West Texas Alfalfa Production

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TEXAS A&M AGRILIFE EXTENSION

April 2023


Alfalfa Impressions: What do you see in this Dallam Co., TX, picture? Anything of concern?


Alfalfa Impressions: What do you see in this Dallam Co., TX, picture? Anything wrong?

Observations in West Texas

- Our best alfalfa producers don't have a large farm operation for other crops
- The understand quality, how to enhance/ensure it, and they make the time for sound, timely production practices
- Lots of water!

Long-time West Texas Problems

- Misunderstanding of:
  - Irrigation requirement
  - Spring planting vs. Fall planting
  - How to market and what the market is

Alfalfa & Irrigation Availability

- Gaines Co. region—what water will you be able to pump moving forward?
- Lea Co., 36” limit (can concentrate from corners)
- Cochran, Hockley, Lubbock, parts of Lynn Co.—15” by 2015 (can concentrate from corners)

Alfalfa Quality

- This is what will make or break large producers
- What is your goal? What is your market?
- $$$ Can you get compensated for quality?

Alfalfa Spring Fever

- Alfalfa calls in January/February are not a good sign
- **Spring planting** not recommended—
  - less developed roots and crowns
  - more water per unit of production
  - weed and insects are more severe
  - large reduction in first year yields, 50% or more

Sizing Alfalfa Fields to Irrigation

- Prospective alfalfa growers can't comprehend amount of water needed for alfalfa production
- Irrigation capacity--Can you grow corn? Can you grow peanuts? Can you grow 4 bale cotton?
- ~8 gpm per acre for good production is a good target (High Plains)
- Drip Irrigation?

Sizing Alfalfa Fields to Irrigation

- Rule of thumb…
  - Texas South Plains (Lubbock region): 6-7” of water required for 1 ton production
  - Top of Texas Panhandle & Clovis, NM area, 5-6” per ton
  - Far West Texas: flood, ~10”/ton; ~8”/ton?
- Consult ‘Texas Alfalfa Production’ for guideline on calculating target acreage for your irrigation capacity/efficiency
- ET: average 0.35”/day, June-August
  - 0.40” in Far West TX

TX High Plains Alfalfa Water Use

- Water use calculations for Panhandle target about 5.5 gpm per acre (use, not efficiency of applied water!) (Leon New, A&M)
- Add about 0.5 gpm per acre more for Littlefield, Plainview, Muleshoe
  - Increases steadily to the south
- If using Center Pivot irrigation with spray >30" above canopy, add 1.0 gpm/A

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TX High Plains Alfalfa Water Use A&M/USDA-Bushland

- For LESA (heads 18” above ground), WUE is running at 500 lbs. per inch of irrigation
  - This is much less water than farmers’ experience.

- Side rolls averaging about 360 lbs. per inch

Alfalfa & Drip Irrigation

- No gap in irrigation frequency (water after cutting, before baling) (Sweetwater, Idalou, Garden City, Plainview, Canyon)
- Super efficient water use, but emitter clogging more a problem with perennial root system?
- First 1” after swathing before bales are off.
- Getting stand established--
  - Prepare field further ahead for packing rain
  - Seed earlier if rain comes & risk hotter weather

Varieties

- No West Texas testing
- NMSU extensive testing
- Also, limited testing in western Oklahoma

Alfalfa Variety Trial Data

- For Texas Panhandle: NMSU (Tucumcari, older Clovis data) and Oklahoma State (Tipton, Goodwell); consider NMSU Artesia and Las Lunas; KSU-Garden City
- For Texas South Plains: NMSU (Artesia, Tucumcari), limited Lubbock trials,; consider Oklahoma State (Tipton, southwest; Goodwell, Panhandle)
- Far West, TX: NMSU @ Artesia & Las Cruces

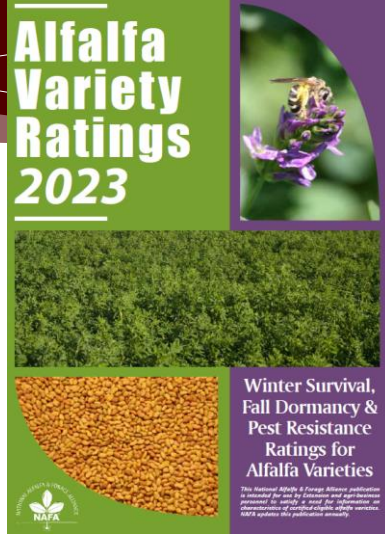
Alfalfa Variety Choice

- Well-tested variety vs. new varieties on the market that represent the latest in plant breeding
- Multiple test locations, representing diverse production areas
- The more a variety is tested the more confidence we have in its performance

Alfalfa Variety & Forage Quality

- Forage quality varies little among alfalfa varieties
- Harvest timing and management is much more important that variety selection in determining forage quality
- Lower Fall Dormancy (FD) rated alfalfa with dormancy, e.g. 4 (compared to non-dormant 7) may have higher quality

Alfalfa Fall Dormancy Ratings



- TX High Plains needs FD ratings 4
  - Far West, TX: likely FD 7-10
- The further north you are (Nebraska, Dakotas), the lower FD rating required
- In other words: the higher dormancy rating, greens up earlier, stays green later
  - more potential harvests, but possibly at the expense of stand longevity (only 3-4 years?)
- High FD rated alfalfas may not persist as long

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Alfalfa Fall Dormancy Ratings

- Trend away from using solely Fall Dormancy as a selection criteria
  - NMSU, OSU, KSU don't list FD ratings directly in their reports
- Breeding more important than the Fall Dormancy
- Also, new Winter Survival (WS) ratings
  - e.g. FD 6 variety with a WS rating that makes the variety equivalent to FD in winter hardiness/survival

Variety Selection Criteria?

- Fall Dormancy
- Multiple insect and disease resistance
- Breeding company
  - In contrast to the marketing company
  - Have a seed dealer you like?
- Cost of seed?
- Availability of seed you want?
- How long you hope to keep the stand?

Alfalfa Varieties & Pests

- Ample disease ratings available
- Data is not necessarily independent
- "2023 Fall Dormancy & Pest Resistance Ratings…"
  - http://www.alfalfa.org
- Many good varieties available
  - NMSU has switched from 'MR' to 'R' ratings as a target for alfalfa variety selection

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Alfalfa Pest Ratings

Resistance Class	Abbr.	% Resistant Plants
Susceptible	S	0-5
Low Resistance	LR	6-14
Moderate Resist.	MR	15-30
Resistance	R	31-50
High Resistance	HR	>50%

National Alfalfa Alliance, 2002

Alfalfa Pest Ratings

- Diseases
- Bacterial Wilt (Bw)
- Fusarium Wilt (Fw)
- Phytophthora root rot
- Verticillium wilt (Vw)
- Anthracnose (Race 1)
- Southern Root Knot Nematode (SRKN)

- Insects
- Spotted alfalfa aphid (SAA)
- Pea aphid (PA)
- Blue alfalfa aphid (BAA)
- Relatively new in NM: Cowpea Aphid (CA); somewhat common now in Texas High Plains

Yield Data Comparisons

- With few exceptions alfalfa varieties that perform well in “high yield” tests (high fertility, good soil, irrigated) also perform well in other tests (moderate fertility, shallow soil, rainfed) (OSU)
- Irrigated vs. rainfed alfalfa tests--no trends among varieties (good in one, good in the other)

Winter Survival (WS)

- Disease and insect resistance is a given--we need these parameters
- Winter survival; some advertising, for example, "FD rating of a '6', but winter hardiness of FD 4"
  - WS, 1 = no injury, 6 = plant death
- "We lose more plants in summer instead."

