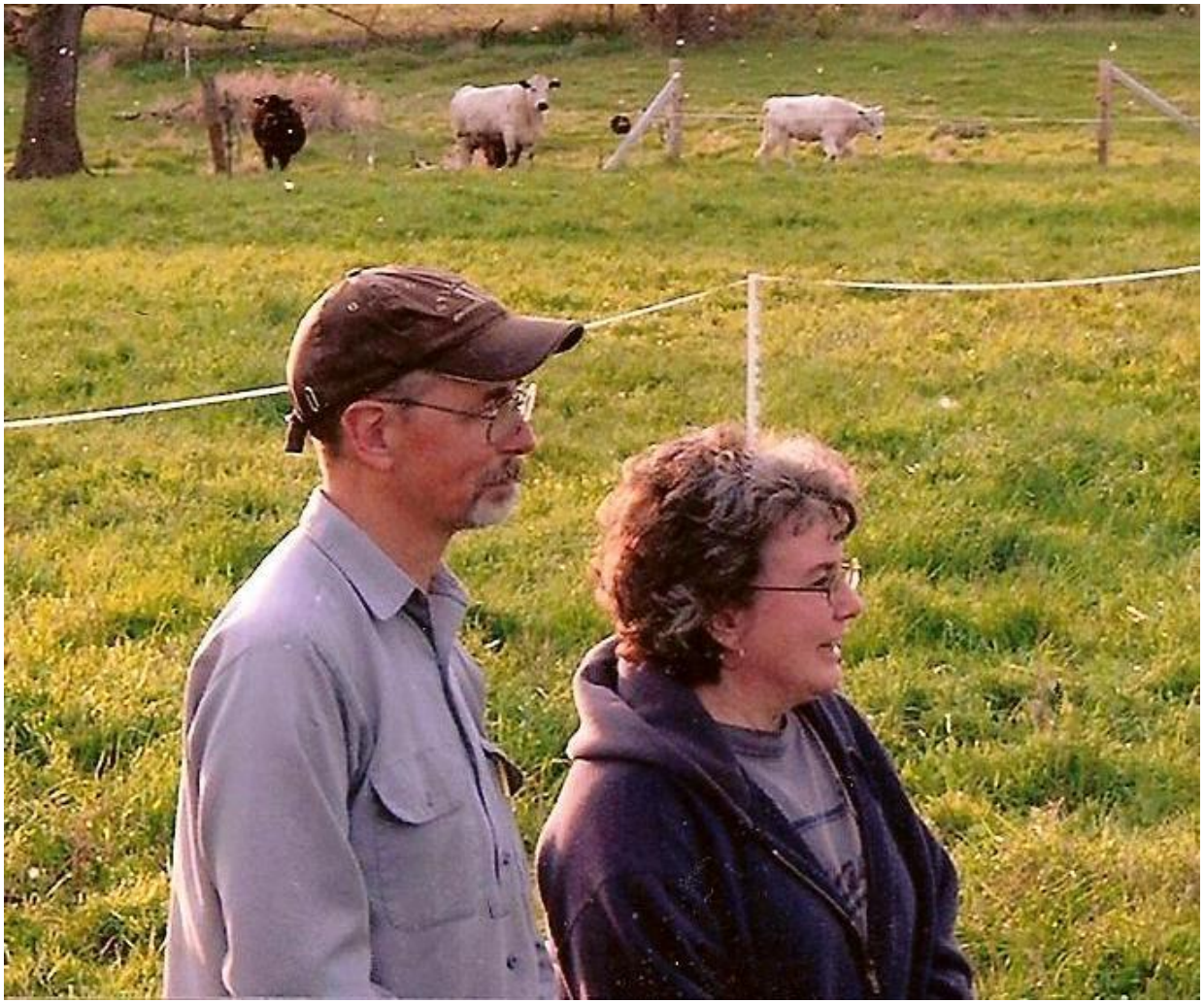
Stockpiling Forages to Extend the Grazing Season on Your Organic Dairy Pasture

