



Seeded Forages for Complementary Grazing

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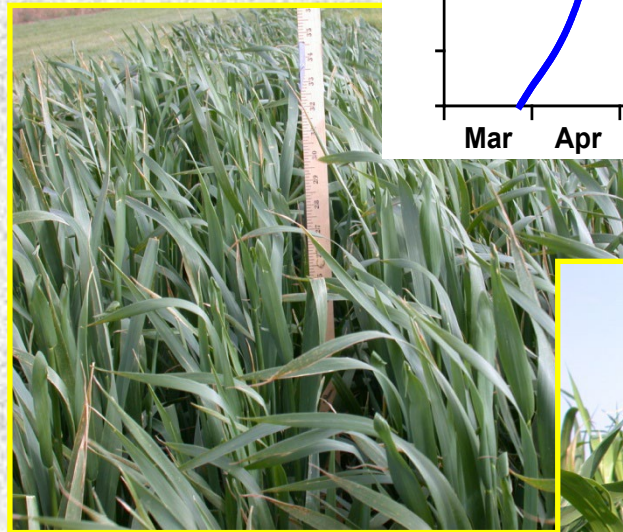
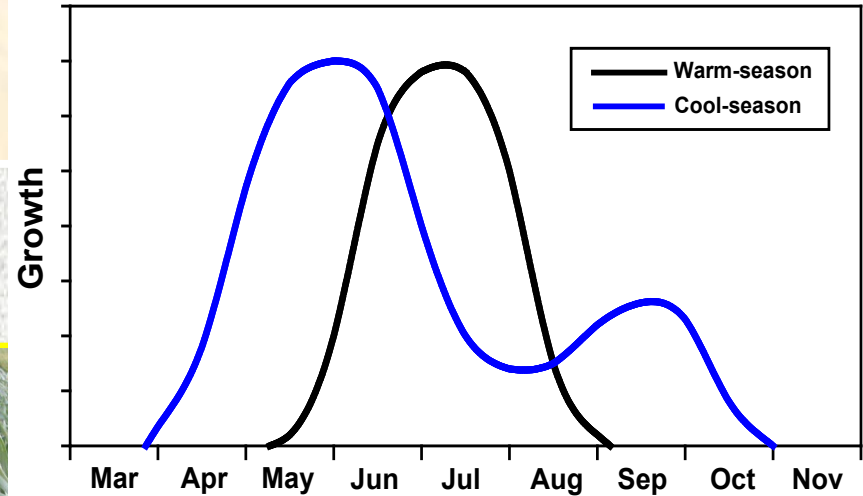
Ranch Practicum: 2023- 2024

Planning and Management Considerations

- **Grazing forage and/or hay needs.**
 - **Use within your operation.**
 - **Site selection - livestock fence and water development.**
 - **Forage type and establishment.**
 - **Irrigation**
 - **Fertilizer**
 - **Grazing management**
 - **Economics.**
-

Irrigated Pasture – Forage Choices

- **Cool-season perennials**
- **Warm-season perennials**
- **Double-cropped annuals**



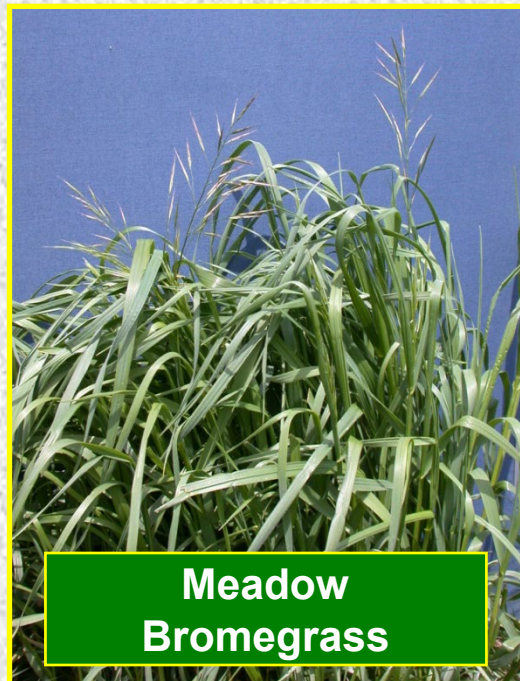
4-Way Grass Mix

3-yr. avg. yield (T/acre)

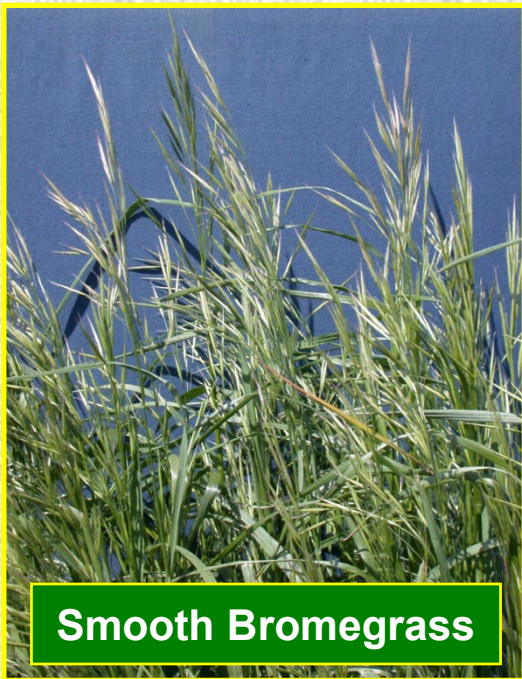
Orchardgrass	7.79
Smooth brome	6.23
Meadow brome	5.87
Creeping foxtail	5.73



Orchardgrass



**Meadow
Bromegrass**



Smooth Bromegrass



Creeping Foxtail



**Alfalfa
(optional)**



**'Oahe' Intermediate
Wheatgrass**



**'Manska' Pubescent
Wheatgrass**



**'Newhy' Hybrid
Wheatgrass**

Wheatgrasses: 3-yr. avg. yield: 7.08 T/acre



Tall fescues and festulolium: 3-yr. avg. yield: 7.53 T/acre

Irrigated pasture mixture: Example 1

Species	Ib / acre	Seeds / ft ²	Cost/acre ¹
Orchardgrass	3.5	45	\$19.40
Festulolium	3.5	17	\$10.30
Tall fescue	3.5	18	\$18.00
Meadow brome	4	8	\$28.00
Smooth brome	3	9	\$18.00
Creeping foxtail	1	17	\$10.50
Alfalfa	1.5	8	\$6.40
Total	20	122	\$110.60

¹ March 2023 prices. Seed prices will vary by time of year, species, variety, and dealer.

