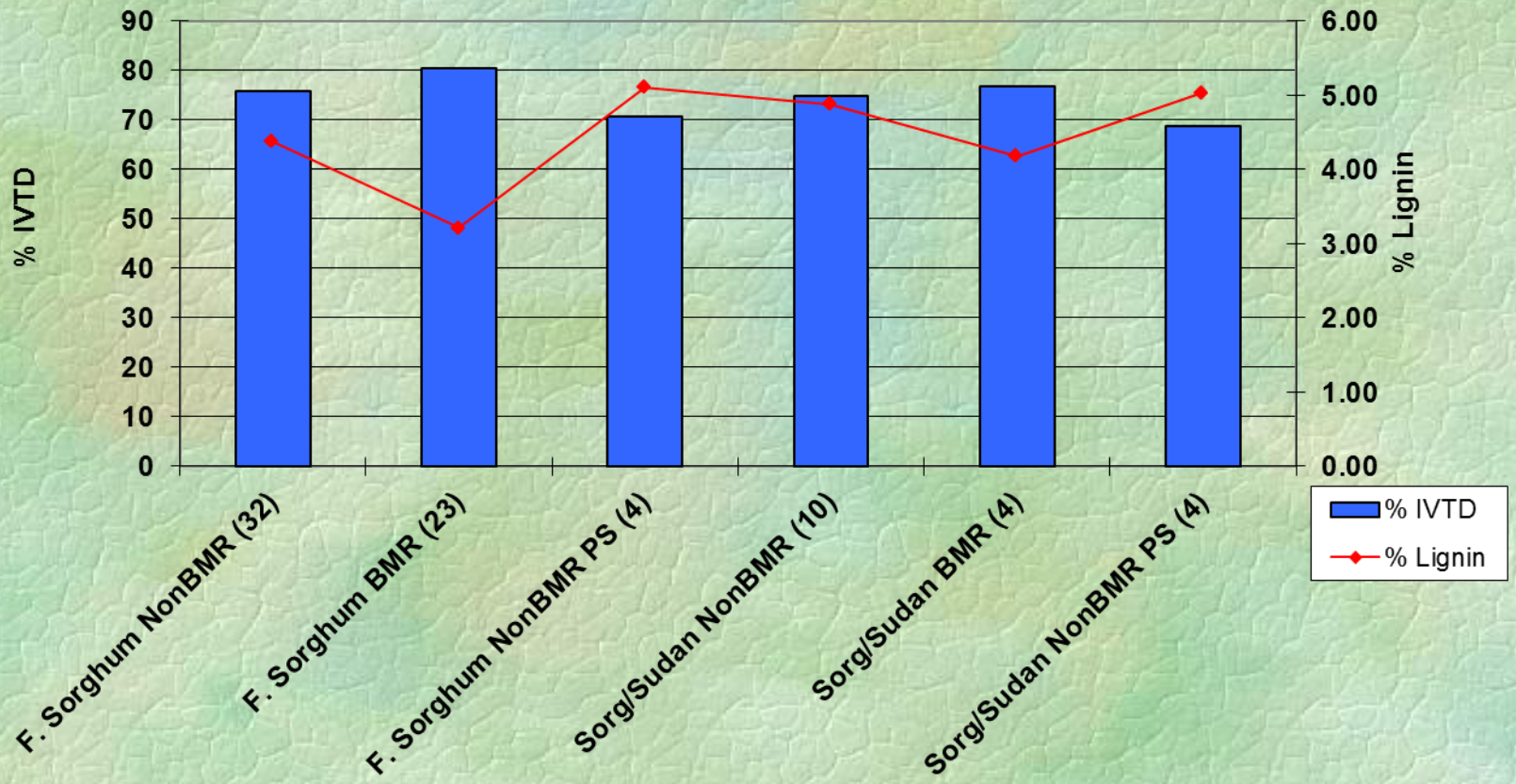
Forage Sorghum Yield per Acre-Inch of Water



Comparison of Sorghum Types for % IVTD and % Lignin -- 2003



Comparison of Sorghum Types for % IVTD and % Lignin -- 2003



Significance of the BMR Sorghum

Reduces the lignin content of the whole plant by 33 to 60%.