Seed Cost?

- Don't' be concerned about seed cost **(WHAT?)**. You get what you pay for.
- Cheaper seed may not be true to varietal designation.
- Older varieties and commons usually don't produce as well and are less likely to persist due to lower resistance to pests and environmental factors.

- **Quality improvements have not been as dramatic as the improvements in yield and stress tolerances.**

- **Your harvest management will have the greatest effect on yield, quality, and persistence.**

Alfalfa Seed Quality

- Reputable company vs. 'Common,' 'Variety Not Stated (VNS),' or possibly blends: a risk to you the producer?
- Certified seed (blue tag on bag), or Plant Variety Protected (see PVP labelling)
- Seed tag--variety, purity, weed seed, % germination, test date (> 9 months?)
- *Rhizobium* inoculated?

Recent Example, West Texas

- A February call, Lubbock area
- Could buy an old variety ‘Mesilla’, (NMSU release in 1978), some insect & disease resistance
- *“How do you even know it is still Mesilla?”*
- Replaced by several other NMSU releases, including ‘Dona Ana’

Recent Example, West Texas

- 'Mesilla' at $3.00/lb.
- No *Rhizobium* inoculant
- No seed treatment (metalaxyl; Apron; etc.)
- Compare to modern, improved variety, at $6.00/lb.
- Target seeding rate of 20 lbs./A

Recent Example, West Texas

- Seed cost cash differential, $60/A
- Alfalfa hay @ *premium* $325/ton (near dairy quality, April 2023, TX Direct Hay Report)
- Four-year stand
  - Some Far West TX, 3years;
  - High Plains shoots for 5+ years
- Question: how much increased yield is required to pay for itself?
  - *A lot?* *A little?*

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Recent Example, West Texas

- **Only 92 lbs./year for four years!**
- Higher priced seed represents newer genetic resistance to insects, disease
- Known variety (vs. uncertainty of older, cheaper offering)
- Inoculated and treated seed
- The best of many things you want as a producer

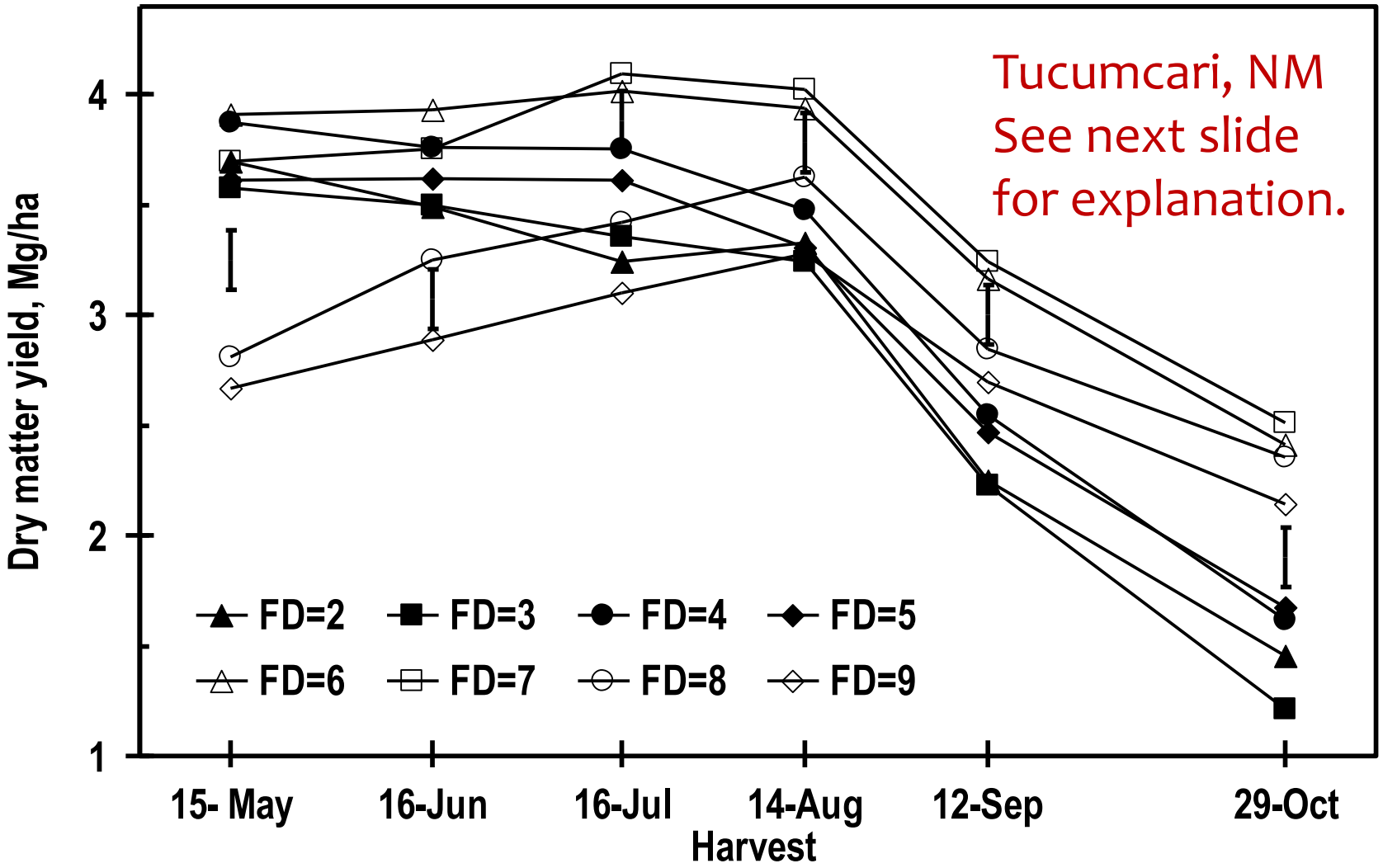
Alfalfa Variety Testing Data

- NMSU annual 'Alfalfa Variety Test Report' (Leonard Lauriault et al.)
  - http://cahe.nmsu.edu/pubs/variety_trials/welcome.html#alfalfa
- Updated annually
  - Tucumcari
  - Artesia
  - Las Cruces
  - Also: Los Lunas, Mora, Farmington

- Many good alfalfa varieties on the market
- Unless a particular variety offers something you really need (improved insect or disease resistance; over-the-top weed control), you manage risk by
  - using known varieties
  - focusing efforts on top-notch management.

Texas Panhandle

- Fall Dormant (FD) 4 and 5, maybe 6, especially above 3000’
- Within this range of FD, breeding is more important than FD
- Winter survival may not be that important here



The difference between harvests in dry matter yield of furrow-irrigated alfalfa of different fall dormancy categories at Tucumcari, New Mexico. Bars indicate the LSD (0.27 Mg ha^{-1}, $P < 0.05$) for fall dormancy category comparisons within any cutting.

