Forage Systems for Dairy Grazing

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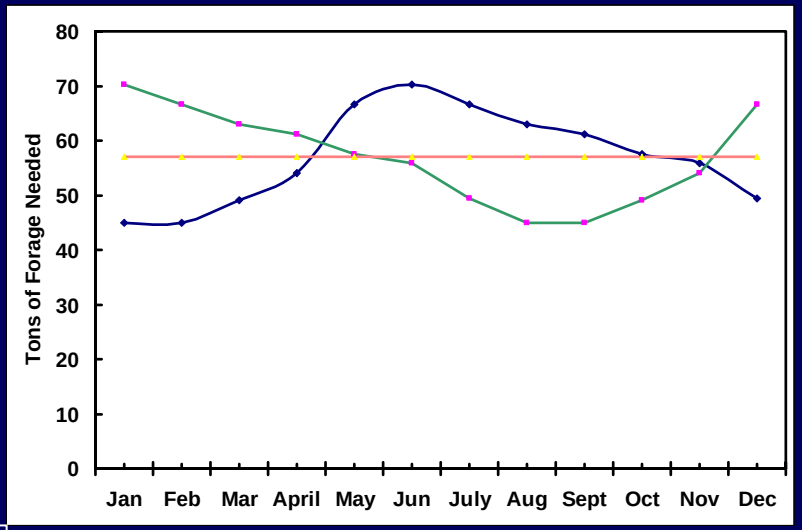
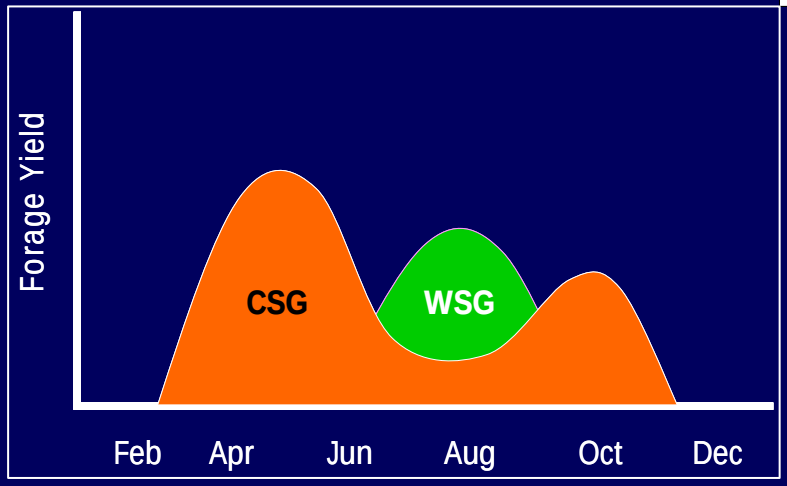
Pasture-based Systems often appear Complex



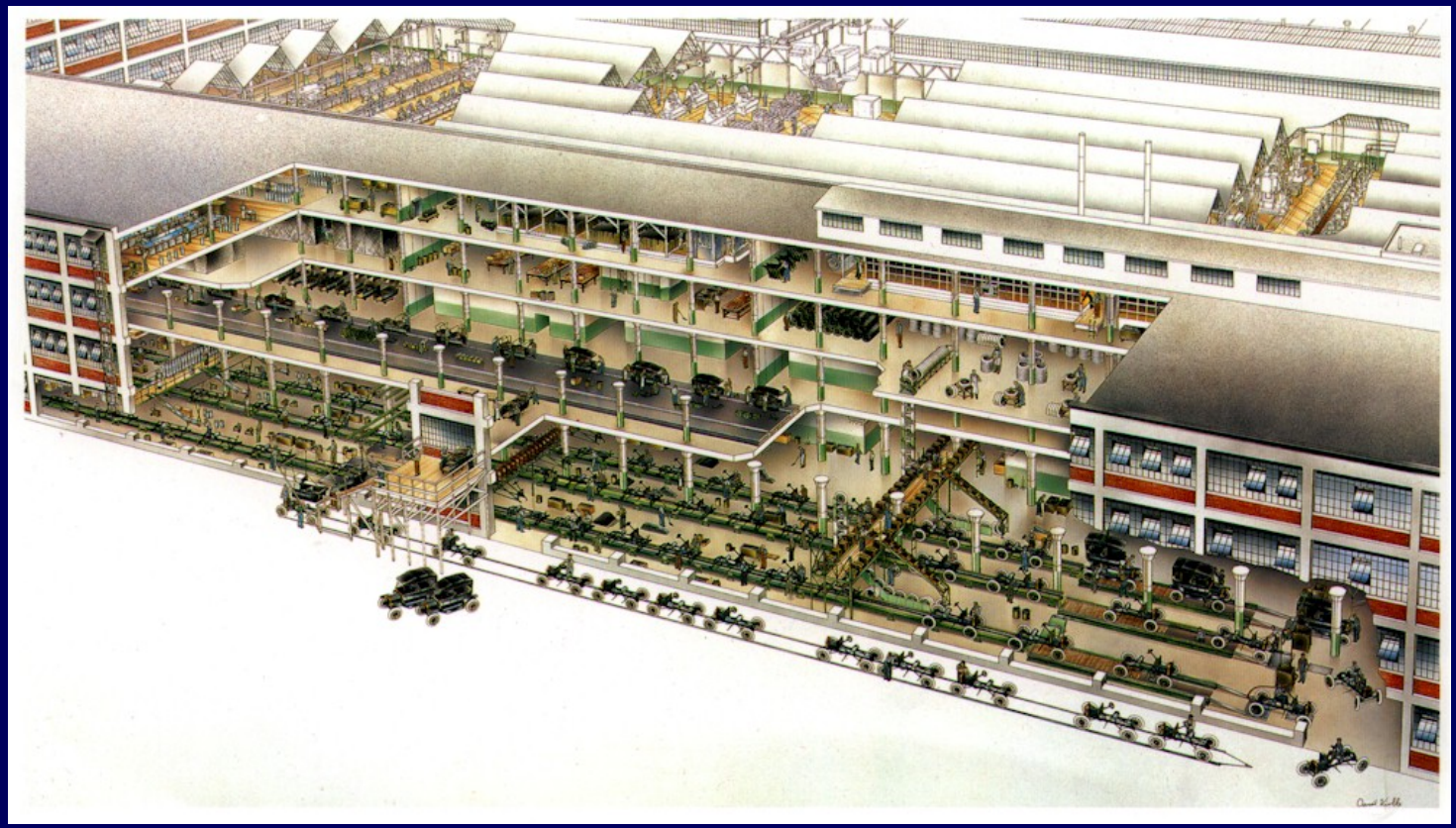


Concepts

- Simple...Allows owner to manage and grow scale
- Repeatable...Must work across a wide variety of conditions
- Profitable...Have to make $ to remain in business