Laura Paine, WI Department of Agriculture

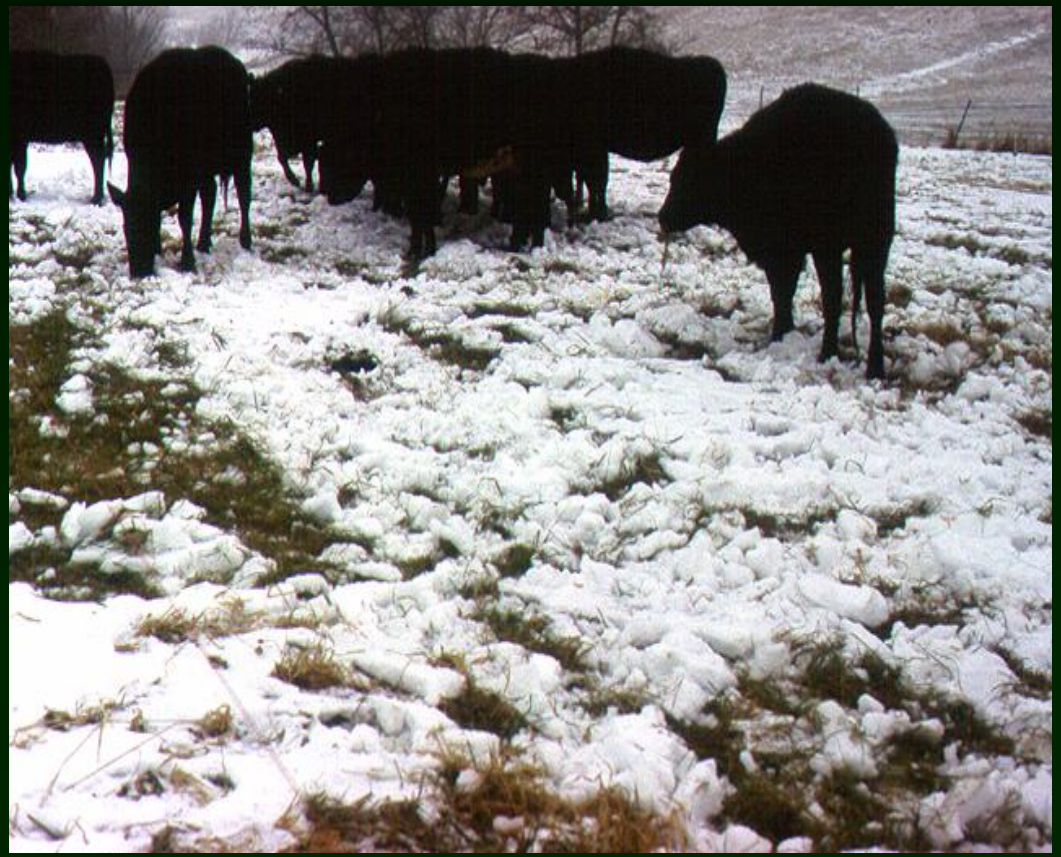
July 28, 2011

http://www.extension.org/organic_production



Laura Paine
Grazing and Organic Agriculture Specialist
Wisconsin Department of Agriculture

Extending the grazing season with stockpiled pasture



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Grazing and Organic Agriculture Specialist

WI Dept. Agriculture

eOrganic Webinar, July 28, 2011

Stockpiling versus Hay Cutting

- **Pasture growth provides forage for only 5 to 6 months in the northern US.**
- **Stored winter feed is one of graziers' largest expenses.**

- Hay production: $70-90/ton
- Hay purchase: $90-140/ton
- Pasture production: $14-40/ton
- *It's always cheaper to let your cows do the harvesting!*

Data from regional SARE beef cost of production study

Concept

<table>
<tr><td colspan="2" rowspan="3">Hay Feeding</td><td colspan="2"></td><td colspan="3">Graze or Cut Hay</td><td colspan="3">Rest</td><td colspan="2"></td></tr>
<tr><td colspan="5">Graze</td><td colspan="2">Stockpile</td><td colspan="2">Graze
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Start here

- Begin stockpiling in late summer
- Rest/grow until frost
- ‘Store’ forage in field until winter
- Forage mass and quality maintained by cold, dry weather
- *Note: you can stockpile pasture at other times of the year, e.g. Summer stockpiling.*