Previous Slide with Chart

Courtesy Leonard Lauriault, New Mexico State Univ. forage agronomist, lmlaur@nmsu.edu, Tucumcari, NM

- Here's some data from Tucumcari showing that FD 6 and 7 varieties performed best throughout the growing season. Summer and fall yields of 8 & 9 were not greater than FD 6 and 7 varieties as anticipated. Additionally, the least dormant varieties performed very poorly in spring. The more dormant varieties performed well in spring, but were lower yielding in fall, as expected.
- Now for some tips for your program.
- If your irrigation district regularly runs out of water in second half of the growing season you'll likely be better off planting a more dormant variety to have higher early season productivity. You can't take advantage of this later season growth if you don't have water.
- **Concerning early irrigation. Alfalfa also is much more water-use-efficient during the cooler parts of the year, so you should concentrate irrigations then if water is limited. Additionally, you cannot apply enough water in summer to keep up with alfalfa's needs, so if you over-irrigate early, you can build up a soil profile for use during the summer and not take as much of a yield hit.**
- Seasonal distribution of yield is as important as total annual yield depending on whether the alfalfa is grown for pasture or hay and, if hay, what class of livestock is the target consumer. Horses are extremely susceptible to blister beetles, which are more prevalent during the summer cuttings. Varieties that are more productive in the spring will more likely fit that market. Winter and spring weeds interfere with quality required for the dairy market; but the final harvest is often very high quality because growth may not even reach bloom. Consequently, this would be best for dairy hay. It is very difficult to control weeds and maturity during summer; but, non-lactating dairy cattle, beef cattle, sheep, and goats don't need the quality and are not as susceptible to blister beetles, although you still don't want them in your hay.
- In this slide, whether grown for pasture or hay, the fall dormancy 6 & 7 varieties provided the highest yields throughout the year to meet season-long grazing requirements or provide hay to multiple classes of livestock. This is fairly important so you can always have something to offer different markets, maintaining the buyer-seller relationship.
- Each climatic zone will likely have a group of FD's that perform like this.

Gaines County Area

- Fall Dormant (FD) 5 and 6, maybe 7
- Within this range of FD, breeding is more important than FD
- Winter survival may not be that important here

Alfalfa Varieties and Seed

>Narrow choices to a couple of suitable varieties, then price the seed.

>If debating between two adjacent FD groups (say FD 6 & FD 5), then go with the lower FD/more dormant alfalfa.

- **BOTTOM LINE:**
  - **You get what you pay for!**

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Alfalfa Varieties and Seed

- Higher FD alfalfa (less dormant) can outyield more dormant alfalfa—longer growing season.
- If FD 4, 6, and 8 are cut on the same day, which has higher forage quality?
  - What is the stage of growth for each when cut at the same # of days since the previous cut?

Fall Dormancy, Yield, and Quality

- If FD 4, 6, and 8 are cut on the same day, which has higher forage quality?
  - Less dormant alfalfa moves through its growth stages faster. So the FD will be further along, possibly by a few days vs. FD 6, and several days vs. FD 4.
  - FD 8 @ 20% bloom, FD at 1-5% bloom, FD 4 at late bud stage?
  - Forage quality: FD 4 > FD 6 > FD 8

After variety selection, proper establishment techniques will ensure that more of your seed will actually become plants that you can harvest as high quality forage.

Establishing Quality Alfalfa

Whatever tillage method is used, proper planting depth and good seed-soil contact are essential to establishing a uniform stand.

Soil should be firm enough at planting for a footprint to sink no deeper than ⅜ inch.

The "Firm Mattress" of Seedbeds

- If > 1/2" deep, emergence is difficult
  - up to ¾" might be needed on sandy soils
- Need firm seedbed
- No clods, no trash on surface…
- The day you seed is the most important day in the life of the alfalfa plant
  - Not easy to backup and fix a mistake

Fall Seedings

Establishing Quality Alfalfa

- Seed 15 to 20 lbs./A of seed product, Texas Panhandle; 20-25 lbs./A for South Plains (sandier)
  - Rates increase if you have trouble with weeds
  - Some farmers like higher seeding rates—seeded two different directions, to crowd out potential weeds.
  - If higher seeding rates do not seem to benefit your stand, then is your seedbed packed and firm?
- Good soil preparation and modest seed rates allow higher per-pound seed cost

Planting Times

Establishing Quality Alfalfa

- Spring--understand the problems
- Late summer/early fall
  - Amarillo Region: Aug. 25-Sept. 15
  - Lubbock Region: Sept. 1-21
  - Seed by 6 weeks before first average 32° F
  - Destroy summer weeds after they germinate
  - Summer weeds may germinate post-planting but little growth
  - Irrigate once or twice to establish only
  - Allow stand to achieve 25% bloom next year before 1st harvest
  - No yield loss in first production year

Fertility
Rhizobium Nodules in Alfalfa

Mixed Feelings about Nitrogen Fertilizer and Alfalfa?

- Is your current crop well nodulated?
- Nodules can be hard to find in enough numbers to convince you that you are getting good N fixation
  - From Dalhart to Littlefield to Lamesa to Ft. Stockton/Pecos, *Rhizobium* nodulation is less
  - Hotter soils & lower organic matter to the south
  - Seed more likely to be 'Common' which usually has no seed treatments including *Rhizobium* or basic fungicide.

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Mixed Feelings about Nitrogen Fertilizer and Alfalfa?

- Annual/multiple mid-season N fertilizer (e.g., 25 lbs. N/A after some cuttings)?
  - I believe some producers have favorable results
  - Is stand longevity being compromised?
  - But N fertilizer suppresses N fixation from *Rhizobium*

Pre-plant Fertility

Establishing Quality Alfalfa

Suggested Application of Fertilizer Nutrients for I

(Modify the rates of fertilizer applications suggested here by your ow
and management practices)

Crop	Pounds per Acre N	P_2O_5	K_2O	Remarks
Alfalfa				
New seedings	20	120	50	A starter of up to 20 pou
Established stands	0	120	50	recommended for new s
				for new seedings and to

NMSU usually recommends <u>against</u> starter nitrogen for alfalfa. It can suppress *Rhizobium* activity and nodule formation.

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"50-15-15" Rule

Nutrient Content of Alfalfa Hay

Pounds per ton of soil nutrient removal

Require Per Ton →	**~50 lbs. N**	**12-14 Lbs. P_2O_5**	**50-60 lbs. K_2O**
Tons yield/A	N	P_2O_5	K_2O
Up to 4	~200	50	230
5-6	310	78	350
7-8	430	108	500

P Fertility

- Soil test for high input crops
- P fertility ahead of seeding
  - Soil test for this high-value crop
  - Incorporate up to 3 years of needed P_2O_5 before new stand? (current research need)
  - Many regional soil tests will call for ~120 lbs. of P_2O_5
  - P through pivot is iffy--must be careful
  - **Soil test**: Oklahoma St. or Texas A&M

OkSU may have better calibration

“Common” Alfalfa Varieties

- New Mexico or Oklahoma “*Common*”
- Sometimes NM Common performs well in NMSU trials.
- There is no reliable, consistent seed source.
- AgriLife does not recommend ‘common’ or any other old variety
  - Likely no *Rhizobium* inoculant/seed treatment
  - You can purchase and apply alfalfa-specific seedbox powder alfalfa-specific *Rhizobium* inoculant for alfalfa. It is not as good vs. inoculant already adhered to the seed whey bought.