Production Planning

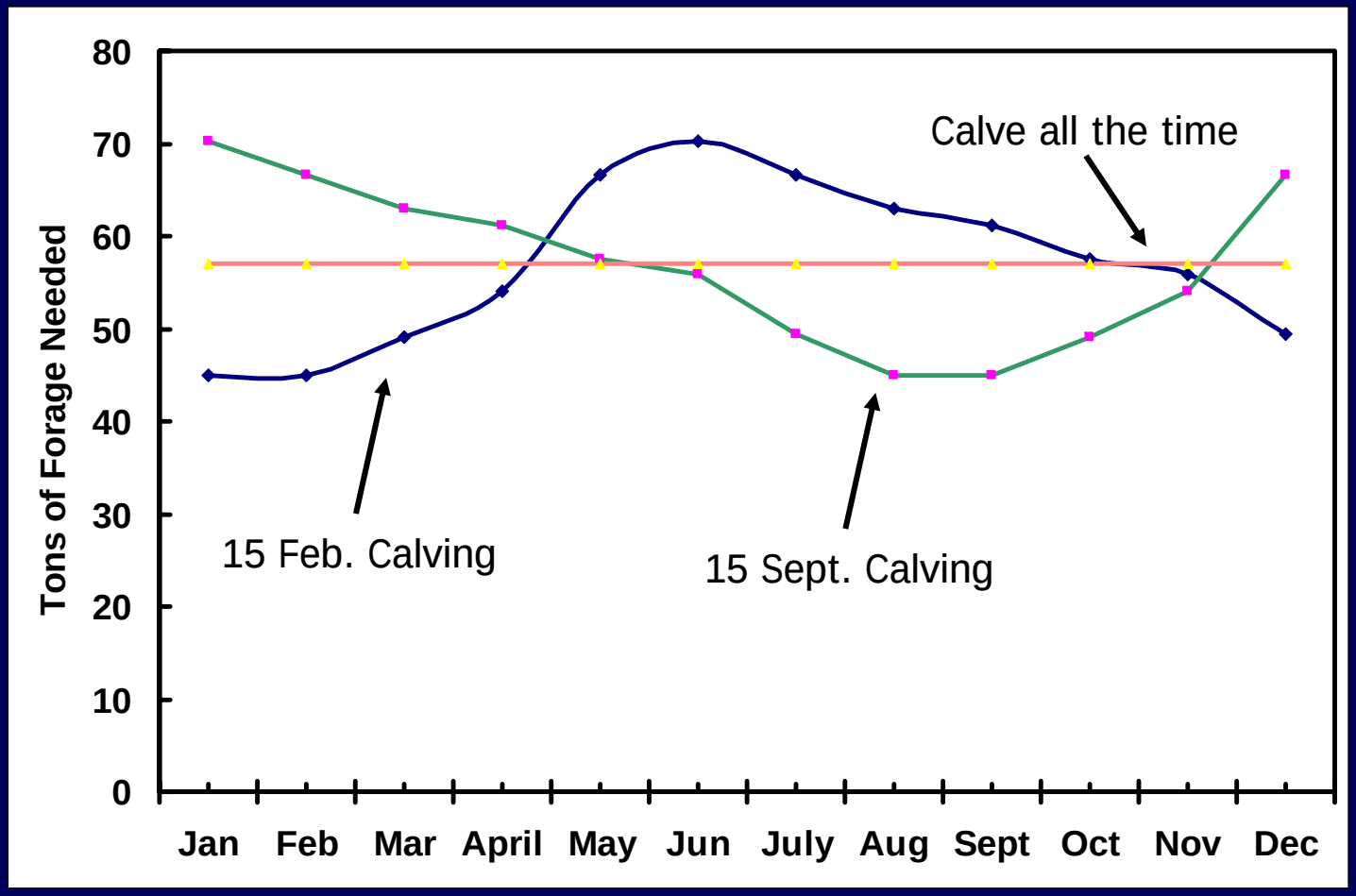
- A pretty ordinary thing in successful business models



Key Factors for Managing Forage Systems

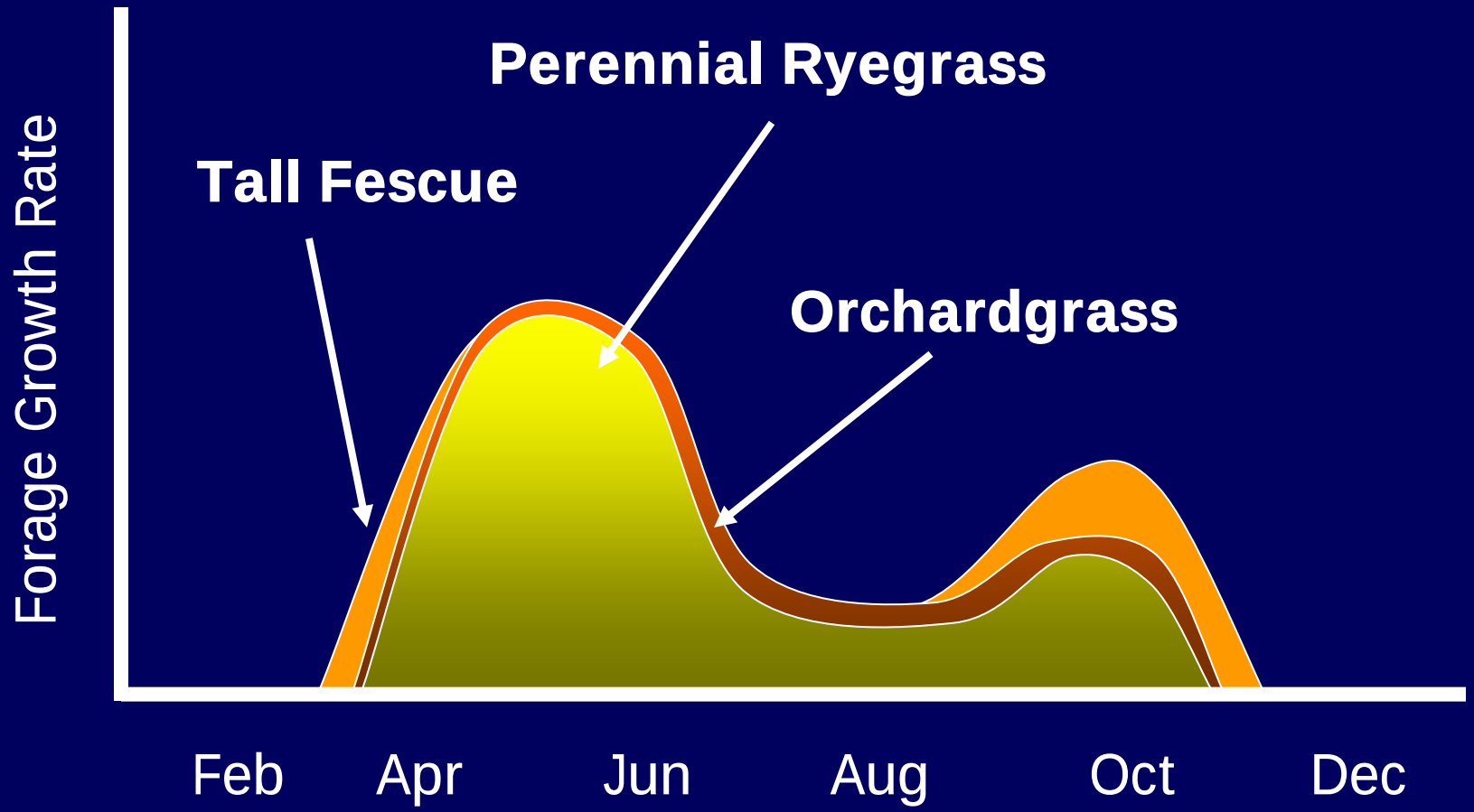
- Understand what nutrients your cows need and when they need them
  - Calving season of most importance
- Select forages that fit your climate, soils, calving season
  - Prepare a pasture growth budget
  - Develop plans for forage growth deficits and excesses
  - Monitor production frequently
- Optimize quality by grazing management
  - Turn in at ~2750 lb/acre for most species
  - Turn out at ~1150 lb/acre for most species