Mixtures

- **Adaptability to variable soils or soil moisture conditions across the field**
- **Species differences in growth patterns across the season**
- **Species differences in persistence or disease, insect resistance, or winter hardiness**
- **Species differences in ability to establish and spread (bunchgrass & sod-forming)**
- **Plant diversity and grazing**



Establishing Irrigated Pasture



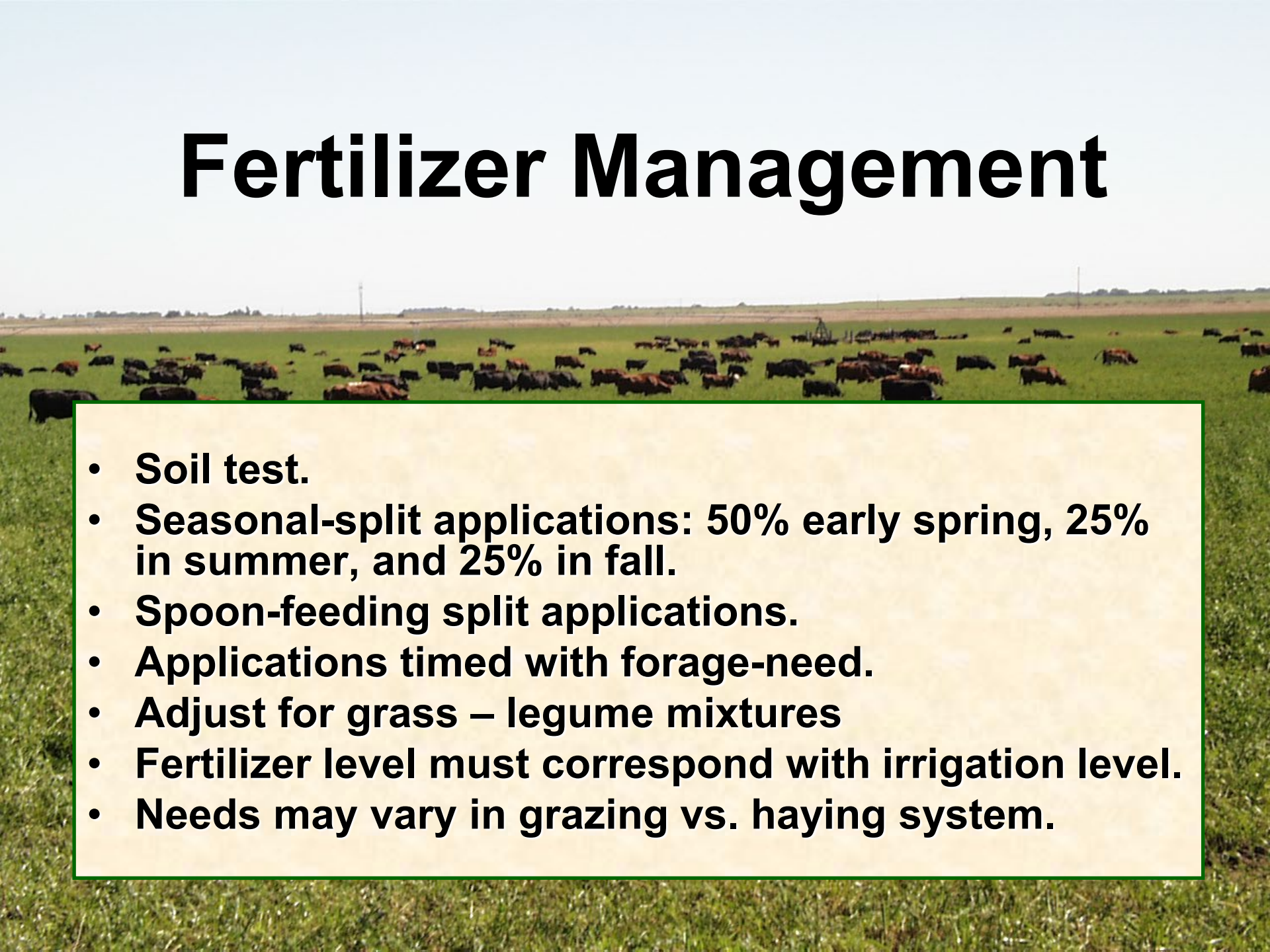
- **Spring Seeding:**

- March 20 – April 15
- First grazing / haying mid-July
- 50% production of an established stand
- Weed control may be needed

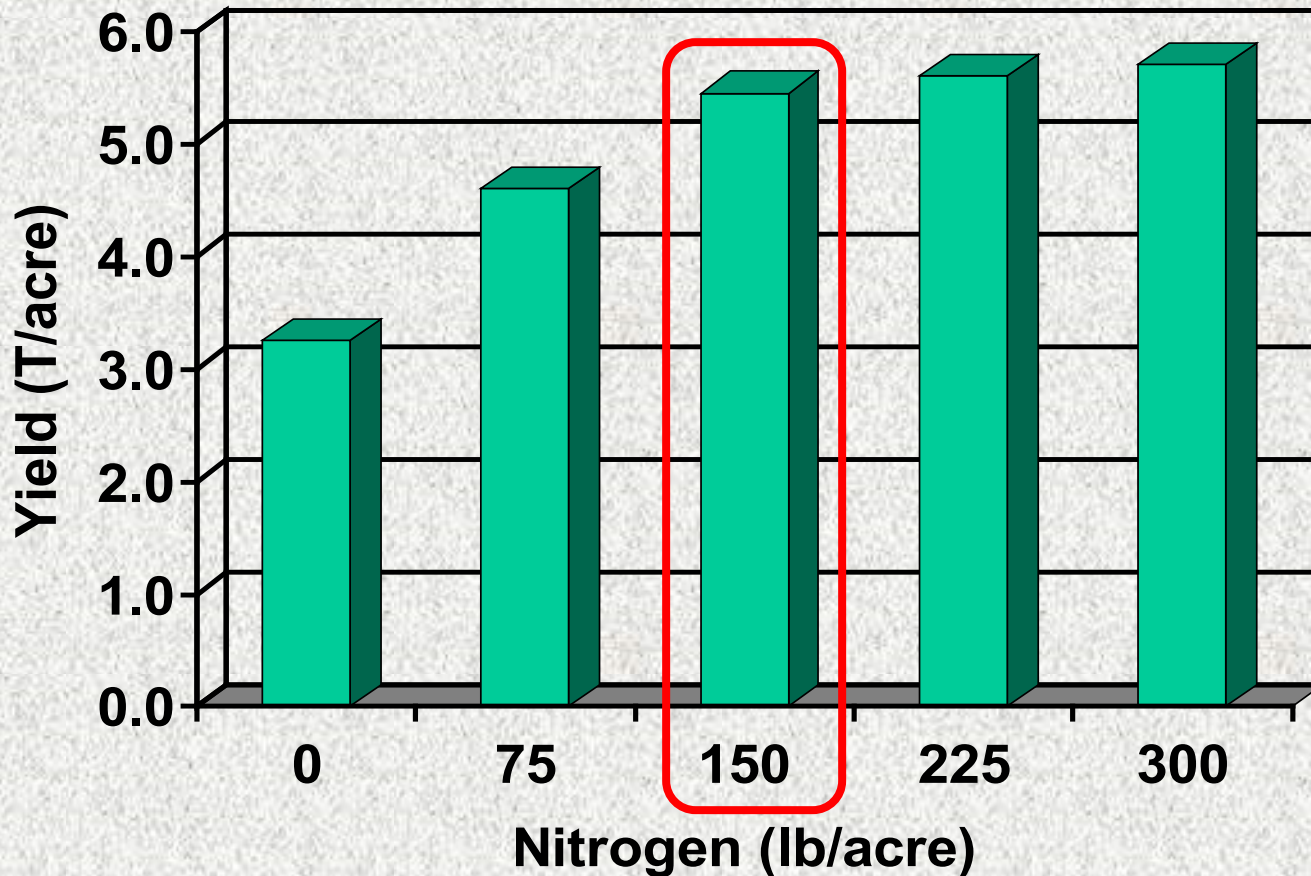
- **Late-summer Seeding:**

- August 10 – September 10
- First grazing / haying late May
- 85 - 90% production of an established stand

Fertilizer Management

- 
- **Soil test.**
 - **Seasonal-split applications: 50% early spring, 25% in summer, and 25% in fall.**
 - **Spoon-feeding split applications.**
 - **Applications timed with forage-need.**
 - **Adjust for grass – legume mixtures**
 - **Fertilizer level must correspond with irrigation level.**
 - **Needs may vary in grazing vs. haying system.**

Effect of nitrogen fertilization on irrigated smooth bromegrass and orchardgrass yield.¹



¹ Three-year average (1970-72) from 4 harvests each year, Holt County.