Crop Salinity Tolerance

Total Soluble Salt Content

mmhos/cm		**Soil EC**	**Soil EC**	**Water EC**	**Water EC**	**Salinity**
dS/m		*Normal*	*Yield*	Normal	Yield	Thresh.
Salts?	Crop	*100%*	*75%*	100%	75%	ppm Cl^-
Tolerant	Cotton	*7.7*	*13.0*	5.1	8.4	1625
	Wheat	*6.0*	*9.5*	4.0	6.4	2100
	Sorghum	*4.0*	*7.2*	2.7	4.8	2450
Sensitive	**Alfalfa**	*2.0*	*5.4*	1.3	3.6	700

Irrigation Water Quality Standards & Salinity Management Strategies, TCE B-1667

Sodium & Alfalfa

- Exchangeable Sodium Percentage (ESP)
- The more calcium and magnesium in the soil the less the problem
- Alfalfa, especially young seedlings and first year crop, is sensitive
- ESP <8 is best; yield limited significantly as ESP approaches 16

Alfalfa Harvest 'Balancing Act'

- Forage yield vs. Quality vs. Plant Persistence
- Optimum balance is 1-10% bloom (NMSU)
- Continued harvest at pre-bloom reduces stand life (plant can't replenish root reserves for new growth and overwintering)

When ‘Pre-Bloom’ is Specified

- Less than 28-day cutting cycle
- Producers should weigh price vs. decreased yields, 1 possibly 2 more trips over the field, and shorter stand life
- Pre-bloom harvest of middle cuttings less likely to harm longevity than first, last cuttings

Cutting Higher Quality Alfalfa

1st Harvest (not the first year after establishment)**: Swath at perhaps 25% bloom--that is longer than for other cuttings (1-10% bloom).**

Last Harvest: Allow six weeks of fall growth to replenish root carbohydrates.

Establishing Quality Alfalfa

What about renovation?

Alfalfa After Alfalfa

Beware of allelopathy a.k.a. autotoxicity

Renovate unproductive or weedy alfalfa fields by rotating to another crop for one year. Plow during winter. Plant a short-season crop like single-cut haygrazer for hay or silage and replant alfalfa in late summer.

Alfalfa planted above in soil from a corn field (no autotoxicity) and below from an alfalfa field (autotoxicity).

Newer Trends in Alfalfa Varieties

- Grazing alfalfas/"Traffic-tested"--tolerance is for real, but nothing to do with bloat
  - no harvest costs!
- Tolerates frequent defoliation, hoof damage
- True grazing-tolerant varieties have broad crown set below soil surface (less hoof damage, more root carbohydrate retention)
- Less equipment traffic damage

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Round-Up Ready Alfalfa

- Genetically engineered
  - Early varieties did not necessarily increased yield—No, just a cleaner sample with fewer weeds
- Many fall dormancies
- Max annual application 132 oz./A ("Max" products)
  - 22 to 44 oz/A per application
- Regulatory conditions have been relaxed (next slide)
- Broad spectrum weed control, but can tank mix or use other chemicals
  - Compare to an annual combination of Treflan, Pursuit/Raptor, Select/Poast Plus
- First spray by 3 to 4 trifoliate leaf stage to remove non-RR plants (could be up to 10%, but likely 1-3%--this is normal and acceptable)

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Round-Up Ready Alfalfa

- The detailed early steward requirements are no longer in place (labelling of hay, GPS of field, etc.
- Seed company may have a grower agreement requirement.
  - **Example**: Bayer for 2023 alfalfa, see technology use agreement, https://tug.bayer.com/downloads/
  - Harvest by 50% bloom to minimize pollen flow to conventional varieties
  - Harvest by 10% bloom if nearby conventional seed production.
  - That's the plan; but what about rain, equipment breakdown, etc.?

West Texas

Roundup Ready Example

- $10.00/lb. for RR alfalfa (includes technology fee) vs. $6.00/lb. conventional
- Cash cost differential @ 20 lbs./A, **$80/A**
- Alfalfa hay @ $325/ton (somewhat lower than most April 2023 dairy quality hay, but we are being conservative)
- Four-year stand
  - Only 123/lbs. per acre per year to make up differential of higher RR alfalfa seed costs
- What is the value of weed control during establishment? In years 3 & 4 & 5 as stand may thin down and invasive grasses come?

"Low" Lignin Alfalfa
Better called 'reduced' lignin

- Leads to higher digestibility & feed value
- Both GMO (HarvXTra, 10-15% lower lignin) and conventional varieties (Hi-Gest etc., 5-8% lower).
- Could enable longer cutting cycle: more yield, similar quality…
  - …or higher quality and similar yield if cut at the same time as your current alfalfa
  - May be $500+ per bag, for high $ markets

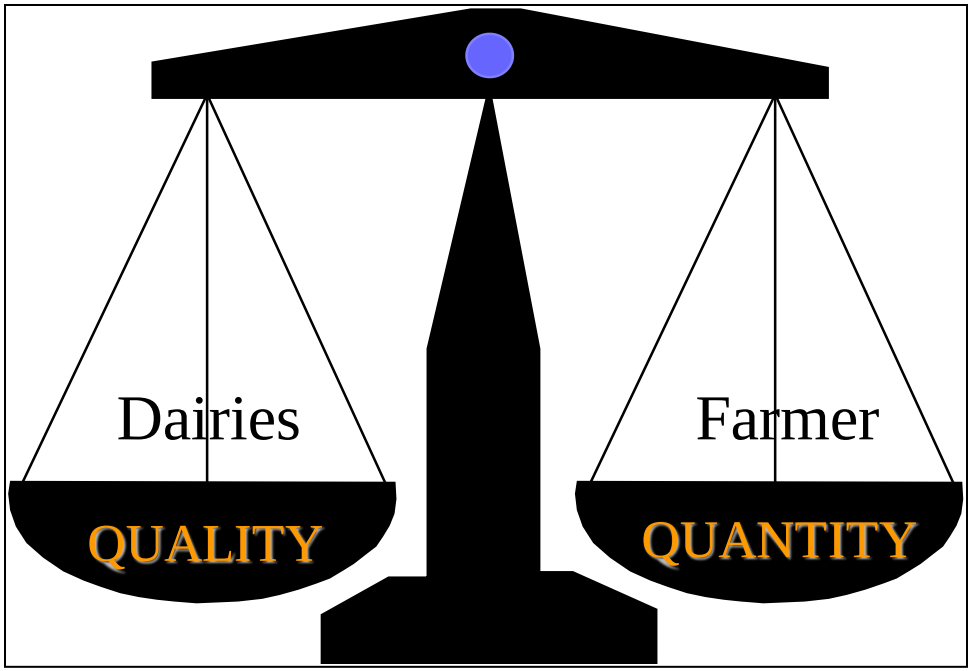
Forage Quality

- Forage quality improves as you move from
  - perennial to annual
  - grass to legume
  - warm season to cool season

What is RFV?

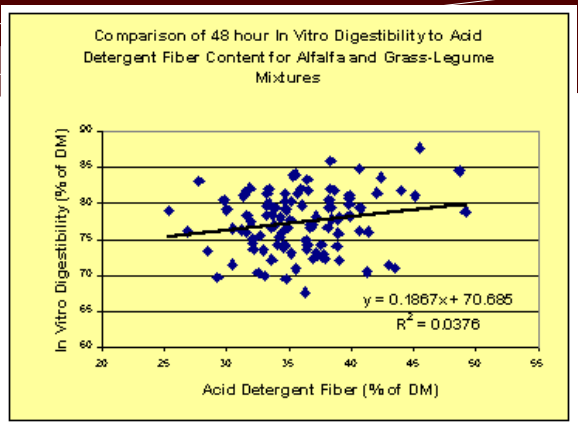
- Relative Feed Value.
- Still the most common, but imperfect, measure of seed quality.
- Does not allow comparison of alfalfa vs. oat hay, or sorghum/sudan vs. Bermudagrass