Monthly Dry Matter Demand



100 cow herd – 1,200 lb cows – 13,000 lb milk/cow/yr

Cool Season Grasses



Perennial Ryegrass

- Medium to high yield potential
- Fair to poor persistence (2 to 4 yrs.)
- Fair tolerance to:
  - poor drainage
  - low soil fertility
- Poor tolerance to:
  - drought
  - heat stress
  - cold temperatures
- Forage quality good to excellent if managed

Orchardgrass

- Medium to high yield potential
- Medium persistence (3-5 yrs.)
- Good tolerance to:
  - cold temperatures
- Fair tolerance to:
  - poor drainage
  - low soil fertility
  - drought
  - heat stress
- Forage quality can be good but matures early

Tall Fescue

- Medium to high yield potential
- Medium persistence
- Good tolerance to:
  - cold temperatures
  - poor drainage
- Fair tolerance to:
  - low soil fertility
  - drought
  - heat stress
- Good forage quality but problems with E+ types formidable

Milk Production from Tall Fescue

Type	Intake	Milk Yield
	lb/d	lb/d
KY 31 Infected	15.6	34.3
KY 31 Uninfected	20.0	43.1

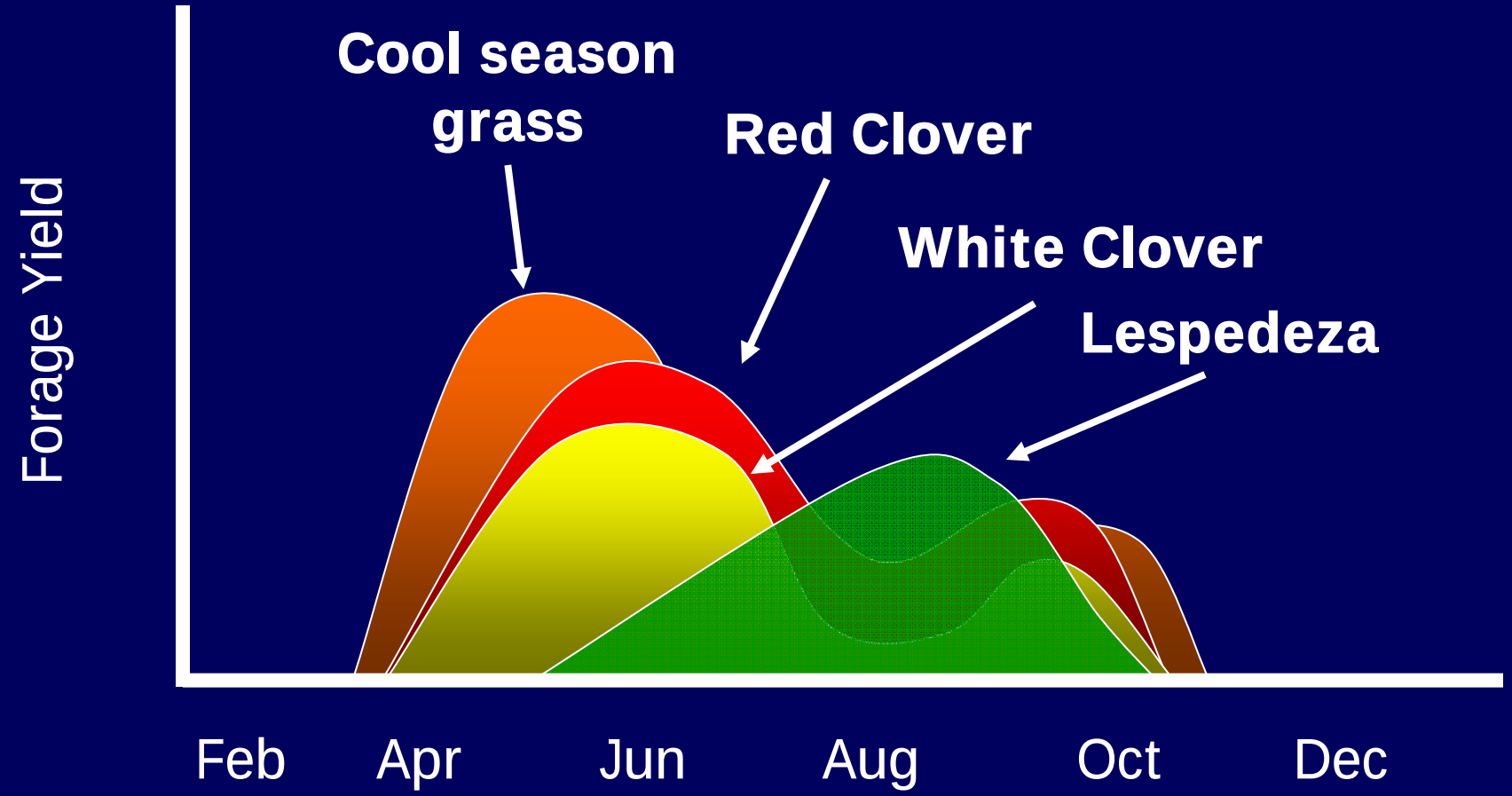
Strahan et al., 1987

Cool-Season Grasses:
Species or Management?