Increases digestibility by 15 to 30%.

Increases palatability of the forage

Decreases by-pass Nitrogen

Bushland, TX, 2000

Non-brown midrib and brown midrib sorghums and sorghum X sudan hybrids harvested for silage

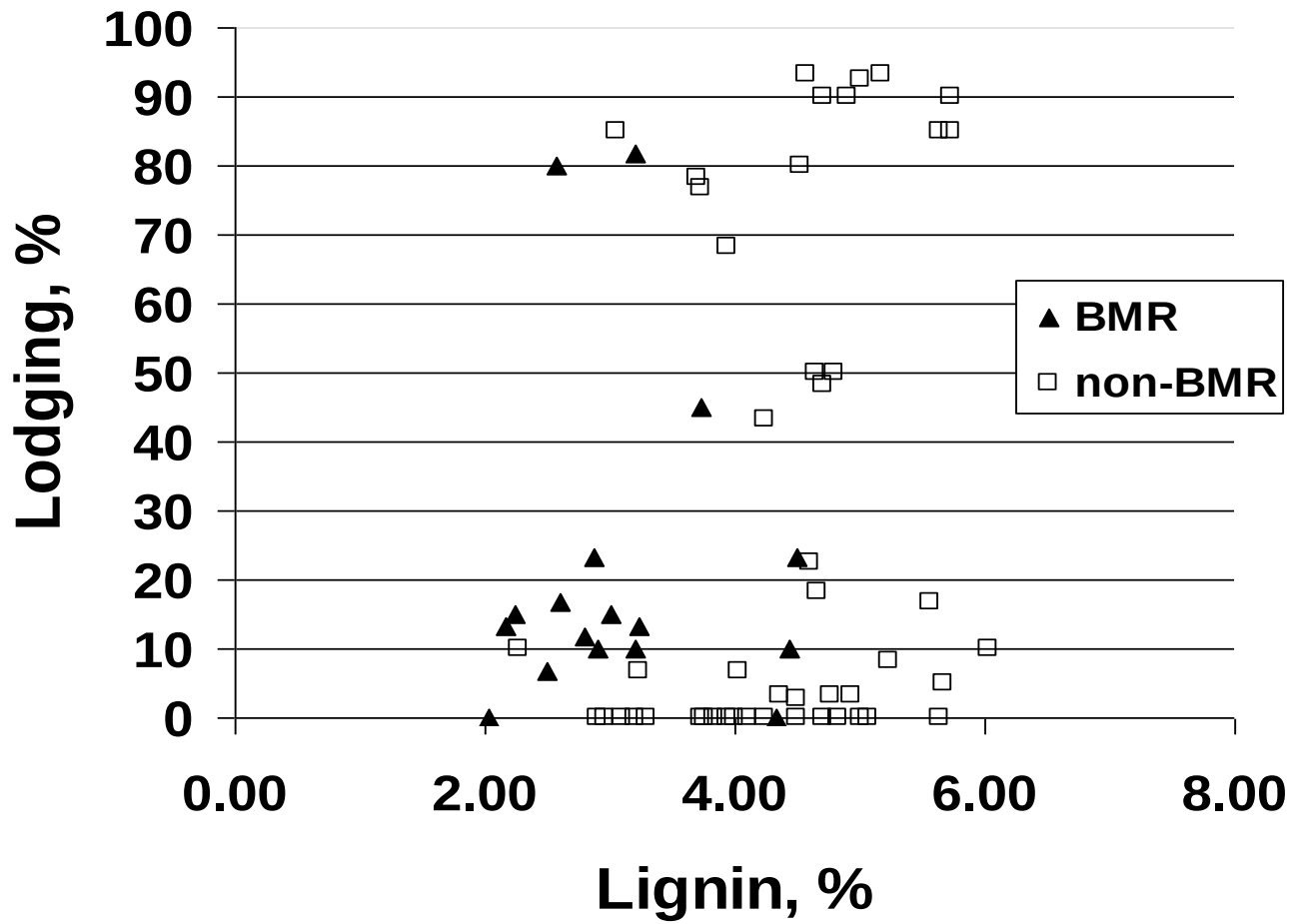
Character	Non-BMR	BMR	P
Varieties	48	17	-
Yield, lbs DM/ac	16702	16306	0.588
Lodging, %	29.4	21.9	0.196