Harvesting & Nutritive Value



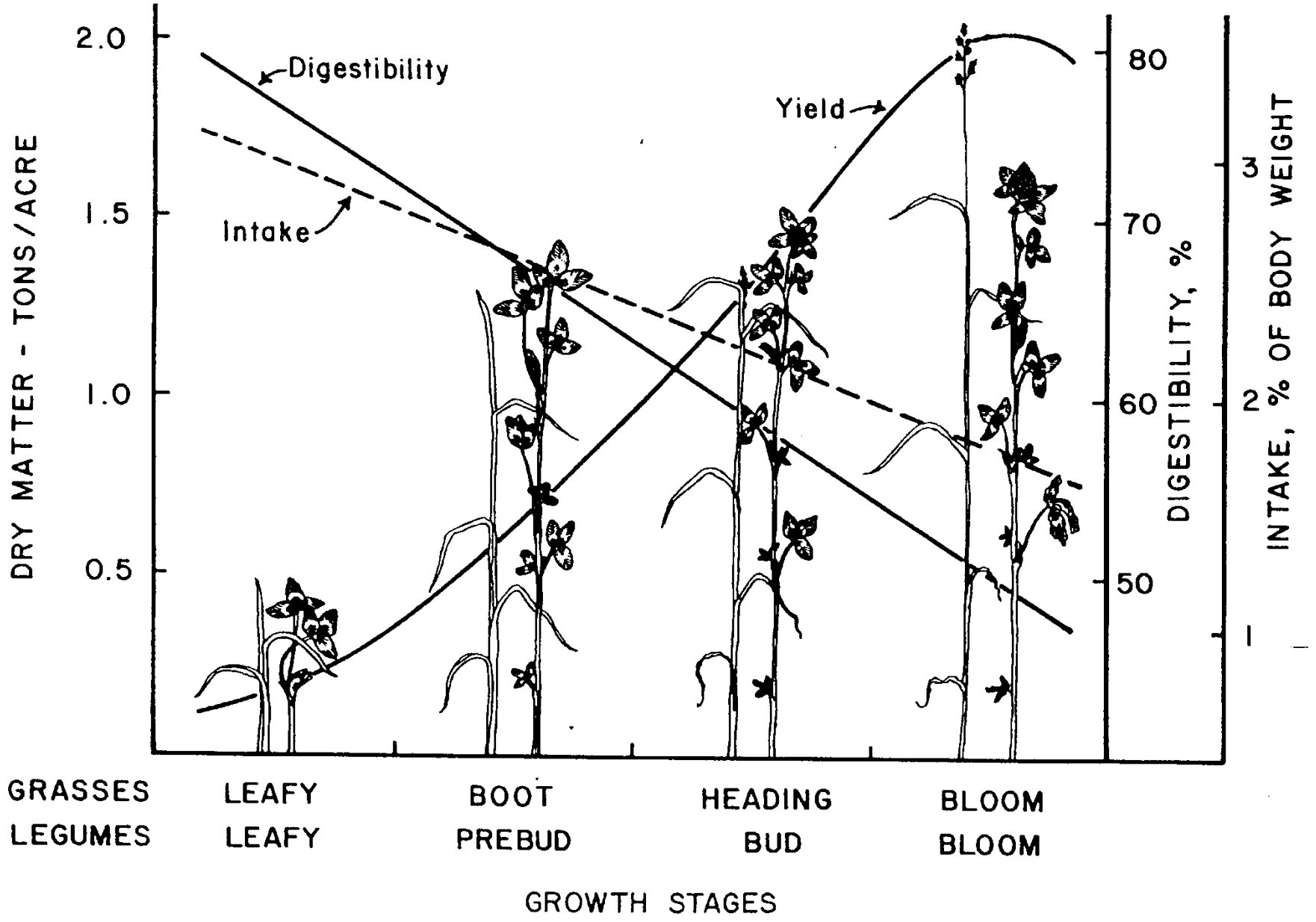
- Considerations
  - Cropping system ?
  - Species / variety ?
  - Kind of livestock ?

RFV vs. RFQ



- RFV (Relative Feed Value)
  - RFV = (DMI,% of BW)*(DDM, % of DM)/1.29
  - Based on ADF
  - ADF not highly correlated with digestibility (IVTD)
- RFQ (Relative Forage Quality)
  - RFQ = (DMI, % of BW)*(**TDN**, % of DM)/1.23
  - TDN based on fiber digestibility (NDFD)
  - More accurate and fair than RFV

Source: Undersander and Moore. Focus on forage. Vol. 4, No. 5. Univ. of Wisconsin.


2.0
1.5
1.0
0.5
DRY MATTER - TONS/ACRE
Digestibility
Intake
Yield
80
70
60
50
DIGESTIBILITY, %
3
2
1
INTAKE, % OF BODY WEIGHT
GRASSES
LEGUMES
LEAFY
LEAFY
BOOT
PREBUD
HEADING
BUD
BLOOM
BLOOM
GROWTH STAGES