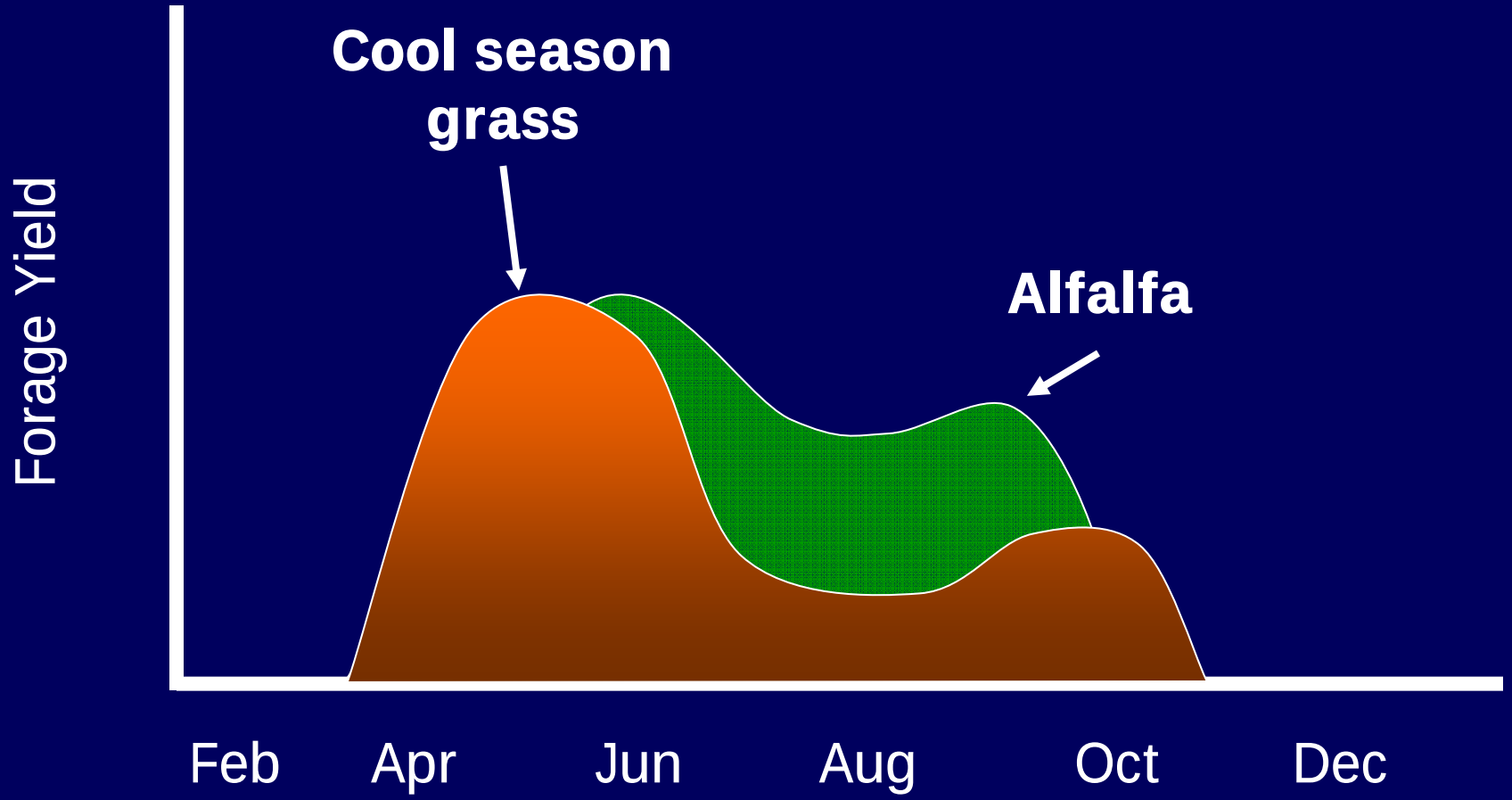
Type	-- Initial Height -- 6-10	12-14
	milk (lb/day)	
Tall Fescue (EF)	58.0	42.4
Orchardgrass	58.2	43.2
Perennial Ryegrass	59.2	44.5