Bushland, TX, 2000

Non-brown midrib and brown midrib sorghums and sorghum X sudan hybrids harvested for silage

Character	Non-BMR	BMR	P
Crude protein, %	6.7	7.2	0.019
NDF, %	48.1	44.8	0.013
ADF, %	28.4	26.1	0.009
Lignin, %	4.4	3.1	0.0001
In vitro true digestibility, %	75.4	81.7	0.0001

Lignin and lodging distributions for non-brown midrib and brown midrib sorghums and sorghum X sudan hybrids harvested for silage



- Harvest hay and silage at proper stage
- Depending on nutrient requirements of cattle – proper stage may vary
- Brown midrib mutants provide opportunity to produce higher quality grazing, hay and silage than with the normal lines
- *BUT*, overlap exists among normal and *bmr* varieties – the presence or absence of *bmr* mutation does not preordain quality and agronomic benefits or problems

Small Grains Forage

- Some general comments about wheat and other small grains and their general forage quality

Small Grains for Hay?

- Sell hay?
- Your buyer understand small grains forage quality?
- Do you—and your buyer—understand how forage quality changes with time?
- Don't waste high quality hay on animals that don't need it (cows), or expect stockers to gain 2+ lbs./day on headed wheat

Buying & Selling?

- If buying hay, have you ever asked if you can take a forage sample?
  - And what would you do if they said “No”?

- If selling hay, especially if high quality have you taken a sample for info. for prospective buyers, or encouraged them to take a sample themselves? (you might agree on which lab for analysis).

The “Trap” of Beardless Wheat (1)

- When I (Trostle) came to West Texas in 1999, I had never heard of ‘beardless wheat’ (I am from the Kansas, “The Wheat State,” and a Kansas State Univ. agronomy graduate)
- West Texas farmers and cattleman talked as if beardless wheat was superior small grains forage

The “Trap” of Beardless Wheat (2)

- My data for small grains forage clipping trials indicated beardless wheats had no more forage production (as a group) than did regular bearded wheats
- But you can graze or bale these beardless wheats longer than bearded wheat: little worry about the awns (‘beards’) causing a problem with animal health (getting stuck in their throat, etc.)
- Hence the ‘Trap’ of beardless wheat: *What is it?*

Lubbock Co. Oat Trial
One-time Hay Harvest, var. *Troy*

Growth Stage	Harvest Date	Dry Hay Lbs./A	% Crude Protein	Lbs. CP per acre
Early Boot	May 17	3,240	18.4	596
Init. Heading	May 24	4,510	16.3	735
Fully Headed	May 31	5,465	13.9	760
Milk	June 7	6,010	12.5	751
Mealy Ripe	June 14	6,420	11.5	738
Firm Dough	June 21	6,845	8.7	596