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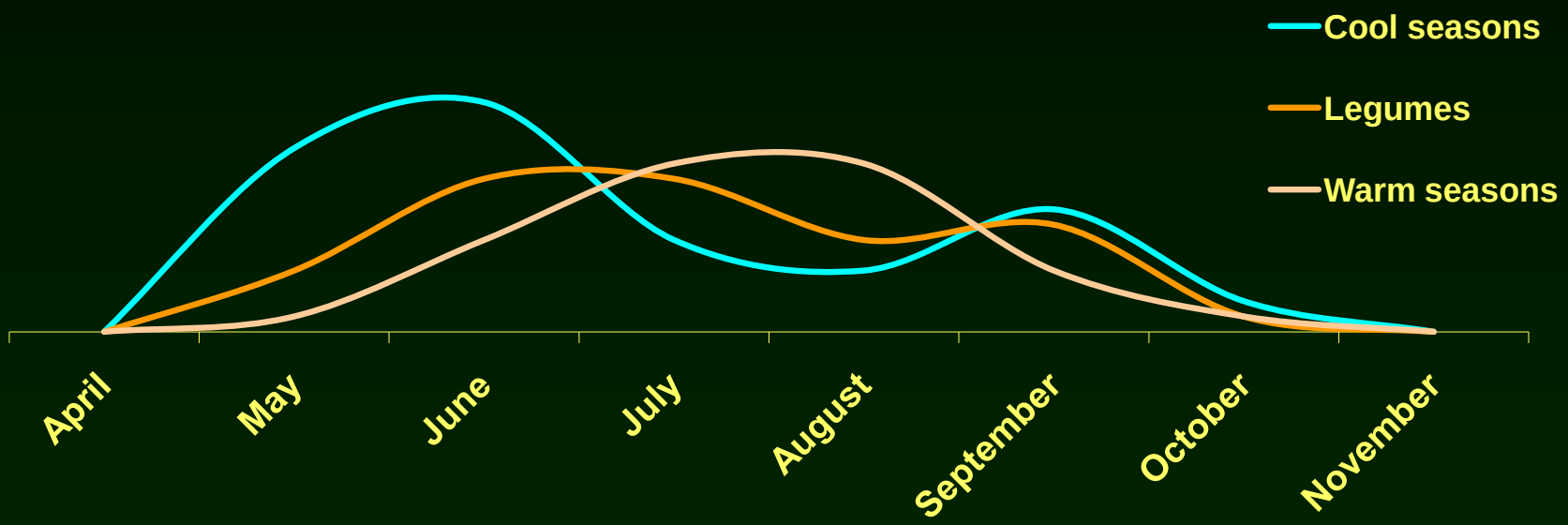
Use stockpiling to even out pasture yield throughout the year



50 to 60% of pasture yield comes in April-June

Grazing Periods

- October-December (very do-able).
- March-early April (pretty ‘iffy’).

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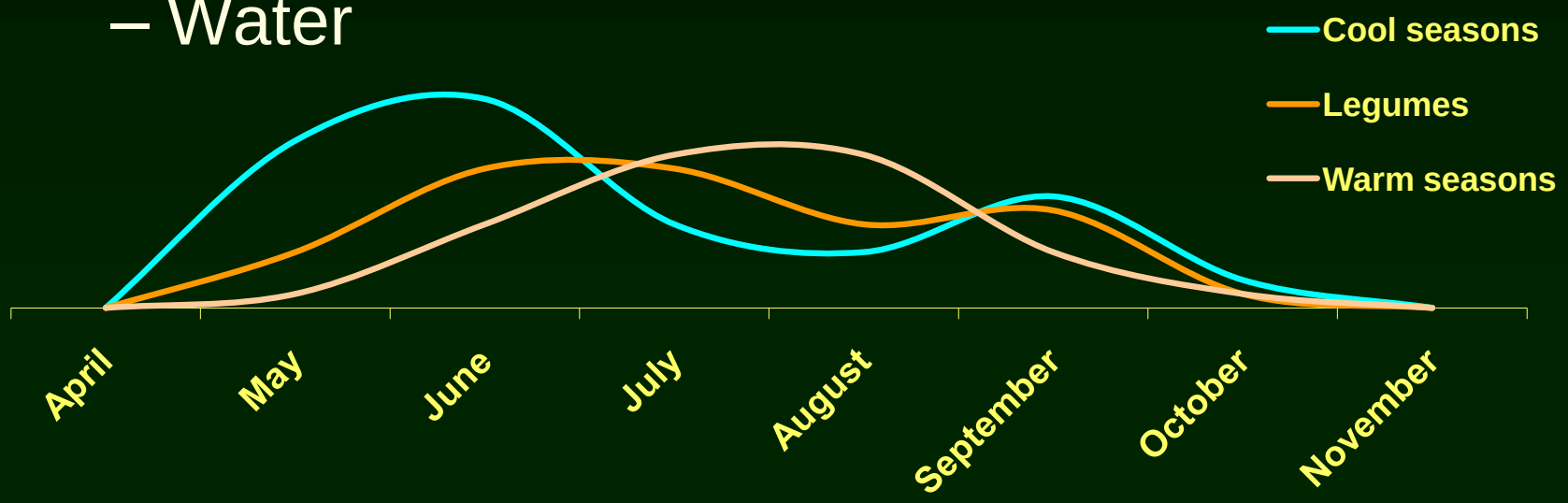
Mechanism