Summary of five studies

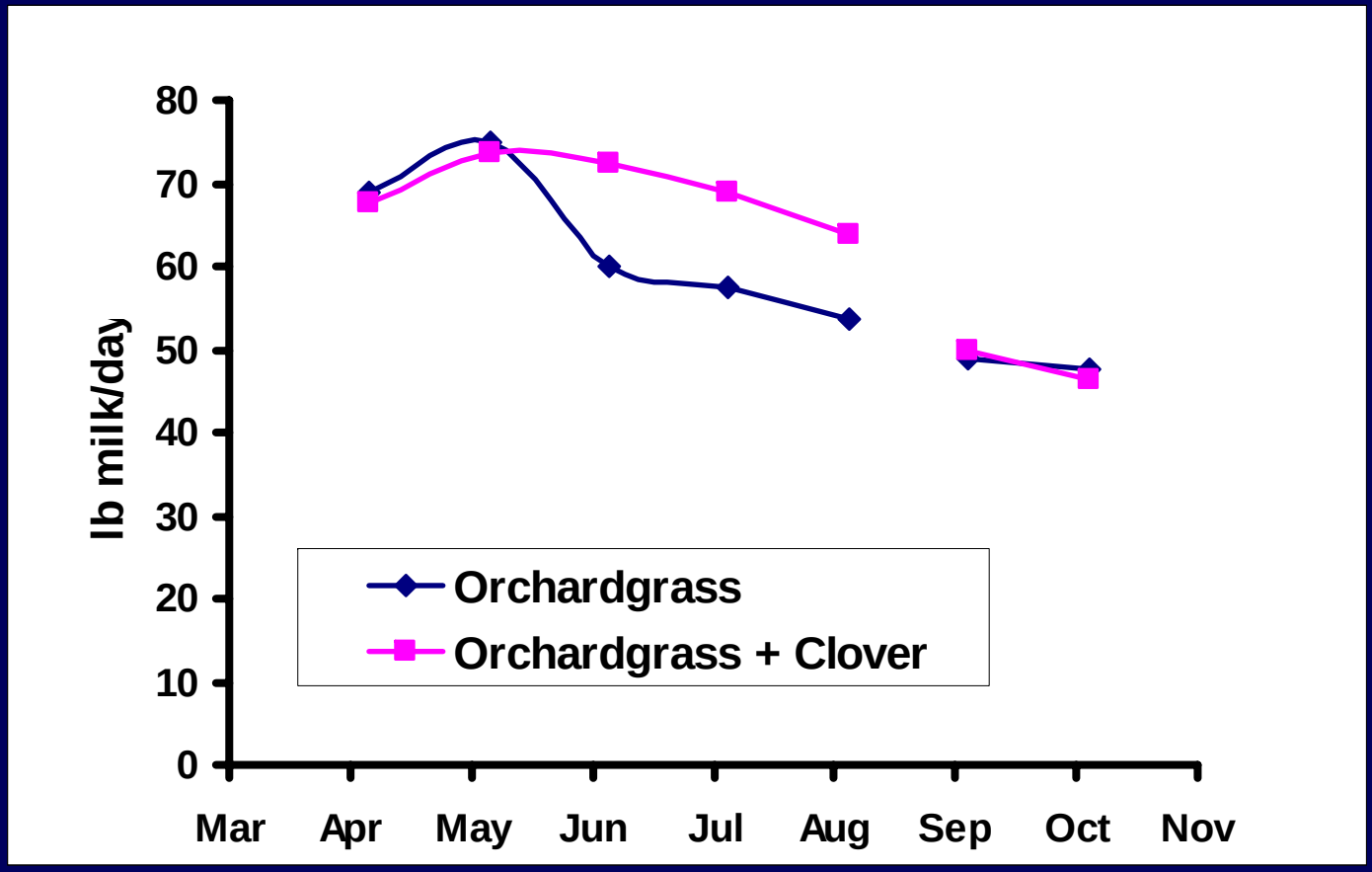
Cool Season Grass with Legumes



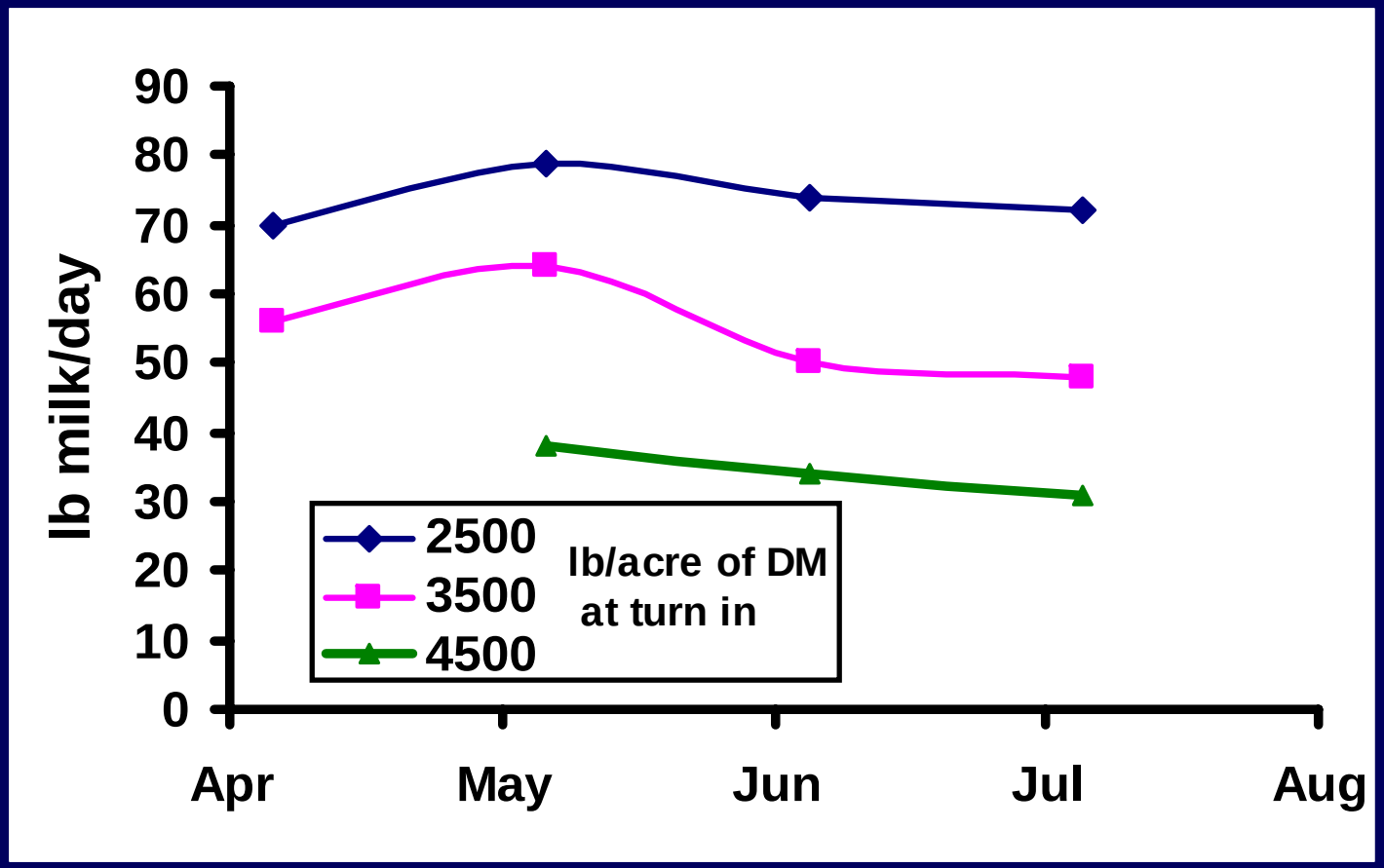
Cool Season Grass with Alfalfa



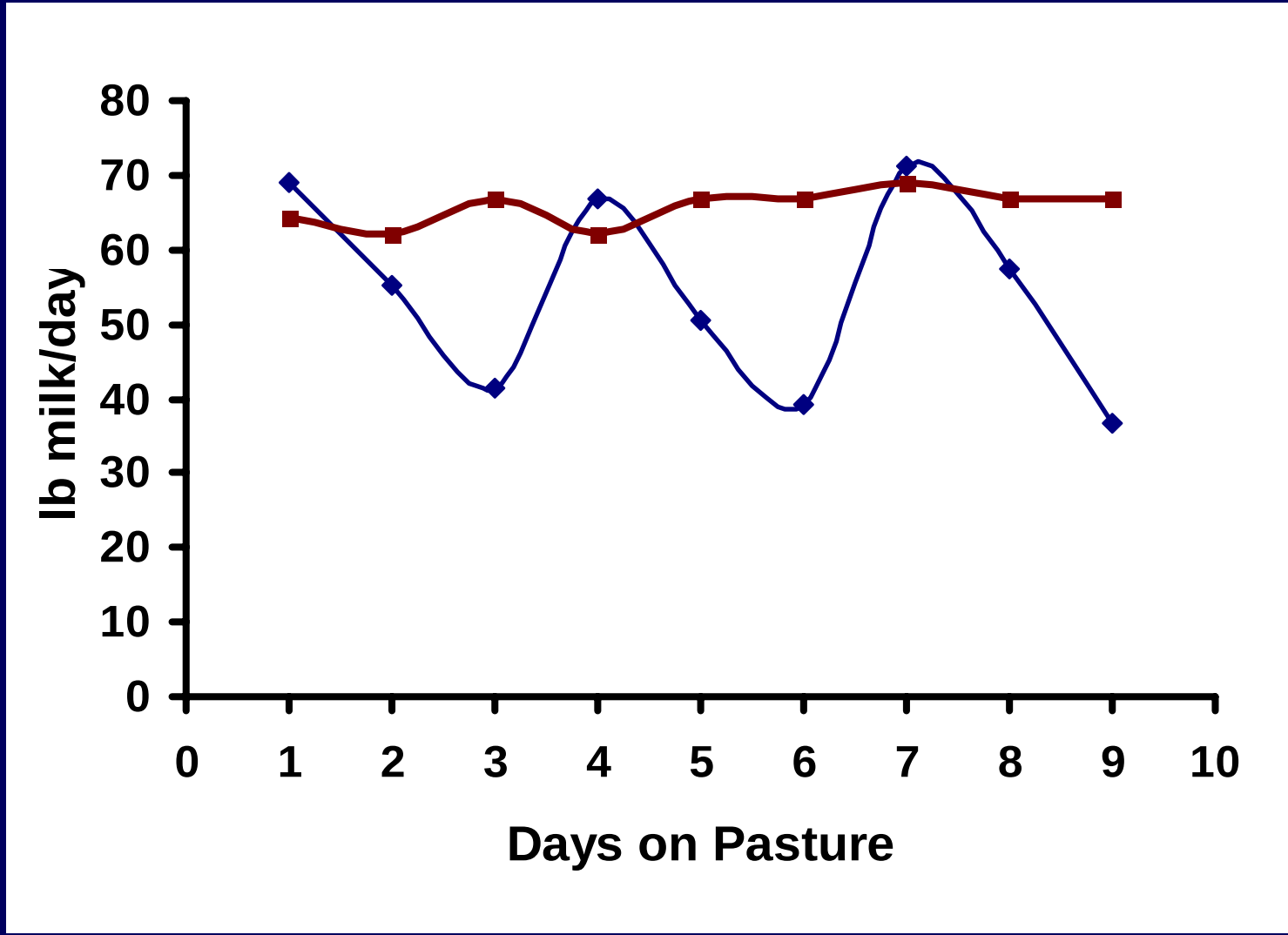
The Benefit of Legumes in Grass Pastures



Allocation of Pasture for Dairy Cattle



Length of Rotation Matters



Pasture Budgeting

- What do you expect from your pasture?
  - When do you expect to get it?
  - How do you plan to deal with deficits in forage production?
  - How are you going to deal with excess forage production?