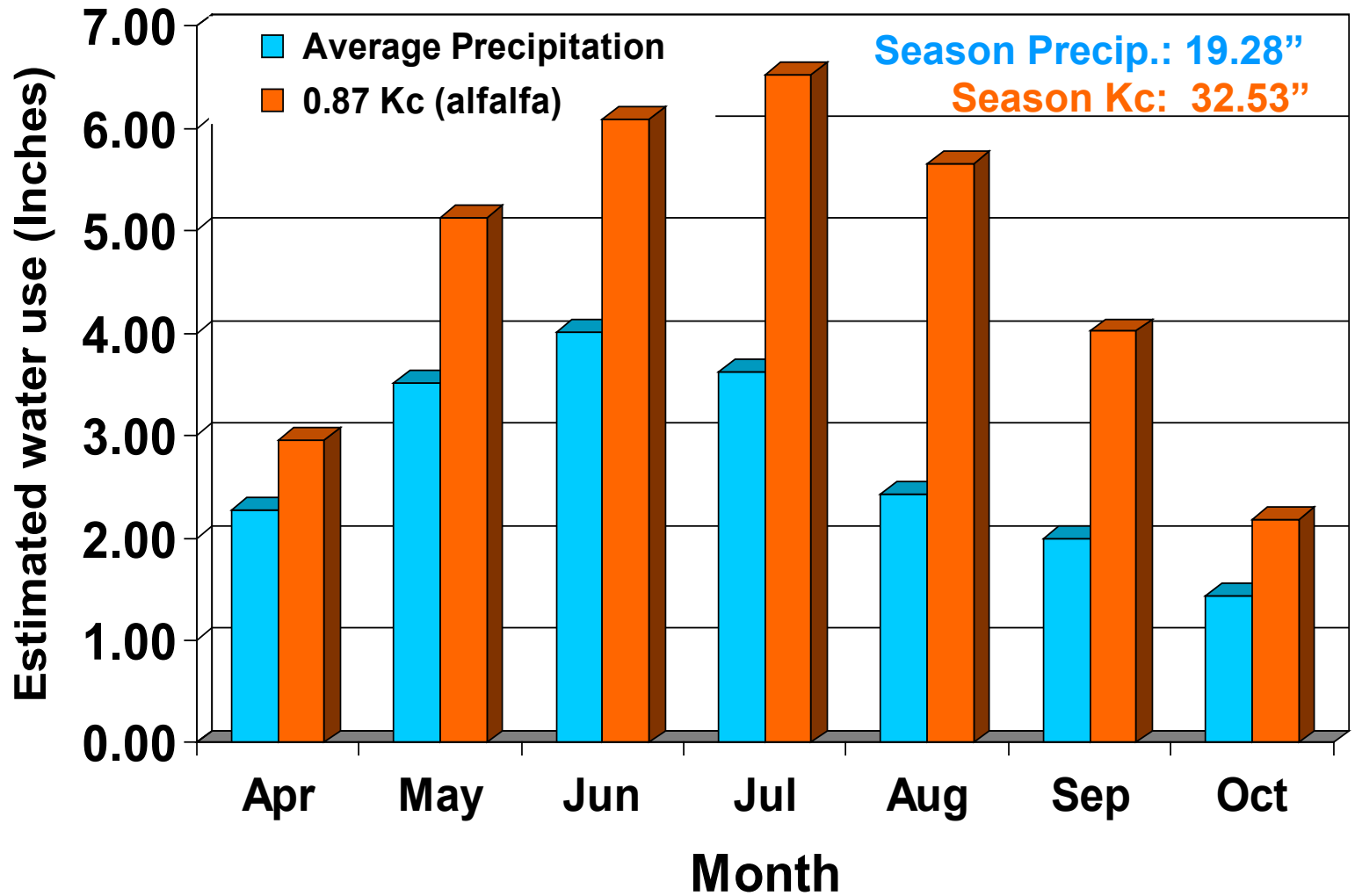
Irrigation Management

North Platte: Apr.-Oct.

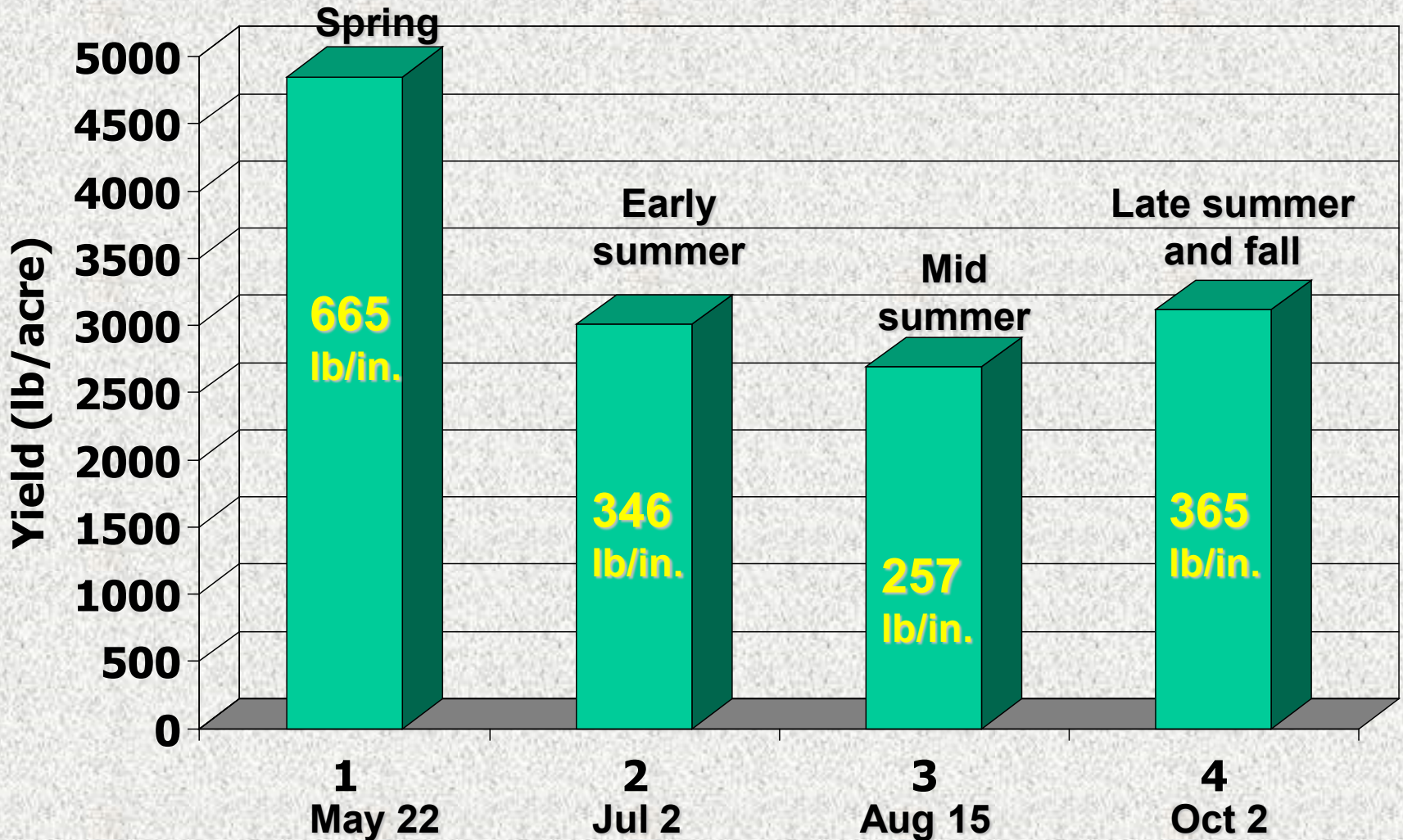
- **Rainfall:** 16.71"
- **Irrigation:** 16 – 20"
- **Total:** 32 – 36"