- Takes advantage of the second flush of growth of cool-season grasses
- Effective stockpiling requires adequate:
  - Nitrogen
  - Water



Research Results

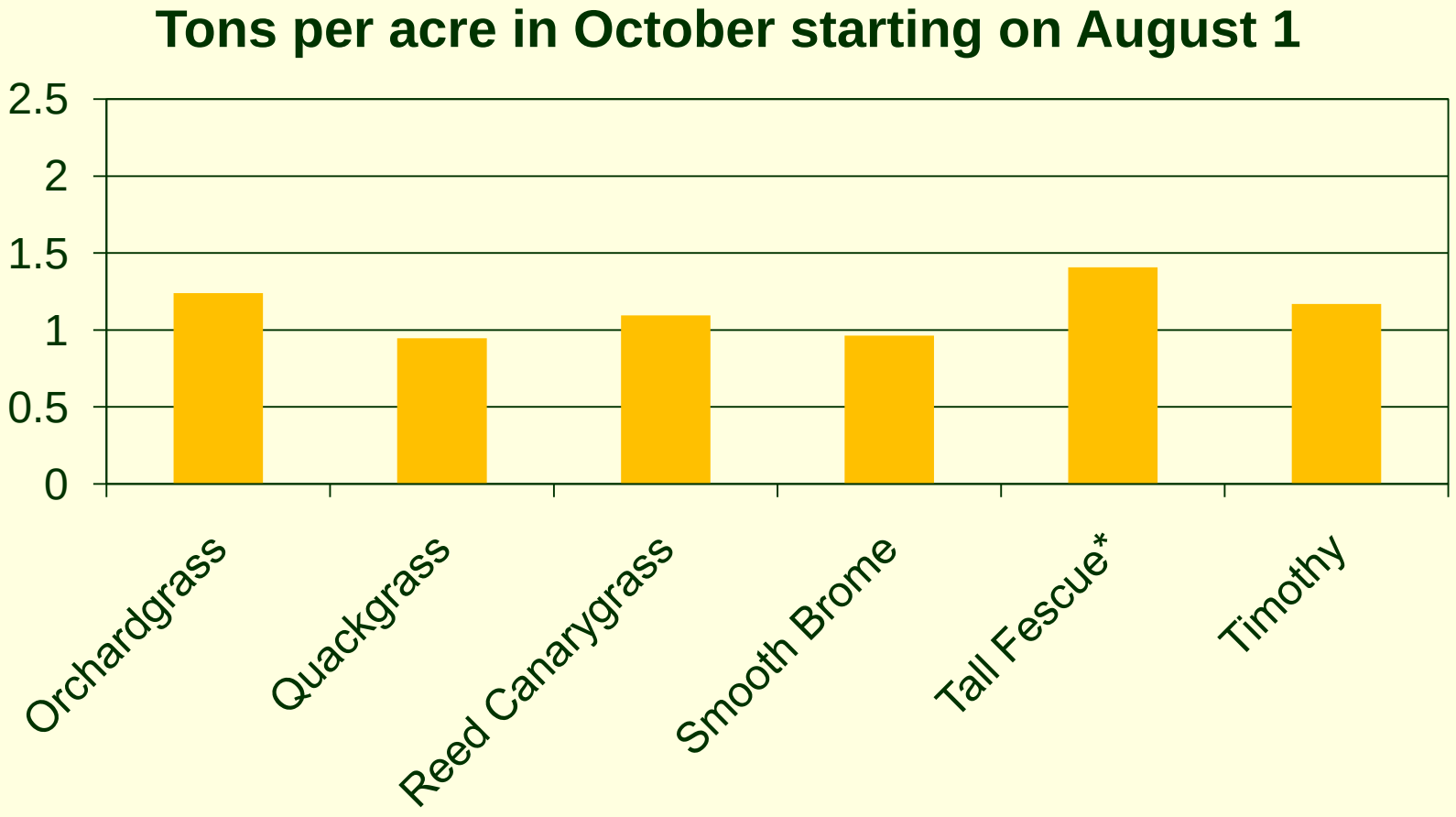
- Potential yields
  - 1 to 1.5 tons w/o nitrogen fertilizer or irrigation
  - 1.8 to 2.7 tons with nitrogen fertilizer
  - 2 to 2.5 tons with irrigation and nitrogen fertilizer
- Quality (in early winter)
  - Crude protein: 11 to 19%
  - Total digestible nutrients: 59 to 74%
  - Dairy farms in WI: 20-25% CP, >150 RFQ