Perennial Ryegrass/Clover

	Monthly Forage Balance							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	---------- tons ----------							
Perennial Ryegrass/Clover	4	97	168	86	39	11	51	33
Forage Needed by Herd	49	54	67	70	67	63	61	58
Forage Surplus/Deficit	-45	43	101	16	-28	-52	-10	-25

- Perennial ryegrass/clover – 100 acres – 5 t/a
- Stocking rate: 100 milking cows on 100 acres
- 15 Feb calving
- 10 lb grain/day
- 13,000 lb annual milk

Forage balance = 1 tons
Excess to be harvested = 160 tons
Excess to be fed back = 159 tons

Orchardgrass/Clover

	Monthly Forage Balance							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	---------- tons ----------							
Orchardgrass/Clover	5	89	154	105	45	25	70	41
Forage Needed by Herd	49	54	67	70	67	63	61	58
Forage Surplus/Deficit	-44	35	87	35	-22	-38	9	-17

- Orchardgrass/clover – 100 acres – 5.5 t/a
- Stocking rate: 100 milking cows on 100 acres
- 15 Feb calving
- 10 lb grain/day
- 13,000 lb annual milk

Forage balance = 44 tons
Excess to be harvested = 166 tons
Excess to be fed back = 122 tons

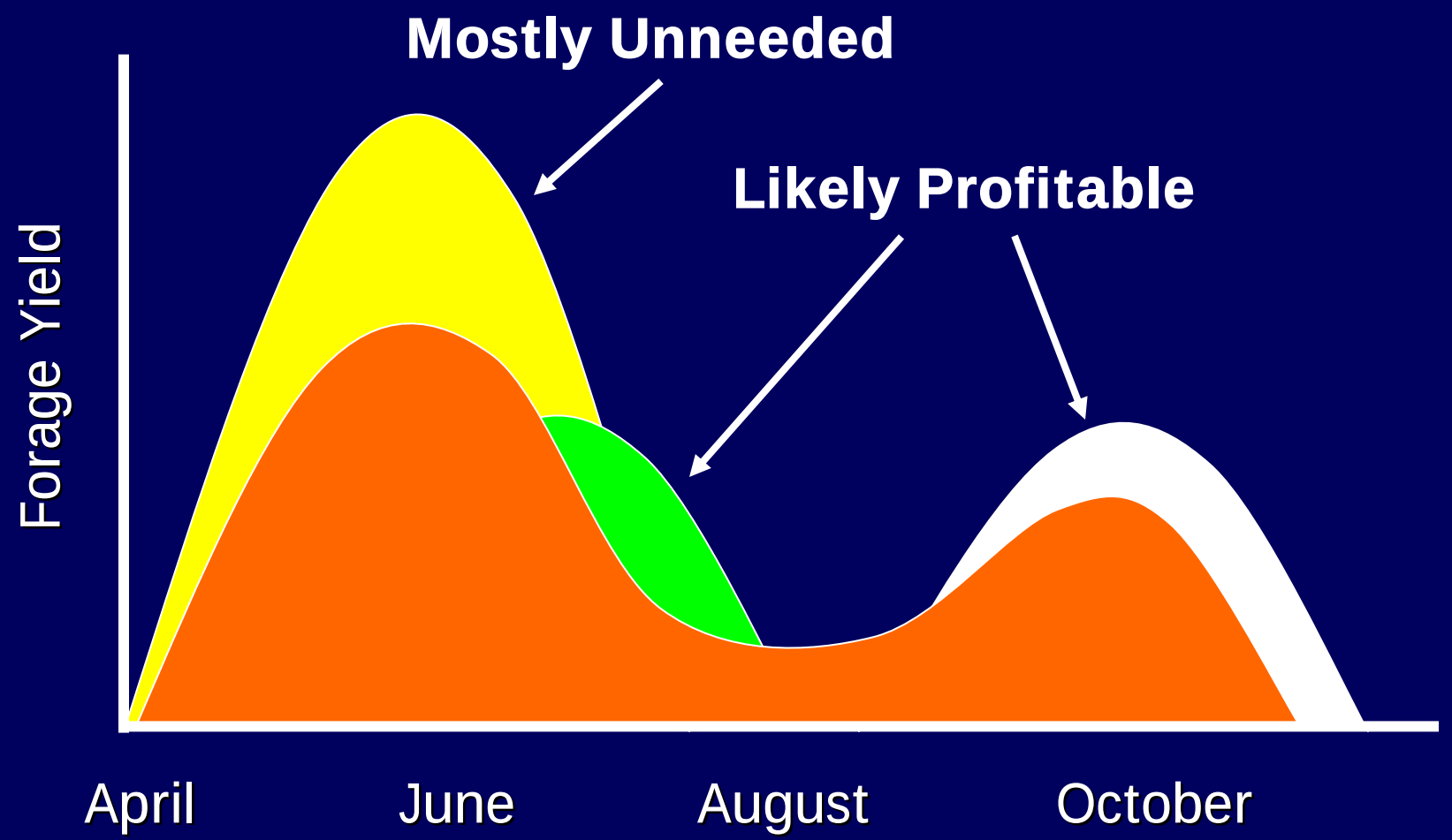
Tall fescue (non-toxic)/Clover

	Monthly Forage Balance							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	---------- tons ----------							
Tall fescue/clover	9	78	167	114	61	11	67	75
Forage Needed by Herd	49	54	67	70	67	63	61	58
Forage Surplus/Deficit	-40	24	100	44	-6	-52	6	17

- Tall fescue/clover – 100 acres – 6.0 t/a
- Stocking rate: 100 milking cows on 100 acres
- 15 Feb calving
- 10 lb grain/day
- 13,000 lb annual milk

Forage balance = 93 tons
Excess to be harvested = 191 tons
Excess to be fed back = 98 tons

Nitrogen for Cool-season grasses



Orchardgrass + 60 lb/N in Early Spring

	Monthly Forage Balance							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	---------- tons ----------							
Orchardgrass + N	5	139	214	115	45	25	70	41
Forage Needed by Herd	49	54	67	70	67	63	61	58
Forage Surplus/Deficit	-44	85	147	45	-22	-38	9	-17

- Orchardgrass – 100 acres – 6.5 t/a
- Stocking rate: 100 milking cows on 100 acres
- 15 Feb calving
- 10 lb grain/day
- 13,000 lb annual milk

Forage balance = 165 tons
Excess to be harvested = 286 tons
Excess to be fed back = 121 tons