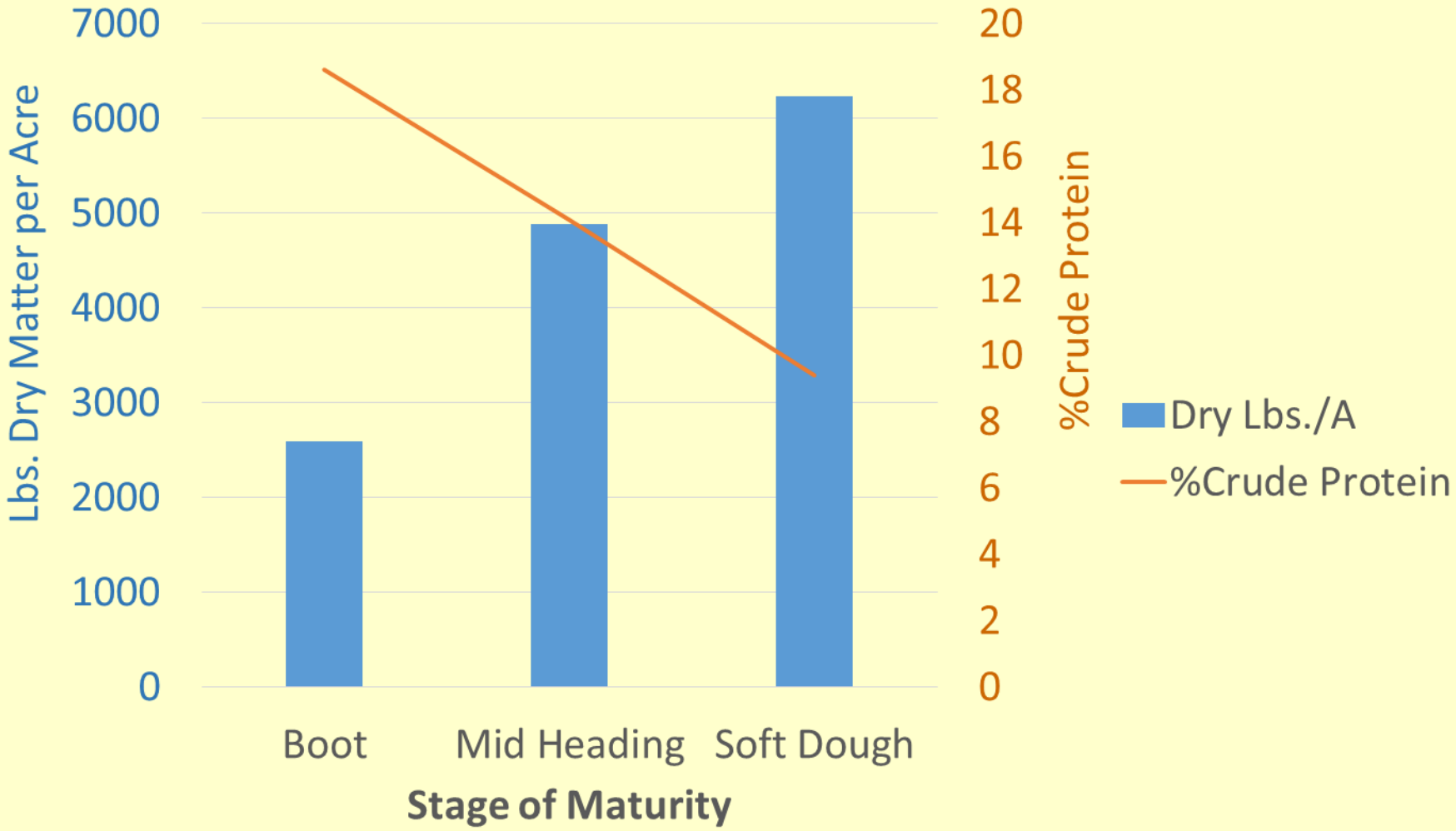
Troy oat was harvested for six Fridays in a row among extra plots. Yield was Taken for three plots at each date, individual each sample analyzed for crude protein. When you consider your tonnage and forage quality goals, and your use or your market, which scenario is best for you?

Wheat Hay—Castro Co.

Growth Stage	Dry lbs./A	%CP
Boot	2,590	18.6
Mid-heading	4,890	14.1
Soft Dough	6,230	9.4

Rick Auckerman, Texas A&M AgriLife Extension (currently Deaf Smith Co.)

Wheat Hay—Castro Co.




April 17, 2015: Curl mite vector of virus into wheat variety trial, Hale Co., TX