Pasture and Species Selection

- Best grasses: tall fescue* and orchardgrass
- Best legumes: alfalfa and birdsfoot trefoil

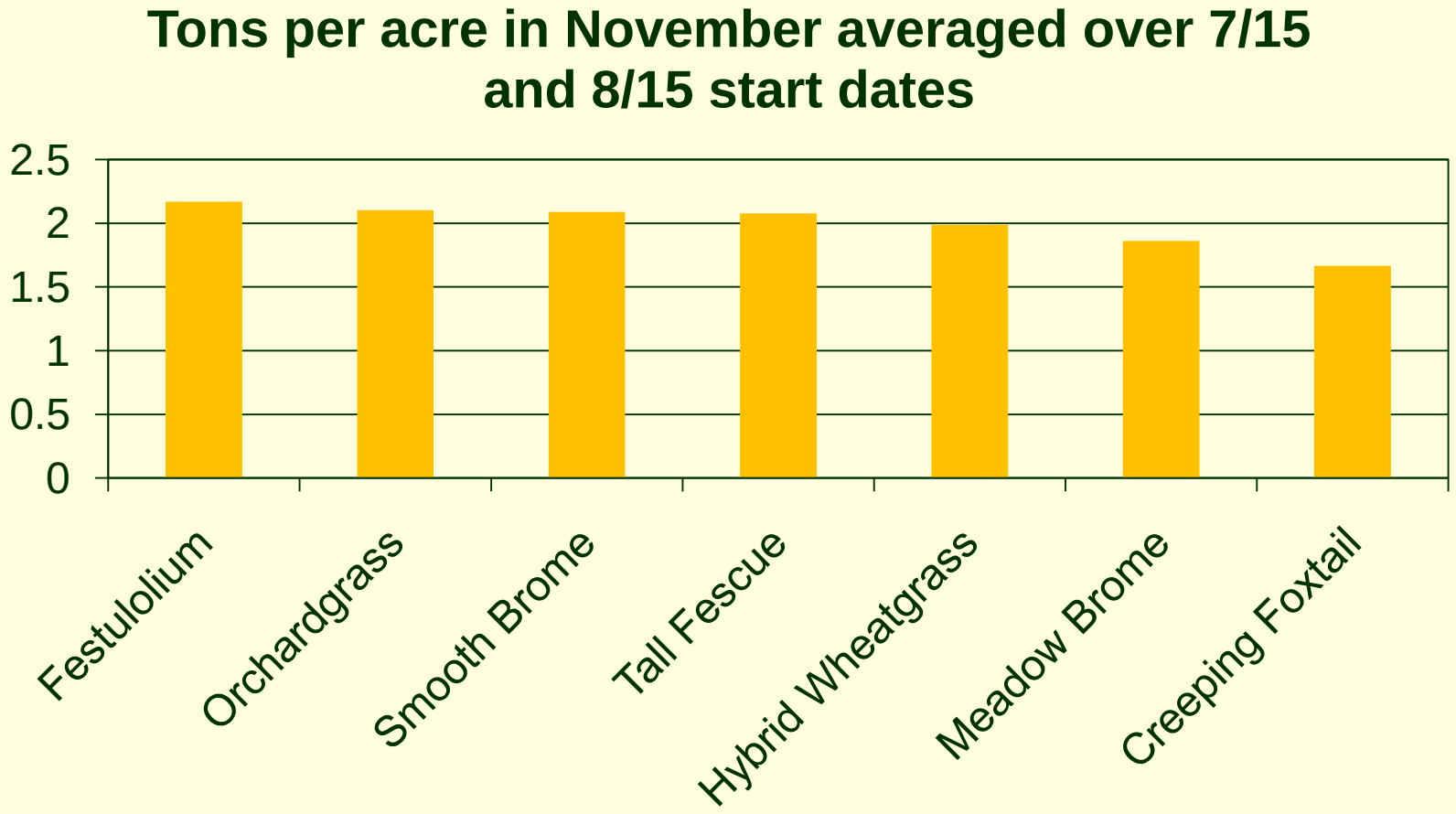
**Improved endophyte free tall fescue*

Stockpile yield by species



Two years' data from three non-irrigated sites in Wisconsin (Reiesterer et al)
**Improved endophyte free tall fescue*