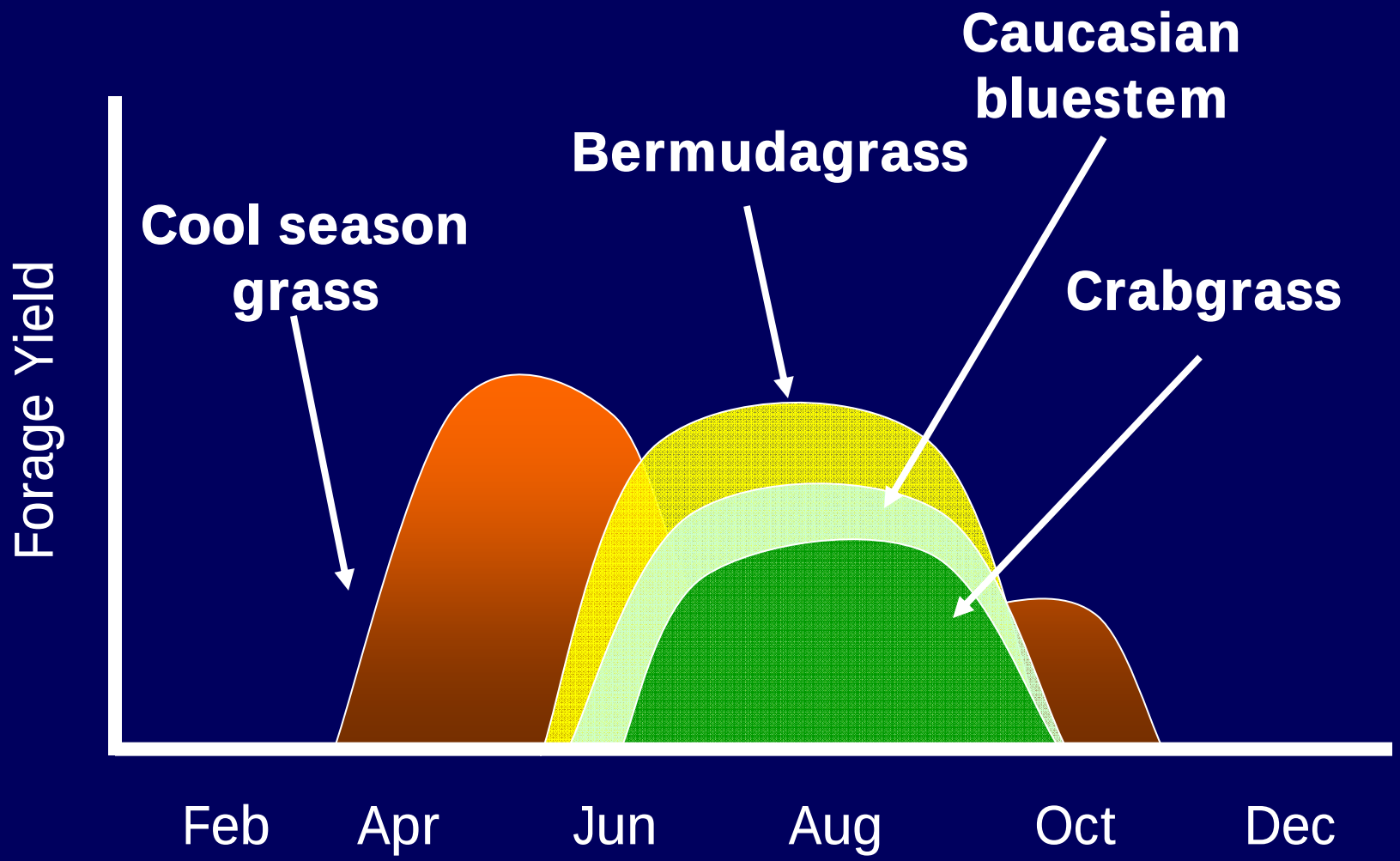
Orchardgrass
+ 60 lb/N in August

	Monthly Forage Balance							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	---------- tons ----------							
Orchardgrass	5	89	154	105	45	50	95	71
Forage Needed by Herd	49	54	67	70	67	63	61	58
Forage Surplus/Deficit	-44	35	87	35	-22	-13	34	13

- Orchardgrass – 100 acres – 6.3 t/a
- Stocking rate: 100 milking cows on 100 acres
- 15 Feb calving
- 10 lb grain/day
- 13,000 lb annual milk

Forage balance = 125 tons
Excess to be harvested = 204 tons
Excess to be fed back = 79 tons

Warm Season Grasses



Milk Production from Warm-Season Grasses

Type	Milk Yield
	lb/d
Bermudagrass	47.0
CSG mix	41.3

Bermudagrass

- High yield potential
- Fair to good persistence depending on cultivar
- Most forage types sprigged
- Good tolerance to:
  - heat stress
- Fair tolerance to:
  - drought
  - poor soil fertility
  - poor drainage
  - cold temperatures
- Forage quality good if managed but refusal an issue at times

Caucasian Bluestem

- Medium yield potential
- Good persistence
- Good tolerance to:
  - heat stress
  - drought
  - poor soil fertility
  - cold temperatures
- Poor tolerance to:
  - poor drainage
- Forage quality good if grazed hard and often. Lousy forage quality if allowed to mature.
- Difficult to interseed a winter crop into these stands.

Crabgrass

- Medium yield potential
- Good persistence if reseeding is managed properly
- Good tolerance to:
  - heat stress
  - poor drainage
  - poor soil fertility
- Fair tolerance to:
  - drought
- Forage quality good. Probably the easiest to manage for dairy quality feed.

Bermudagrass Only

	Monthly Forage Balance							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	---------- tons ----------							
Bermudagrass	0	0	108	150	162	120	60	0
Forage Needed by Herd	49	54	67	70	67	63	61	58
Forage Surplus/Deficit	-49	-54	41	80	95	57	-1	-58

- Bermudagrass – 6.0 t/a
- Stocking rate: 100 milking cows on 100 acres
- 15 Feb calving
- 10 lb grain/day
- 13,000 lb annual milk

Forage balance = 111 tons
Excess to be harvested = 273 tons
Excess to be fed back = 162 tons