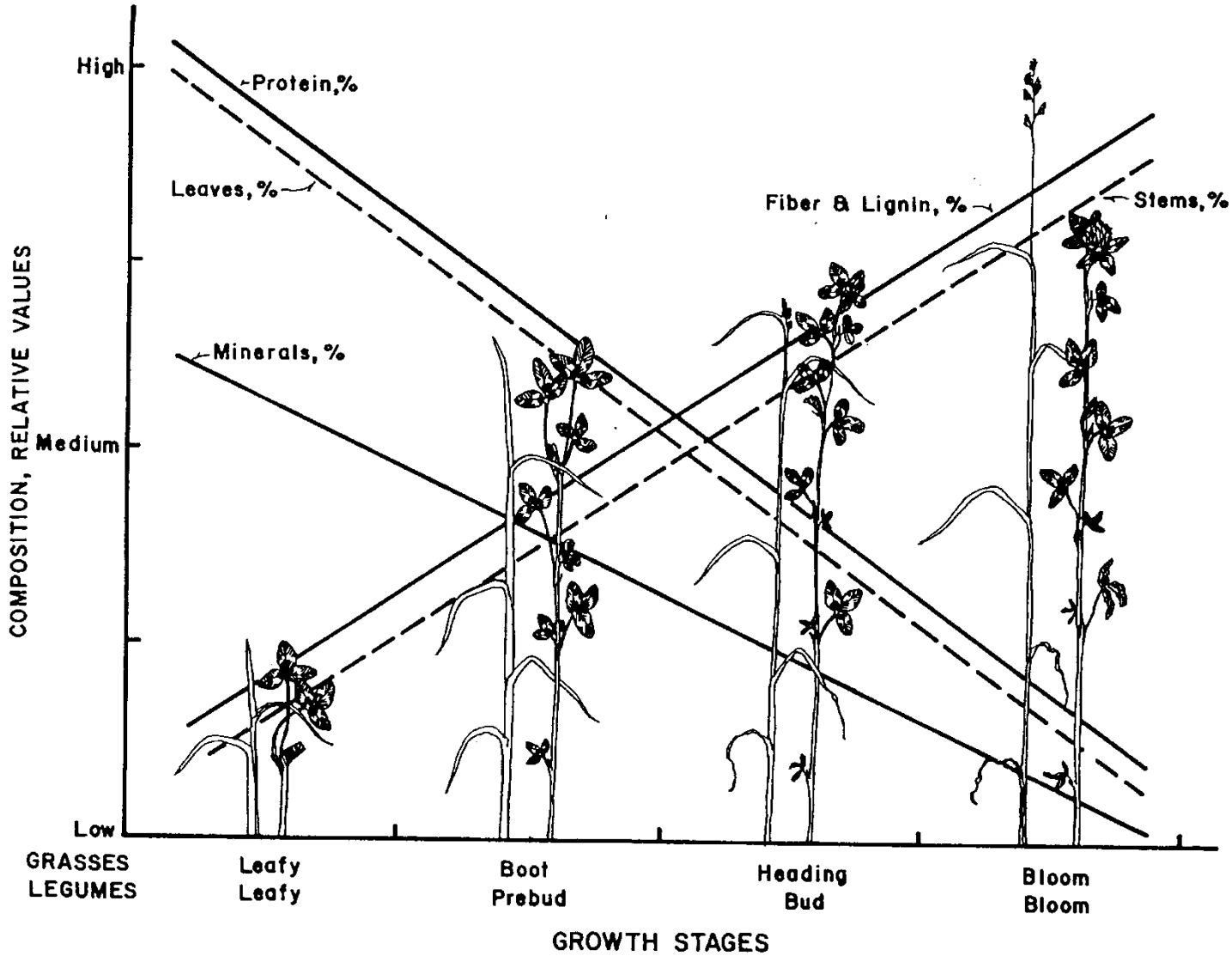


Figure 4. When perennial grasses or legumes grow from leafy to bloom growth stages, protein and mineral contents decline dramatically with leafiness. Concurrently, stemminess and cell wall materials increase rapidly as canopies grow to a stemmy bloom stage.

Nutritional Requirement vs. Hay Quality

Quality Parameter	Dairy Cow Requirement [a]	Alfalfa Hay [b]
Crude Protein (%)	**15**	**18**
TDN (%)	**67**	**60**
NE_l (Mcal kg^{-1})	**1.52**	**1.35**
NDF (%)	**28**	**42**
ADF (%)	**21**	**31**

[a] 1500-lb lactating cow, 60 lb/day milk production ; [b] hay, sun-cured, early bloom

Source: Nutrient Requirements of Dairy Cattle. 6th Ed. 1989. Nat. Academy Press. Washington D.C.

Effect of Maturity on Quality

Forage	CP[1] %	ADF[1] %	NDF[1] %	NE_L[1] Mcal/kg	NE_M[1] Mcal/kg	NE_G[1] Mcal/kg	TDN[1] %
			Alfalfa				
Bud	20	29	40	1.42	1.41	0.83	63
Full Bloom	15	37	50	1.23	1.14	0.58	55
			Sorghum-Sudangrass				
Vegetative	17	29	55	1.60	1.63	1.03	70
Headed	8	42	68	1.30	1.18	0.62	56
			Corn Silage				
Few Ears	8.5	30	53	1.40	1.38	0.80	62
Well Eared	8.0	28	51	1.60	1.63	1.03	70

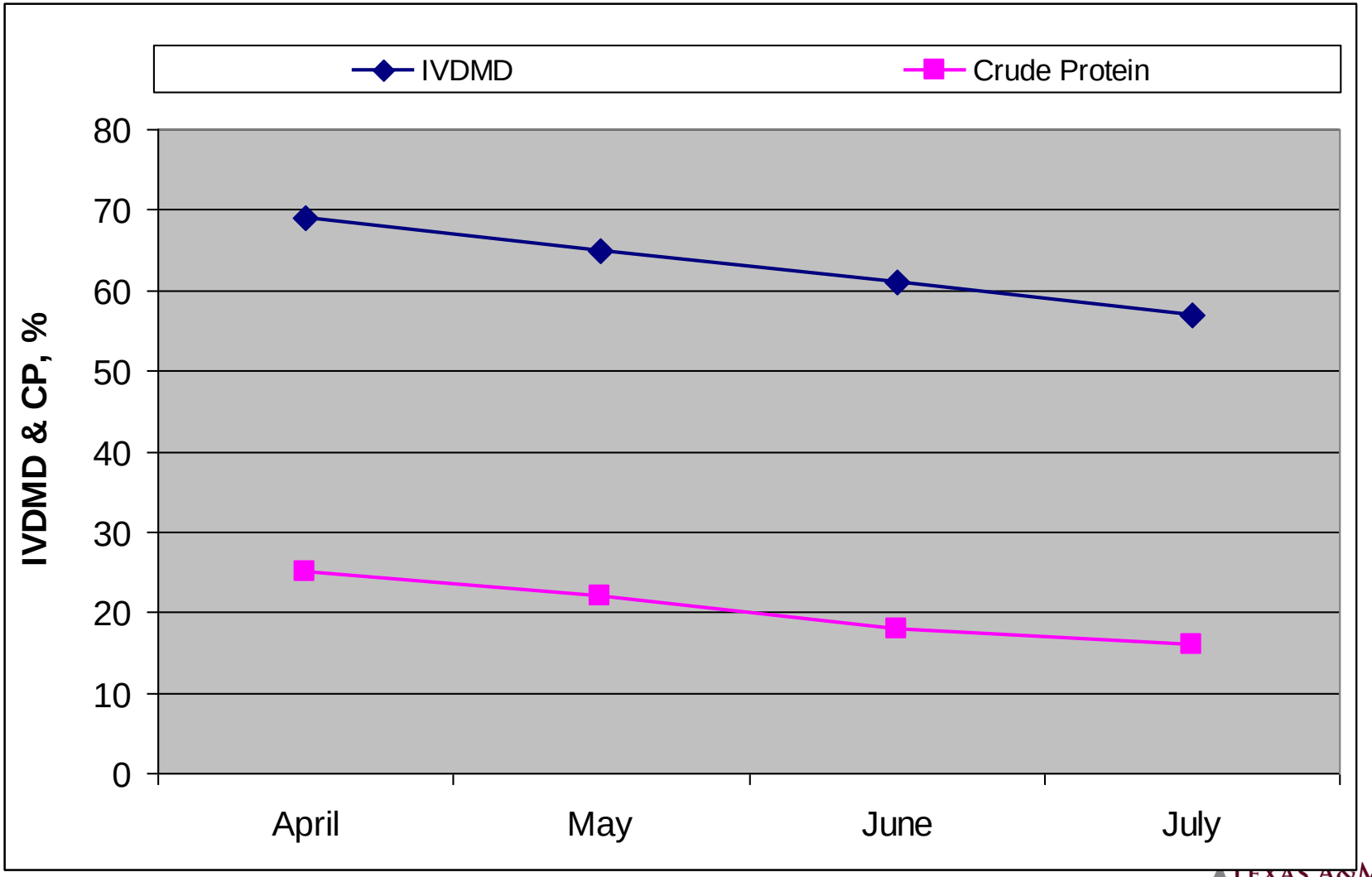
[1]CP = crude protein, ADF = acid detergent fiber, NDF = neutral detergent fiber, NE_L = net energy of lactation, NE_M = net energy of maintenance, NE_G = net energy of gain, TDN = total digestible nutrients. Source: Nutrient Requirements of Dairy Cattle, 1989.