Stockpile yield by species with irrigation



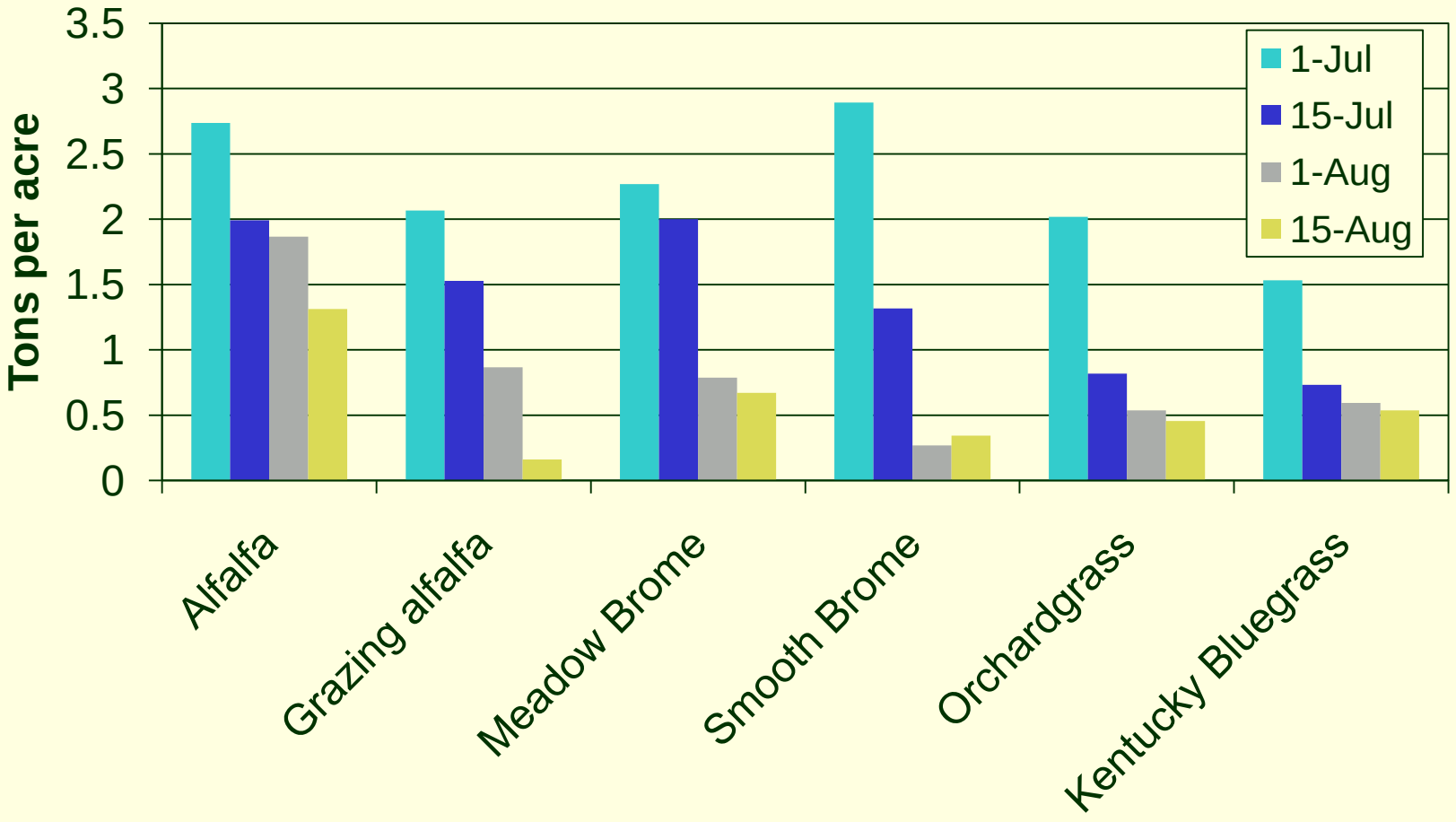
Two years' data under irrigation in Utah (Voleski et al)