- **Crop water use: 0.20 to 0.35 inches/day.**
- **Applications at higher frequency (5 - 12 days); lesser amounts (0.50" – 1.00").**
 - **Soil water holding capacity**
 - **Evapotranspiration**
 - **Rainfall**

Average monthly precipitation and estimated cool-season grass water use at Broken Bow, NE.

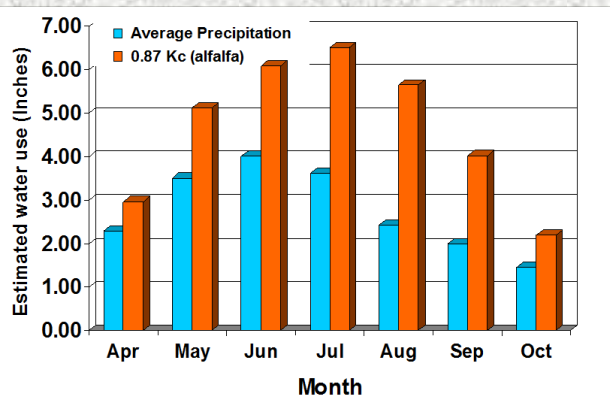


Average forage yield of 8 irrigated cool-season grass species by harvest date, North Platte, 2003.



Possible irrigation timing strategies for irrigated cool-season pasture, central Nebraska.

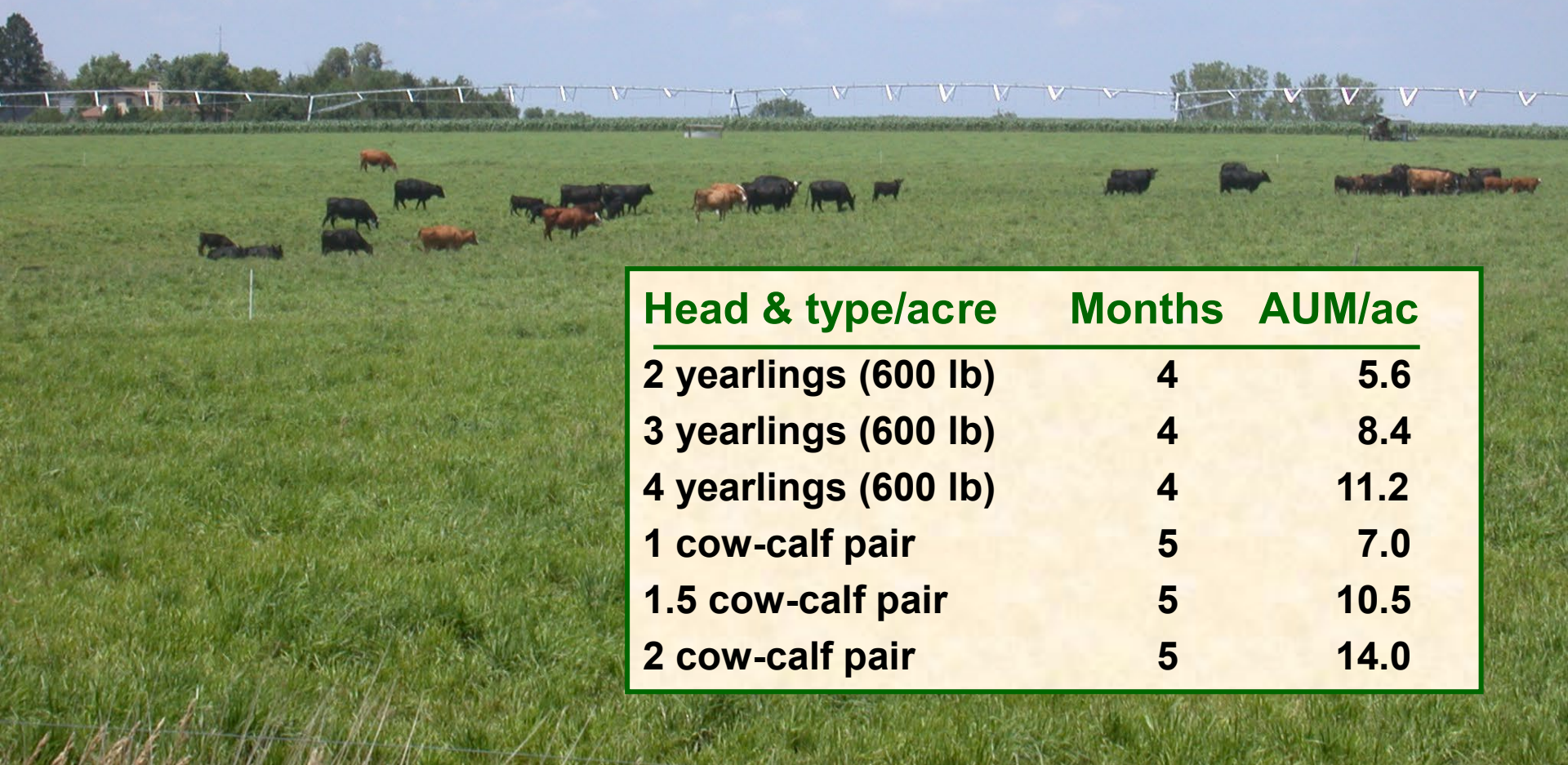
	Apr	May	Jun	Jul	Aug	Sep	Oct	Total inches
Full irrigation								14.0
Limited # 1								9.0
Limited # 2								7.0
Limited # 3								2.5