Effect of Maturity on Quality

Maturity	CP %	TDN %	ADF %
Pre-bud	21.7	65	28
Bud	19.9	62	31
1/10 Bloom	17.2	58	34
1/2 Bloom	16.0	56	38
Full Bloom	15.0	54	40
Mature	13.6	52	42

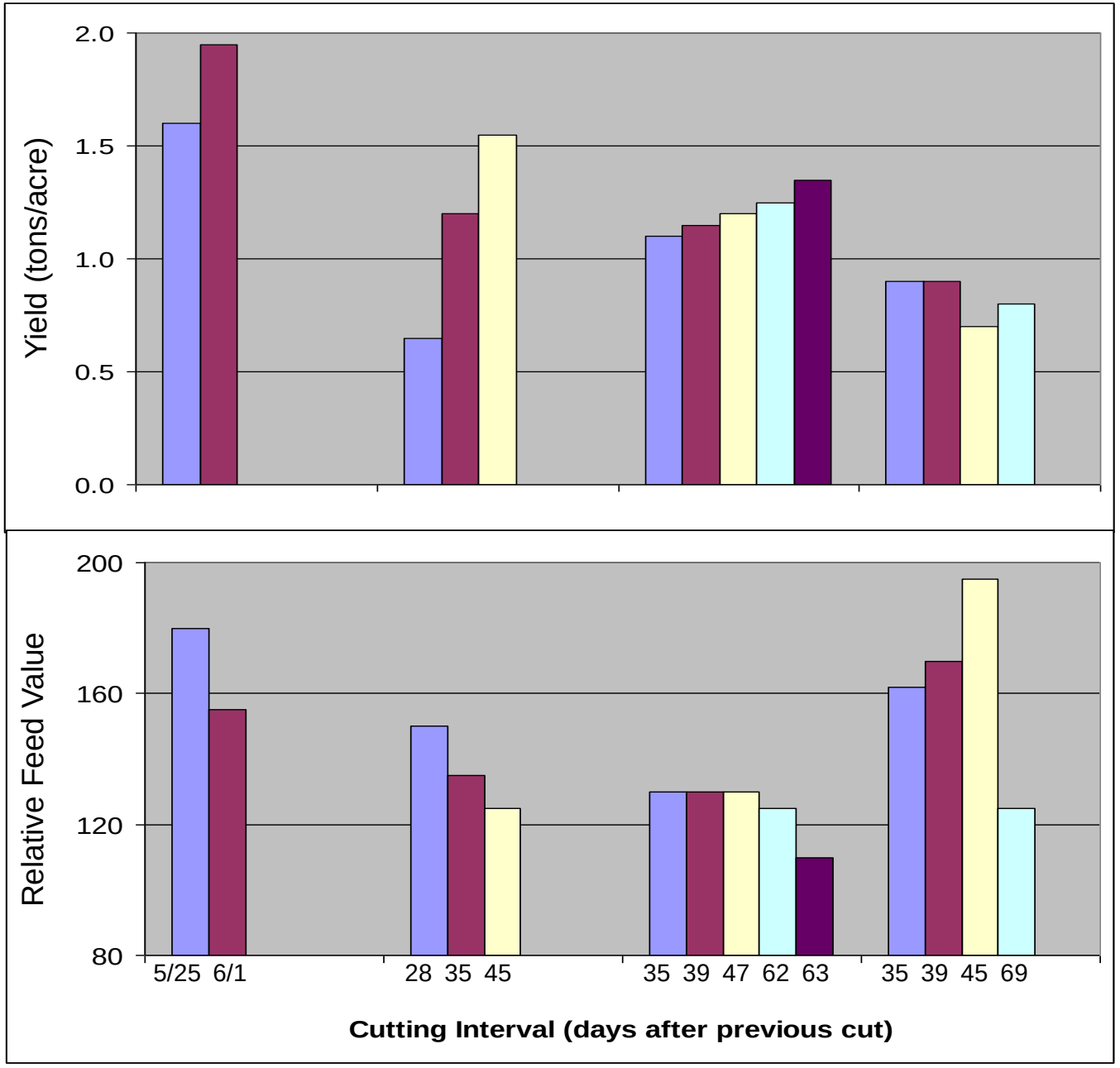
Source: Nutrient Requirements of Dairy Cattle. 1978. National Academy of Science, Pub. 1349.

Seasonal Changes in Nutritive Value



Adapted from: C.S. Hoveland et al. J. Prod. Agric. 1:343-346.

TEXAS A&M AGRILIFE EXTENSION



Adapted from: Brink and Marten, Univ. of Minnesota, 1989..

Relative Feed Value

- For dairy cattle, prime alfalfa hay has
  - **>19% CP, <30% ADF, <40% NDF, and >151 RFV**
- Varietal quality improvements less dramatic than improvements in yield and stress tolerances.
- Your harvest management will have the greatest effect on yield, quality, and persistence.
- Most dairies want RFV > 170, even >180

Harvesting Alfalfa Quality

Table I: Proposed Quality Standards for Legume, Grass, and Legume-Grass Mixed Hays

	Analysis					
Quality Standard	CP (%)	ADF (% of DM)	NDF	DDM (%)	DMI (% of BW)	RFV
Prime	>19	<31	<40	>65	>3.0	>151
1	17-19	31-35	40-46	62-65	3.0-2.6	151-125
2	14-16	36-40	47-53	58-61	2.5-2.3	124-103
3	11-13	41-42	54-60	65-57	2.2-2.0	102-87
4	8-10	43-45	61-65	53-55	1.9-1.8	86-75
5	<8	>45	>65	<53	<1.8	<75

Source: Taylor, Richard W. 1995, 3.

Alfalfa Information

- Website, for West Texas, http://lubbock.tamu.edu/othercrops
- Also, a Texas A&M AgriLife Extension document for most suitable and relevant websites in other states.
- Mid-January to early February, in Ruidoso, NM, annual meeting of the New Mexico Hay Association, http://nmhay.com

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When to terminate the stand?

- Yields declining?
- Health of roots?
  - A lot of pock marks on the roots?
  - Crowns deteriorating, or dark streaks moving into the vascular system
- Plants per square foot (<5)
- Stem number per square foot (~50 or less)

Alfalfa Market Considerations

- What kind of bales the market wants vs. what you can provide
- Weed control ahead of time--pesky perennials and annuals that are hard to control
- How much labor is involved?
- Do you understand quality? (e.g., what is RFQ?)

Dodder in alfalfa , Reeves Co., TX (2018)