**Improved endophyte free tall fescue*

Stockpile yield of legumes

- Robinson et al (Nebraska)
  - Alfalfa averaged 1.2 t/a
  - Birdsfoot Trefoil averaged 1.38 t/a
  - Ladino and alsike clover were dropped from the study due to lack of yield
- Baron et al (western Canada)
  - Alfalfa averaged 1.86 t/a
  - Grazing alfalfa averaged 0.87 t/a

Influence of start date on yield

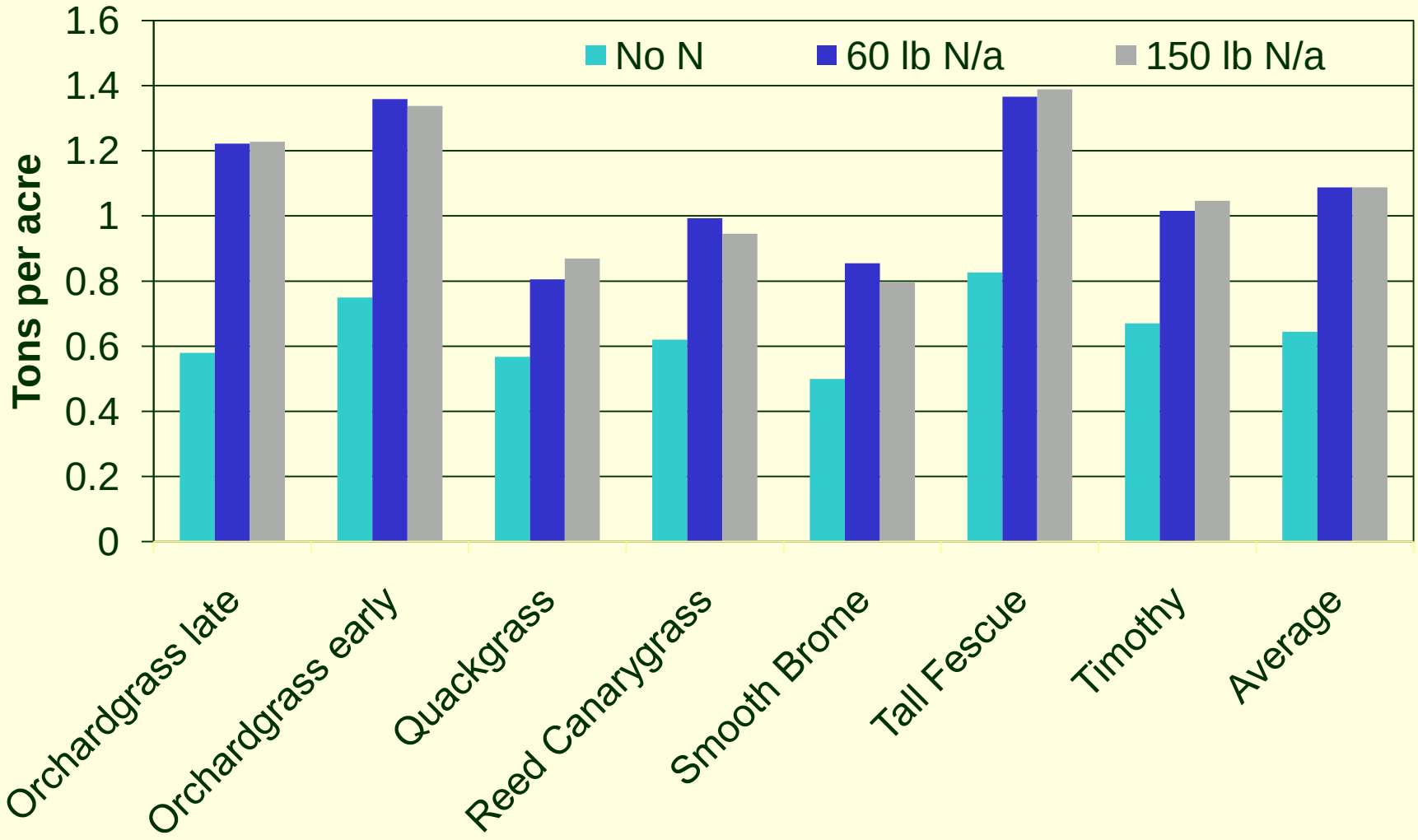


Two years' data from western Canada (Barron et al)