 -- Irrigation applied as needed

Grazing Management

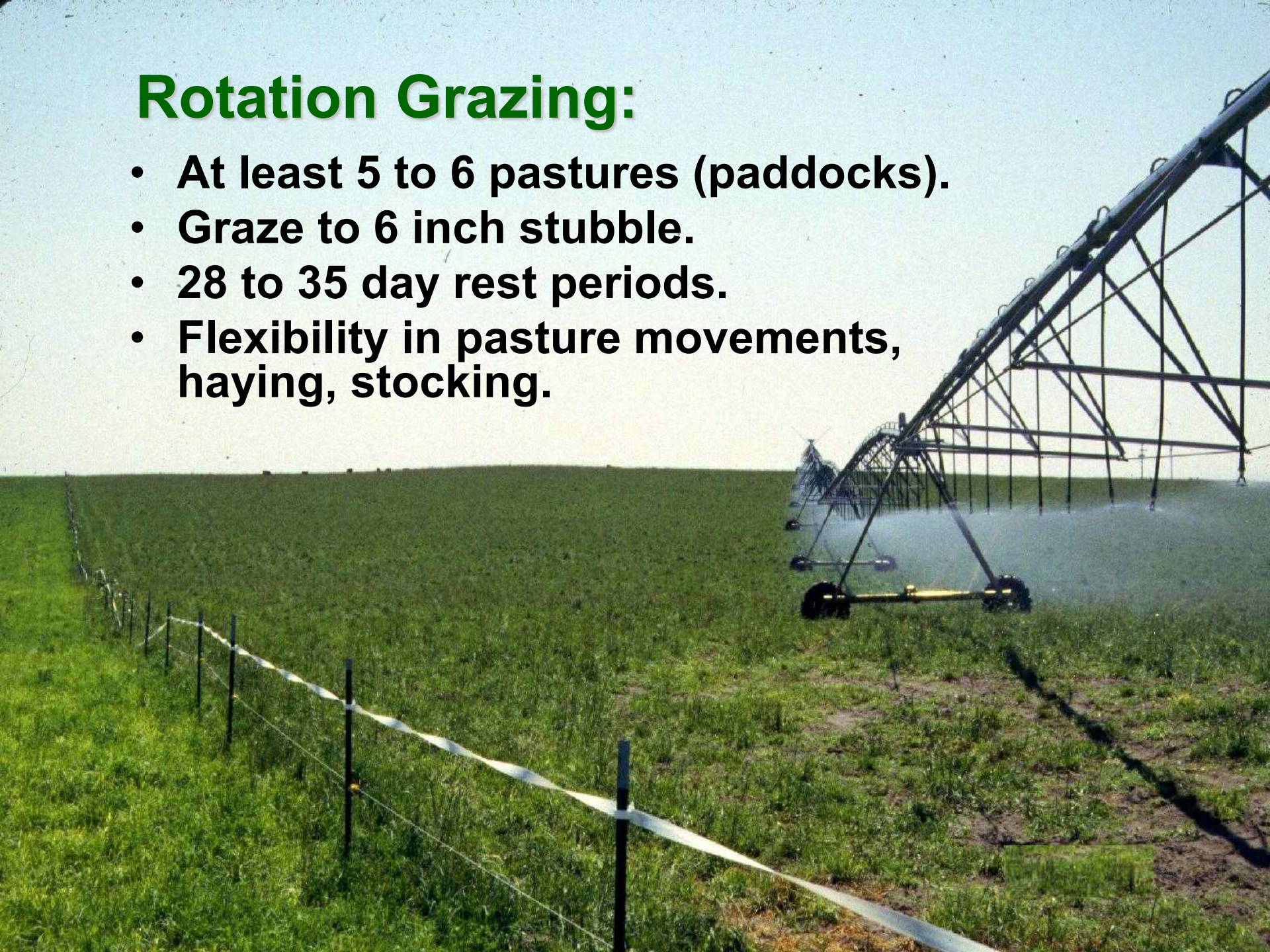
Stocking rates: 6 - 12 AUM/acre



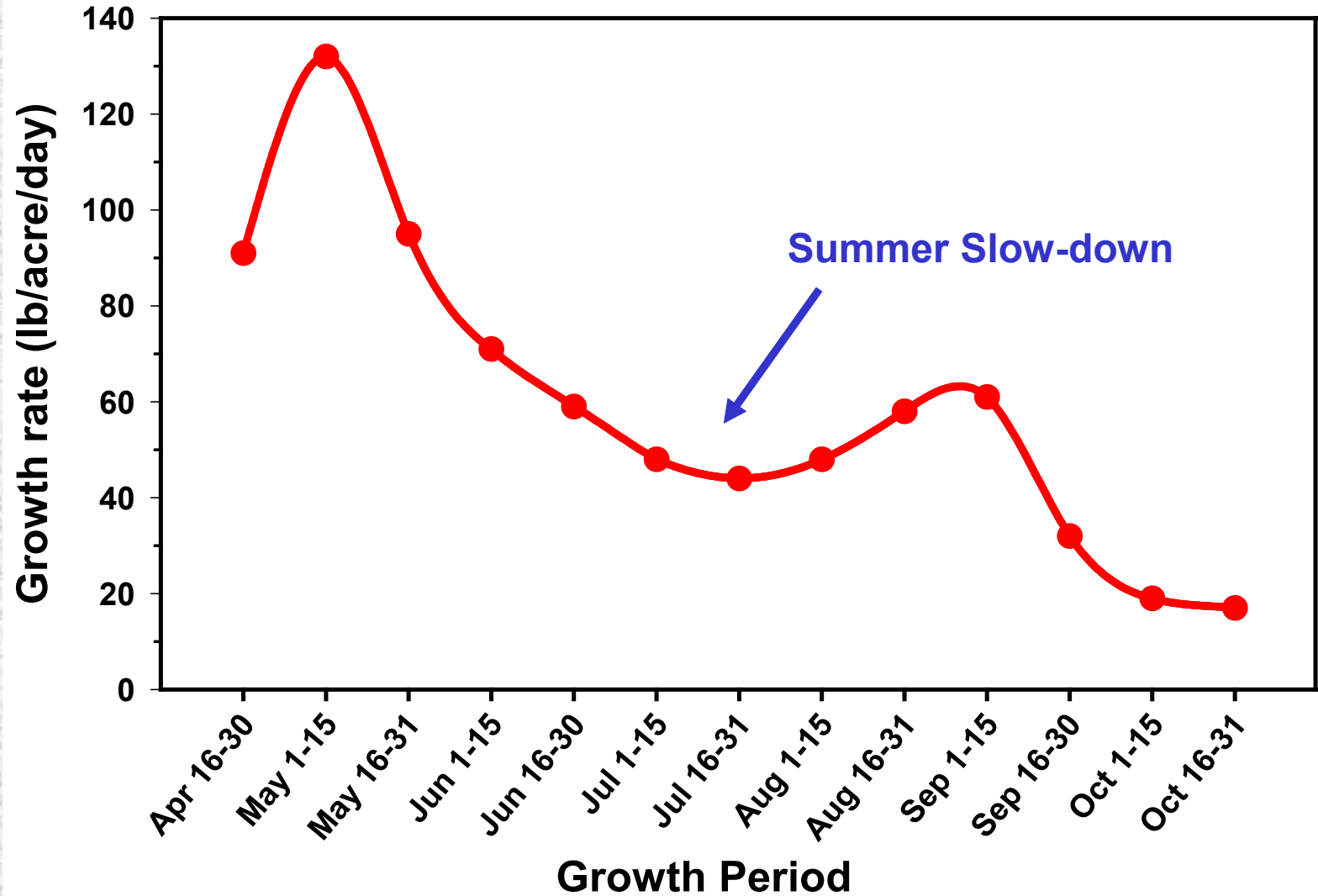
Head & type/acre	Months	AUM/ac
2 yearlings (600 lb)	4	5.6
3 yearlings (600 lb)	4	8.4
4 yearlings (600 lb)	4	11.2
1 cow-calf pair	5	7.0
1.5 cow-calf pair	5	10.5
2 cow-calf pair	5	14.0

Rotation Grazing:

- At least 5 to 6 pastures (paddocks).
- Graze to 6 inch stubble.
- 28 to 35 day rest periods.
- Flexibility in pasture movements, haying, stocking.