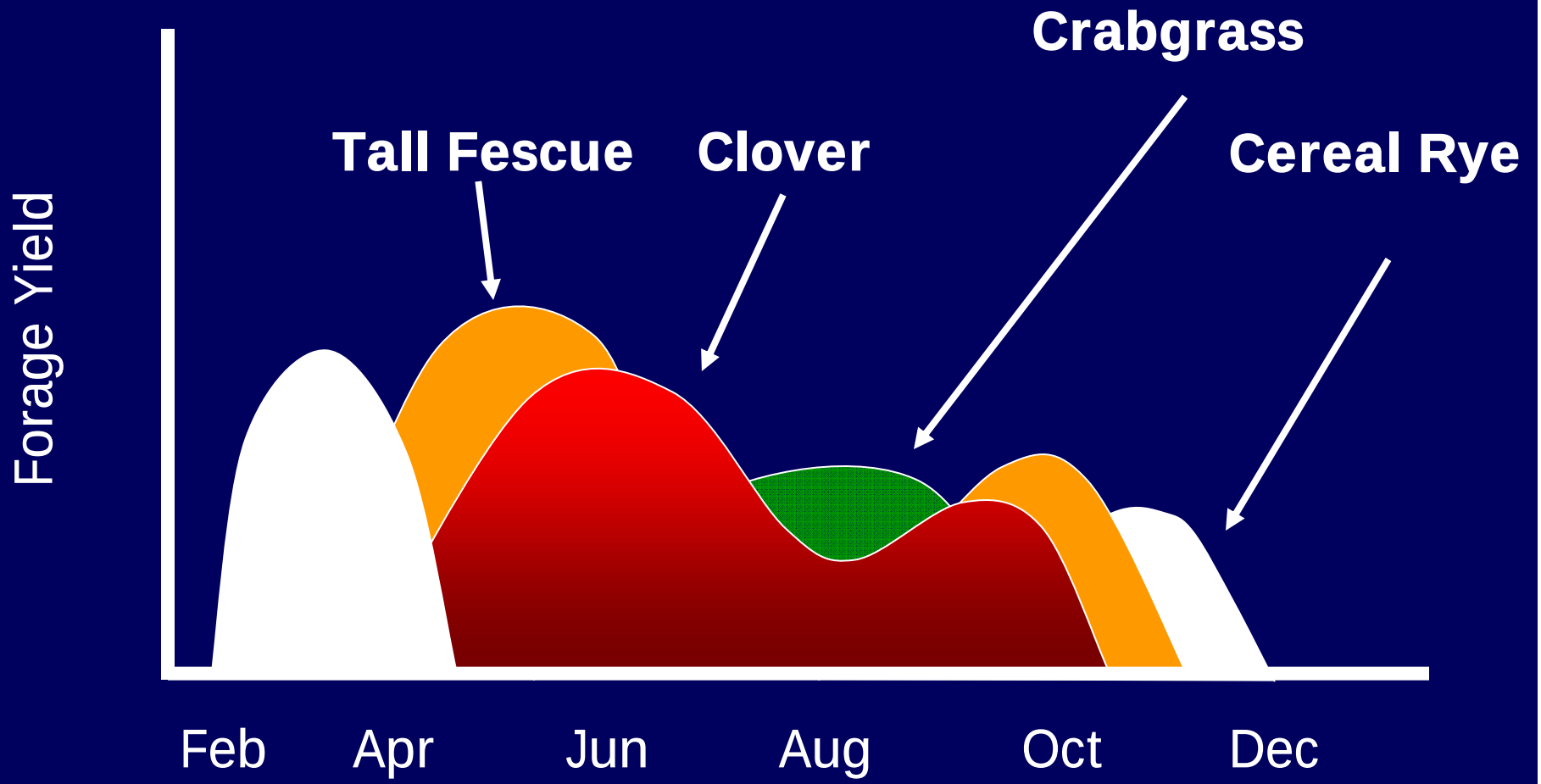
Crabgrass Only

	Monthly Forage Balance							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	---------- tons ----------							
Crabgrass	0	0	0	116	128	100	56	0
Forage Needed by Herd	49	54	67	70	67	63	61	58
Forage Surplus/Deficit	-49	-54	-67	46	61	37	-5	-58

- Crabgrass – 4.0 t/a
- Stocking rate: 100 milking cows on 100 acres
- 15 Feb calving
- 10 lb grain/day
- 13,000 lb annual milk

Forage balance = -89 tons
Excess to be harvested = 144 tons
Excess to be fed back = 233 tons

A Simple System



50% Tall Fescue/clover
50% Crabgrass – Cereal Rye

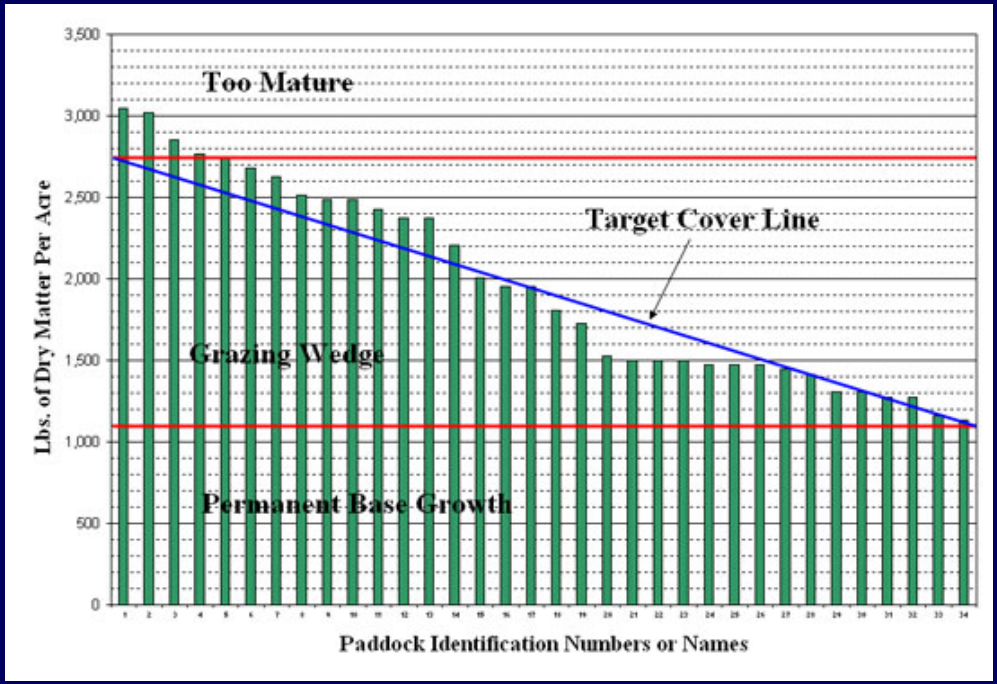
	Monthly Forage Balance							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
	---------- tons ----------							
Tall Fescue/clover	4	39	83	57	31	6	34	38
Crabgrass – Cereal rye	51	45	0	45	66	54	15	15
Forage Needed by Herd	49	54	67	70	67	63	61	58
Forage Surplus/Deficit	6	30	16	32	30	-3	-12	-6

- Tall fescue/clover – 50 acres – 6.0 t/a
- Crabgrass interseeded with rye in fall – 6.0 t/a
- Stocking rate: 100 milking cows on 100 acres
- 15 Feb calving
- 10 lb grain/day
- 13,000 lb annual milk

Forage balance = 93 tons
Excess to be harvested = 114 tons
Excess to be fed back = 21 tons

Monitor Pasture Growth

http://agebb.missouri.edu/dairy/grazing/wedge/index.htm



Monitor Pasture Growth

- Look at the entire system weekly
  - Does pasture growth meet your expectations?
    - Some folks even measure it.
  - How do current weather forecasts alter growth for the next week to two weeks?
  - How has your system responded historically at this time of year?

Key Factors for Managing Forage Systems

- Understand what nutrients your cows need and when they need them
  - Calving season of most importance
- Select forages that fit your climate, soils, calving season
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  - Monitor production frequently
- Optimize quality by grazing management
  - Turn in at ~2750 lb/acre for most species
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