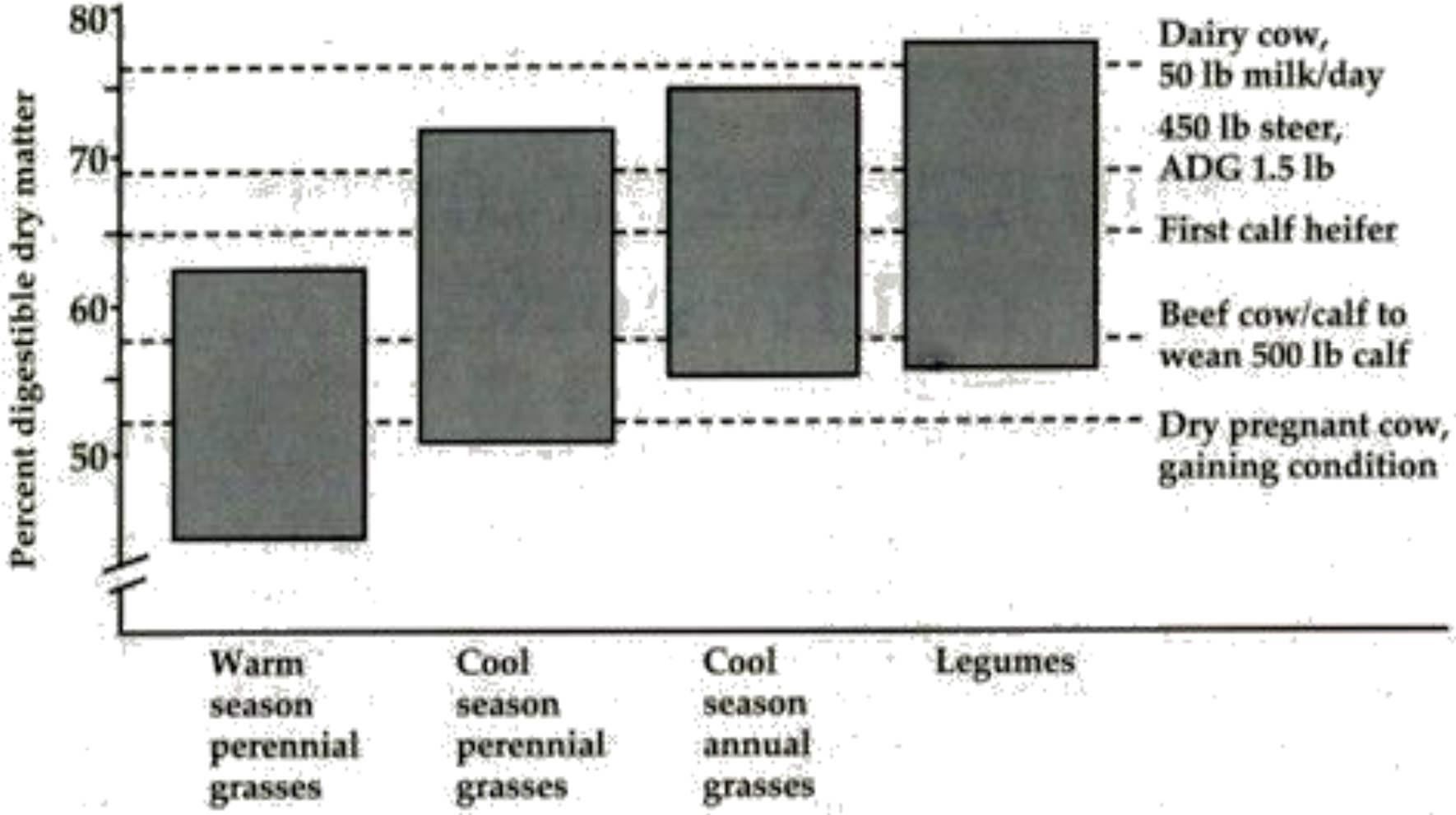

Figure 17.1. Forage digestibility ranges and their suitability for different classes of livestock.
Adapted from: H. Lippke and M.E. Riewe. 1976. Texas Agric. Exp. Stn. Res. Monograph RMGC: 169-206.

Buying & Selling?—any forage

- 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).

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

USDA publishes a summary of current Texas hay prices every 2 weeks. This is a useful note on current prices.

https://www.ams.usda.gov/mnreports/ams_2707.pdf

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

USDA Texas Direct Hay Report

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

Fri Mar 24, 2023

Email us with accessibility issues with this report.

Panhandle

Hay (Conventional)

Alfalfa - Supreme (Ask/Per Ton)

	Qty	Price Range	Wtd Avg	Freight/Use	Description	Crop Age
Large Square 3x4		400.00-420.00		Delivered		

Alfalfa - Premium (Ask/Per Ton)

	Qty	Price Range	Wtd Avg	Freight/Use	Description	Crop Age
Large Square 3x4		365.00-385.00		Delivered		

Texas Direct Hay Market

- Updated every two weeks, year round
- https://www.ams.usda.govmnreports/ams_2707.pdf
- Different hays, different regions of Texas
- Some forage growers complain they can never find the higher prices listed in the bi-weekly report.
- Drawback: prices are often by bale size rather than per ton

Weed Control in Alfalfa

- From New Mexico State Univ.
- “Managing Weeds in Alfalfa,” 2017

- https://pubs.nmsu.edu/_a/A325/index.html

Dodder in Alfalfa

This is an issue in some alfalfa field in Far West Texas (Ft. Stockton, Pecos, Dell City, etc. The most common grower means of suppressing growth is using trifluralin (most common commercial name ‘Treflan’).

The following quote comes from a Univ. of Texas professor's blog, 2009

(Provided by the son of then colleague Dr. Brent Bean, Extension agronomist, Amarillo)

- “So far, more than 89,000 American citizens have signed an urgent appeal from Food Democracy Now! requesting that President Obama and Secretary Vilsack choose wisely and prudently to reject the approval of this unnecessary GMO crop (alfalfa). According to the vast majority of farmers who plant alfalfa, the use of Monsanto’s herbicide Roundup Ready on alfalfa is entirely unnecessary as alfalfa is a perennial grain and is a preferred weed suppressing crop when managed properly. As any farmer of fruit, vegetable or grain farmer can tell you, any pollinated crop is at certain risk of contamination from any crop that produces pollen. Unfortunately, this is not about adding another crop to feed more human beings, but simply another ploy for Monsanto to maintain their stranglehold on agriculture and our food supply and add to their bottom line with their long-term strategy to undermine the organic and local food movement - the fastest growing and most profitable sector in agriculture today."
  - University of Texas professor biology class, ~2009

My Former Boss Travis Miller notes…

- “There has indeed been a furor among organic producers and others about the release of RR alfalfa. In part, I suppose due to some risk or perceived risk to their organic status should they be cross pollinated; and in part, I would suppose, due to their bias against genetically modified (GM) crops as a whole. We have only 200,000 farmers in the state of Texas, most of whom make the greatest part of their living from another occupations and only a small part of those grow alfalfa. This number is dwarfed by the number of urban people who don't know anything about agriculture and get informed on current issues such as this by blogs from the organic/local food groups. It points to a huge vacuum in information the general public has about agricultural issues, particularly issues that fall on the wrong side of the fence with these interest groups.”

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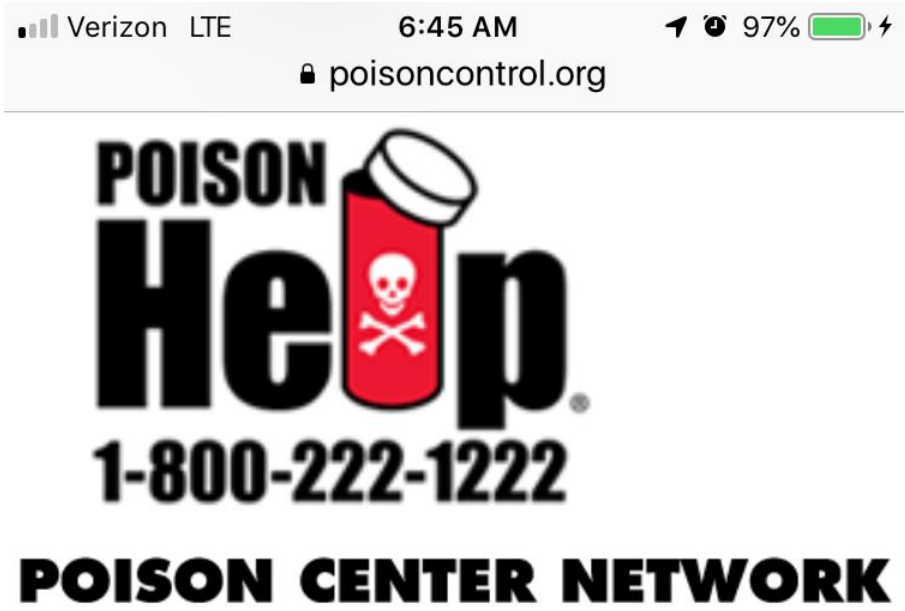
Sources of Label Information

- 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 Poison Center Network

- http://www.poisoncontrol.org
- (800) 222-1222
- Put this in your Cell Phone!

  If you are blinded and can't see you can still voice dial (or call 9-1-1).




Http://Lubbock.tamu.edu/alfalfa