Average seasonal growth rate of 4 irrigated, cool-season perennial grasses, North Platte, 2003.¹



Grazing Management Principles

- **Rotational grazing with multiple (3 – 4) cycles during growing season.**
 - **Increases stocking density**
 - **Improves distribution and harvest efficiency**
 - **Periods of non-use to allow plant recovery after grazing.**
 - **Maintain adequate leaf area to increase rate of recovery and production.**
 - **Flexibility in stocking with grass growth.**
-

Grazing Strategies

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				Pairs (season-long)							
				Pairs (Range)	Yearlings						
				Pairs (Range)			No use – Stockpile		Calves		

Webinars: Irrigated Pasture

UNIVERSITY OF NEBRASKA-LINCOLN

UNL Beef

UNL | UNL Extension | Beef | Beef Webinars recorded in 2014 | Perennial Forages for Irrigated Pasture Webinars

HOME CATTLE PRODUCTION LEARNING MODULES, APPS AND WEBINARS REPORTS AND PROCEEDINGS UNL BEEFWATCH NEWSLETTER FIND A FACULTY EXPERT

Irrigated Pasture: four-part webinar series

December 2014

Dr. Jerry Volesky
Range / Forage Specialist
West Central Research & Extension Center
University of Nebraska-Lincoln

Perennial Forages for Irrigated Pasture

The demand for pasture in Nebraska, cattle prices and changes to crop prices is encouraging producers to consider the plating of perennial irrigated grass pastures. Dr. Volesky presents an overview of irrigated perennial pastures and

Beef Cattle Production

- Cow-calf, Bull and Heifer Nutrition and Management
- Breeding, Genetics & Reproduction
- Backgrounding, Yearling and Feedlot Nutrition and Management
- Forage, Pasture & Range Management
- By-Product Feeds
- Beef Forage Crops Systems
- Herd Health

Nebraska LINCOLN EXTENSION Know how. Know now.

Perennial Forages for Irrigated Pasture

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Webinar Part 1 - 2014

<http://beef.unl.edu>

Nebraska LINCOLN EXTENSION Know how. Know now.

Establishing Irrigated Pasture

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Webinar Part 2 - 2014

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Fertilizer and Water Management for Irrigated Pasture

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Webinar Part 3 - 2014

Nebraska LINCOLN EXTENSION Know how. Know now.

Grazing Management of Irrigated Pasture

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Webinar Part 4 - 2014

Alternative Forages

Annual forages, Cover crops
Forage cocktails



Use proven species
and varieties

Annual Forages

Winter Annuals

Fall seeded:

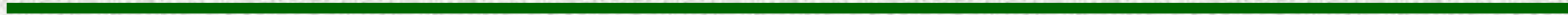
Winter wheat

Rye

Triticale

Barley

Annual ryegrass





Winter Annual Forages – June 8, 2023

Table 1. Height, and forage yield of winter annual forage entries, North Platte, NE. Harvest date: Jun 8 and Jun 14, 2023 for Willow Creek wheat.

Entry	Height	Forage yield
	<i>(inches)</i>	<i>(tons/acre)</i>
MTF 1435 Wheat	45	4.96
SY Monument wheat	35	4.73
Roadrunner Wheat	33	3.96
Forage FX 1001 triticale	62	4.76
SY EverRock wheat	32	4.50
AP Baldy wheat	33	4.06
AP Prolific wheat	33	4.67
Flex 719 triticale	56	4.33
Gunner Triticale	47	4.27
NT 11428 triticale	51	4.27
NT 13443 triticale	45	4.57
Willow Creek wheat	52	4.05
VNS rye	55	3.84

Table 2. Crude protein (CP), acid detergent fiber (ADF), and total digestible nutrients (TDN) of winter annual forage entries, North Platte, NE, 2023

Entry	CP	ADF	TDN
	----- % -----		
MTF 1435 Wheat	7.0	45.0	51.3
SY Monument Wheat	10.0	41.7	55.0
Roadrunner Wheat	9.2	39.3	57.8
Forage FX 1001 Triticale	6.2	43.2	53.4
SY EverRock Wheat	8.2	40.1	56.8
AP Baldy Wheat	9.7	36.4	61.1
AP Prolific Wheat	8.2	41.2	55.7
Flex 719 Triticale	7.9	45.9	50.3
Gunner Triticale	7.6	44.1	52.3
NT 11428 Triticale	7.3	41.5	55.3
NT 13443 Triticale	6.8	43.3	53.2
Willow Creek Wheat	8.4	44.9	51.4
VNS rye	5.8	46.2	49.9

Annual Forages

Cool Season Annuals

Spring seeded:

Oats

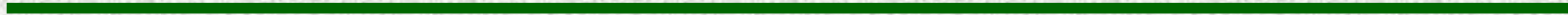
Spring triticale

Spring barley

Field peas

Several other legumes

Italian or annual ryegrass



Spring cool-season annuals

Planting date:

- Mid-March to mid-April (soil 43 – 45°F)
- Less yield with later planting
- Check for potential residual herbicide

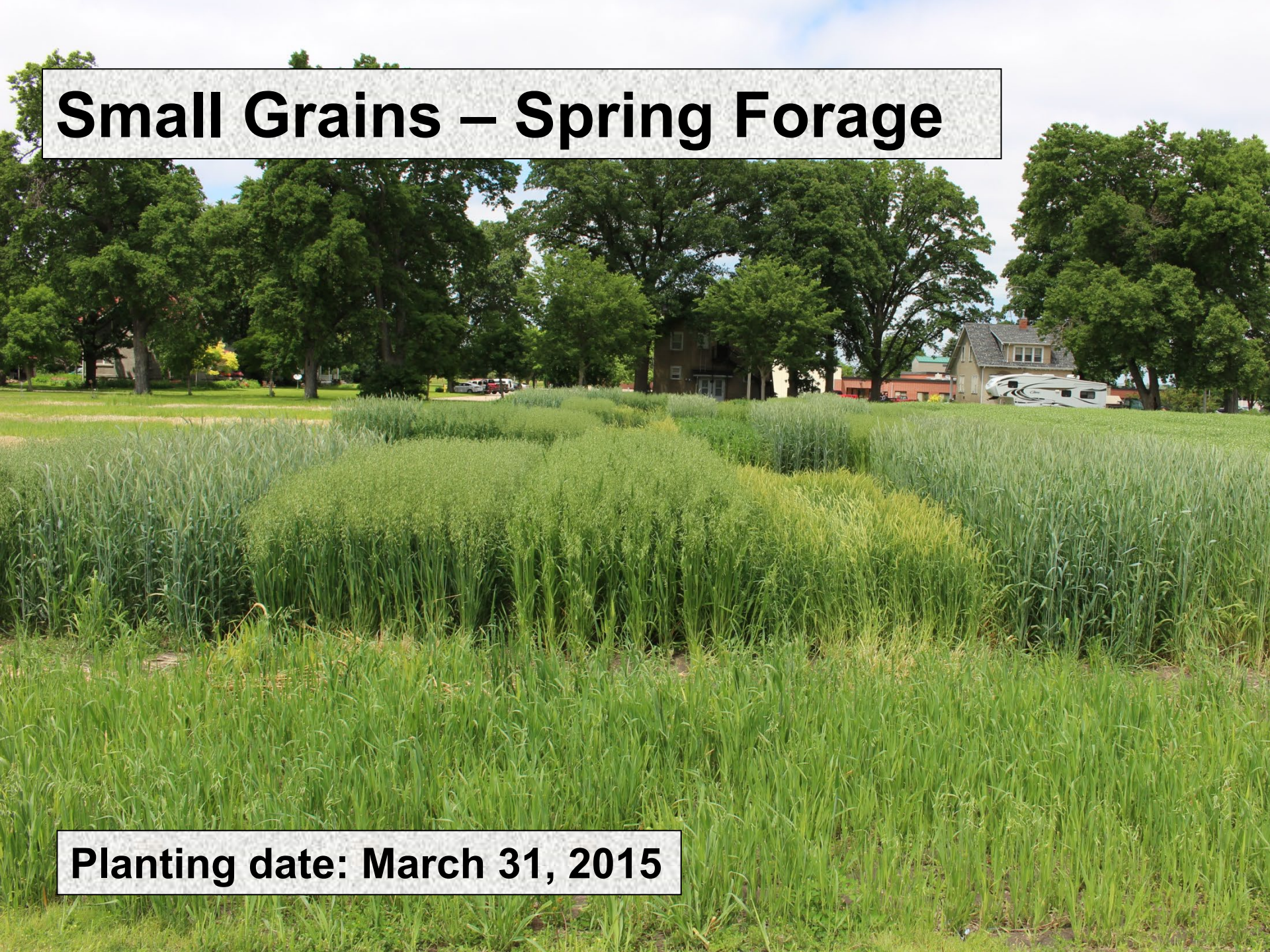
Seeding rate:

- Check with seed supplier or Extension office
- **NebGuide G2185** (*Utilizing Annual Forages with Limited Irrigation for Beef Cattle During and Following Drought*)

Fertilization:

- Soil test
- **Extension Circ.: EC 155** (*Nutrient Management for Agronomic Crops in Nebraska*)
- 50 – 75 lb N/acre (irrigated small grains)

Small Grains – Spring Forage

A wide-angle photograph of a lush green field of small grains, likely corn, growing in neat rows. The plants are tall and vibrant green, with some showing signs of maturity. In the background, a line of large, mature trees with dense green foliage separates the field from a residential area. A house with a grey roof and a white RV are visible among the trees. The sky is bright and slightly overcast.

Planting date: March 31, 2015

'Jerry' oats - - VNS spring triticale



'Haybet' barley - - '141' Triticale



Spring cereal forage harvest date, height at harvest and forage yield, North Platte, NE - 2015.

Entry	Harvest date ¹	Height (inches)	Forage yield ² (tons/acre)
'Everleaf 126' oats	7-July	- -	4.71 ^A
'Haybet' barley	22-June	44	4.39 ^{AB}
VNS spring triticale	22-June	58	4.29 ^{AB}
'141' spring triticale	22-June	63	4.21 ^{AB}
'Stallion' oats	22-June	56	4.16 ^{ABC}
'Shelby 427' oats	22-June	52	4.11 ^{ABC}
'Jerry' oats	22-June	54	3.82 ^{BC}
'Goliath' oats	22-June	58	3.41 ^C
LSD _{0.05}	- -	- -	0.77

¹ All entries harvested at an equal stage of maturity (late-milk to soft dough).

² Dry matter basis.

^{ABC} Means followed by unlike letters significantly differ (P < 0.05).

Spring cereal forage crude protein (CP) and total digestible nutrients (TDN). North Platte – 2015.

Entry	CP	TDN
	----- (%) -----	
'Goliath' oats	11.9 ^a	57 ^{ab}
VNS spring triticales	10.6 ^{ab}	58 ^A
'141' triticales	10.3 ^{ab}	51 ^{de}
'Haybet' barley	9.9 ^{bc}	53 ^{cd}
'Stallion' oats	9.8 ^{bcd}	52 ^d
'Shelby 427' oats'	9.3 ^{cde}	55 ^{bc}
'Jerry' oats	8.0 ^{de}	55 ^{bc}
'Everleaf 126' oats	7.7 ^e	53 ^{cd}
LSD _{0.05}	1.9	2.6

abcde Means followed by unlike letters significantly differ (P < 0.05).

Annual Forages

Warm Season Annuals

Late-spring or summer seeded:

Millet (grazing & hay types)

S X S hybrids

Sorghum

Sudangrass

Crabgrass

Teff

Corn

Several legumes



Warm-season annuals

Planting date:

- Mid-May to August (soil 60 – 70°F)
- Less yield (regrowth potential) with later planting

Seeding rate:

- Check with seed supplier or Extension office
- **NebGuide G2183** (*Summer Annual Forage Grasses*)

Fertilization:

- Soil test
- **Extension Circ.: EC 155** (*Nutrient Management for Agronomic Crops in Nebraska*)
- 40 – 80 lb N/acre (high end when irrigated)

Range of dry matter yield for summer annual forages under irrigated conditions.

Forage	Tons/acre
Sudangrass	4.1 to 4.8
Sorghum-sudangrass hybrid	4.2 to 5.3
Forage sorghum	4.4 to 5.3
Pearl millet	3.8 to 4.5
Foxtail millet	2.8 to 3.8
Teff	2.6 to 3.8

*** Yield ranges include the primary and regrowth harvest for all forages except forage sorghum and foxtail millet.**

Teff



Harvest and total dry matter yield of teff, crabgrass, and foxtail millet, 2007, North Platte.

	1 st Harvest	2 nd Harvest	3 rd Harvest	Total
Forage Entry	----- Tons/acre -----			
<i>'Tiffany'</i> teff	2.02	2.22	0.85	5.10 ^{AB}
<i>'Pharoah'</i> teff	1.95	2.46	0.96	5.36 ^{AB}
<i>'Red River'</i> crabgrass	2.52	2.25	1.02	5.79 ^A
Common crabgrass	1.94	2.08	0.92	4.94 ^B
<i>'White Wonder'</i> foxtail millet	4.80	--	--	4.80 ^B
LSD _{0.05}				0.74

^{AB} Total yield means followed by unlike letters significantly differ (P < 0.05).

Annual Forages

Summer or late-summer seeded (for fall / winter forage):

Oats, barley, spring triticale, spring wheat, ryegrass, peas, and/or turnips, other brassicas

- **Planting date: late July through August**

Winter wheat, rye, triticale

Planting date: late August – September

- **Some fall/winter forage, mostly the following spring**

Fall small grain harvest date, height at harvest and forage yield, North Platte, NE – 2012^{1,2}.

Entry	Harvest date	Height (inches)	Forage yield ² (tons/acre)
Spring triticale	29-Oct	38	4.48 ^A
'Shelby' oats	29-Oct	35	4.07 ^{AB}
'Haybet' barley	29-Oct	30	3.88 ^B
'Brick' hard red spring wheat	29-Oct	31	3.17 ^C
'Stallion' oats	29-Oct	32	3.08 ^C
Winter wheat	29-Oct	15	2.38 ^D
'Ocala' annual ryegrass	29-Oct & 30-Nov	14	1.33 + 0.28 = 1.62 ^E
'Fria' annual ryegrass	29-Oct & 30-Nov	13	1.18 + 0.29 = 1.47 ^E
LSD _{0.05}	- -	- -	0.56

¹ All entries planted on August 13, 2012.

² Dry matter basis.

ABCDE Means followed by unlike letters significantly differ (P < 0.05).

Forage Cocktail / Cover Crop in wheat residue



Turnip

Soybean



Lentil

Pea

**Oil seed
radish**

Sorghum

Oats + Turnips

(2.40 AUM/acre)

(72 AUD/acre)

Freeze-down...late November to
mid-December



Nov. 1, 2004



Sept. 21 planting

Cool-season annual forages must be planted by September 1 (+/-) to produce significant fall forage.

Aug. 13 planting

Warm-season annual forages must be planted by August 10 (+/-) to produce significant fall forage.

Photo: Oct. 8, 2012

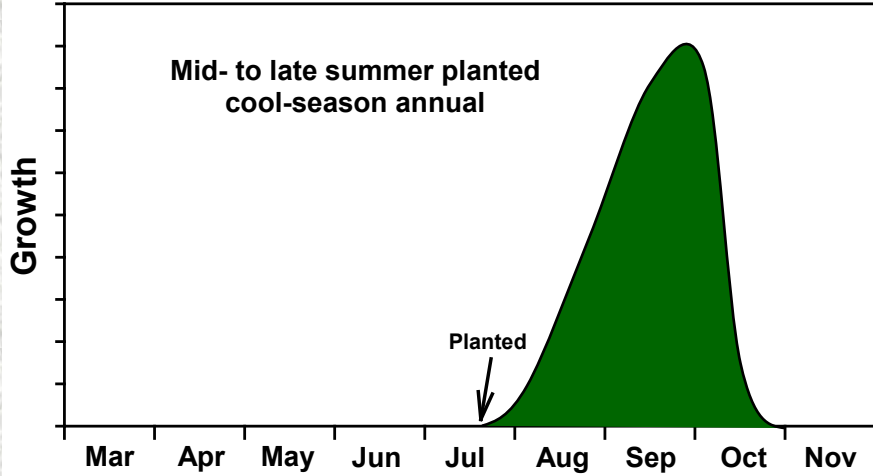
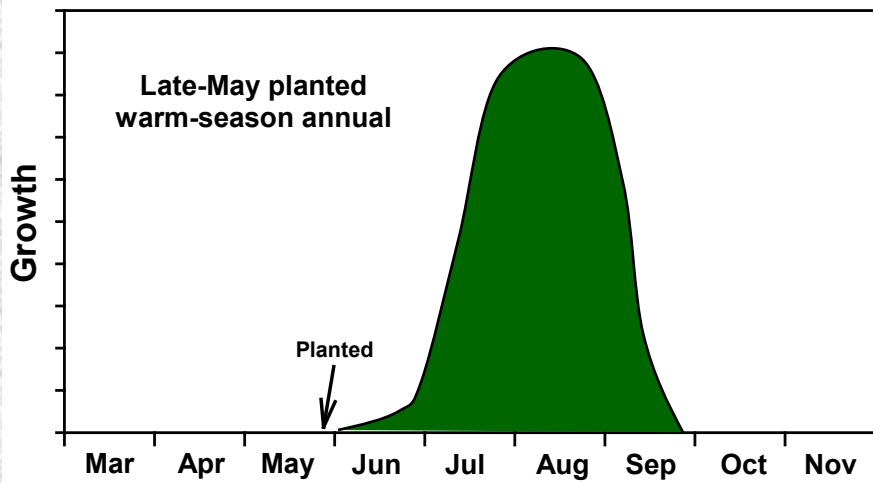
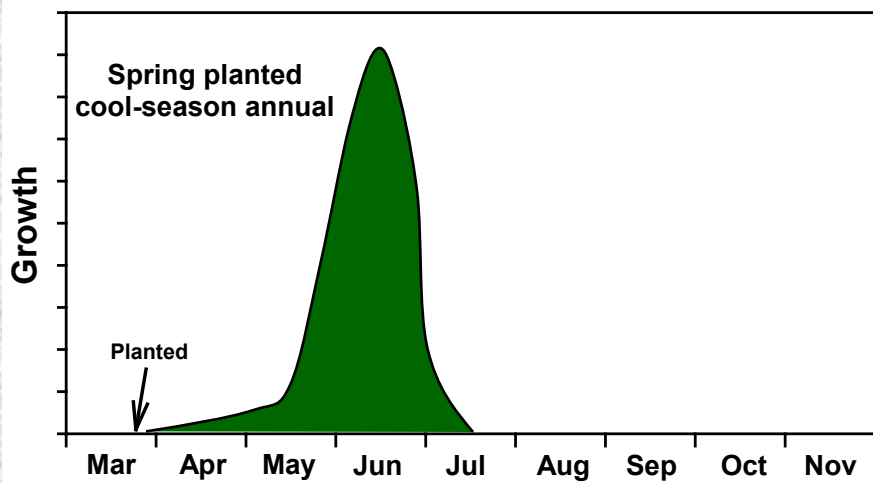


Grazing Annual Forages

BMR Sorghum-Sudan Hybrid

Grazing Annual Forages

- **Grazing not as efficient as haying.**
 - Grazing interrupts plant growth, may reduce potential growth.
 - Trampling losses.
 - **Start at appropriate stage or height.**
 - **Simple rotations beneficial.**
 - **Staggered plantings (warm-season annuals).**
-



Cool- and warm-season double-cropped annuals

Table 1. System A: example of approximate planting and grazing periods of double-cropped annual forages to provide extended grazing.

Field	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1	Plant cool-season forage ¹ →			Graze		← Plant cool-season forage ²		Graze	
2			Plant warm-season forage ³ →		Graze			←	Plant winter annual for next spring ⁴
3 (optional)	Plant cool-season forage ¹ →			Graze (or hay in late June)		← Plant warm-season forage ⁵			Stockpiled. Graze in Nov., Dec., Jan. +

¹ Cool-season forages could include oats, spring triticale, barley, field peas, or mixtures.

² Cool-season forages could include oats, spring triticale, barley, field peas, turnips, radishes, or mixtures.

³ Warm-season forages could include sudangrass, pearl millet, sorghum-sudangrass hybrids, corn, soybeans, sunflowers, or mixtures.

⁴ Plant winter annual (rye, triticale, or wheat) for the following spring.

⁵ Warm-season forages could include sudangrass, pearl millet, sorghum-sudangrass hybrids, corn, soybeans, sunflowers, or mixtures. These acres would be stockpiled for grazing during the winter months.

Table 2. System B: example of approximate planting and grazing periods of double-cropped annual forages to provide extended grazing.

Field	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1	Winter annual planted previous fall ¹ →	Graze		← Plant warm-season forage ²	Graze			← Plant winter annual ³	
2	Plant cool-season forage ⁴ →			Graze		← Plant cool-season forage ⁵		Graze	

¹ Winter annual (rye, triticale, or wheat) planted the previous fall.

² Warm-season forages could include sudangrass, pearl millet, sorghum-sudangrass hybrids, corn, soybeans, sunflowers, or mixtures.

³ Plant winter annual (rye, triticale, or wheat) for the following spring.

⁴ Cool-season forages could include oats, spring triticale, barley, field peas, or mixtures.

⁵ Cool-season forages could include oats, spring triticale, barley, field peas, turnips, radishes, or mixtures.

Table 3. Approximate stocking rates for early-spring planted cool-season annual forages (oats, spring triticale, barley, field peas, or mixtures) or fall-planted winter annuals (rye, triticale or wheat) grazed in spring. based on a range of potential hay yields and a grazing efficiency of 50%.¹

			Cow-calf pairs per acre ²	
Potential hay yield (Tons/acre)	AUM/acre ³	AUD/acre ³	for 1 month	for 1.5 months
1.5	1.92	58	1.28	0.85
2.5	3.21	96	2.14	1.42
3.5	4.49	135	2.99	1.99

¹ Typical grazing period would be late May through early July.

² To convert cow-calf pairs per acre to yearlings (600 to 800 lb.) per acre, multiply by 2. A cow-calf pair is assumed to be 1.5 AU (1500 lb.)

³ AUM = animal unit month; AUD = animal unit day.

Thank You