Yield & quality trade-offs

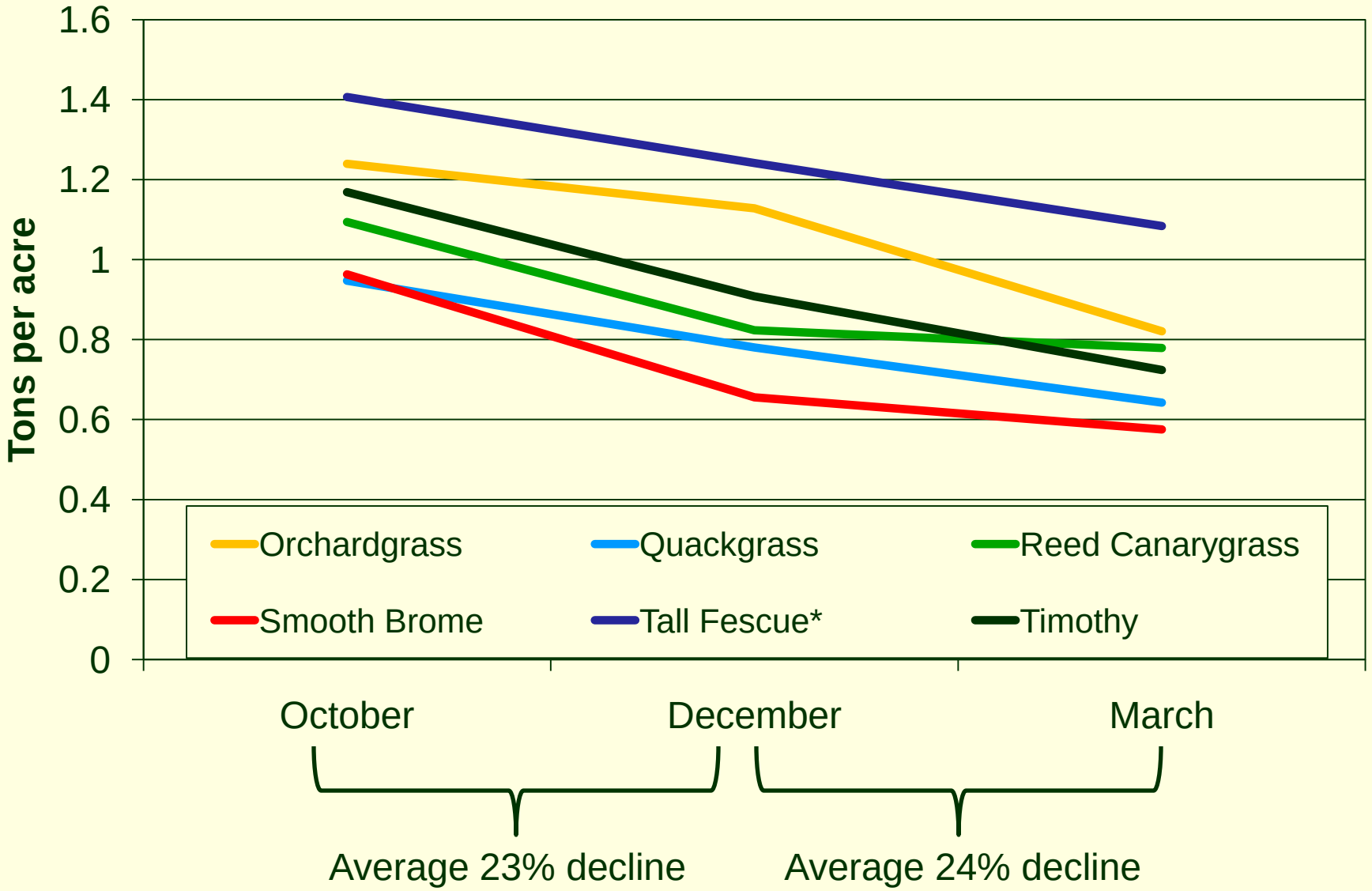
	Dry Matter	Crude Protein	IVDMV
July 15	2.54 t/a	12%	62.5%
August 15	1.68 t/a	14.4%	67.5%
Data from Voleski et al			

Effects of nitrogen fertilization

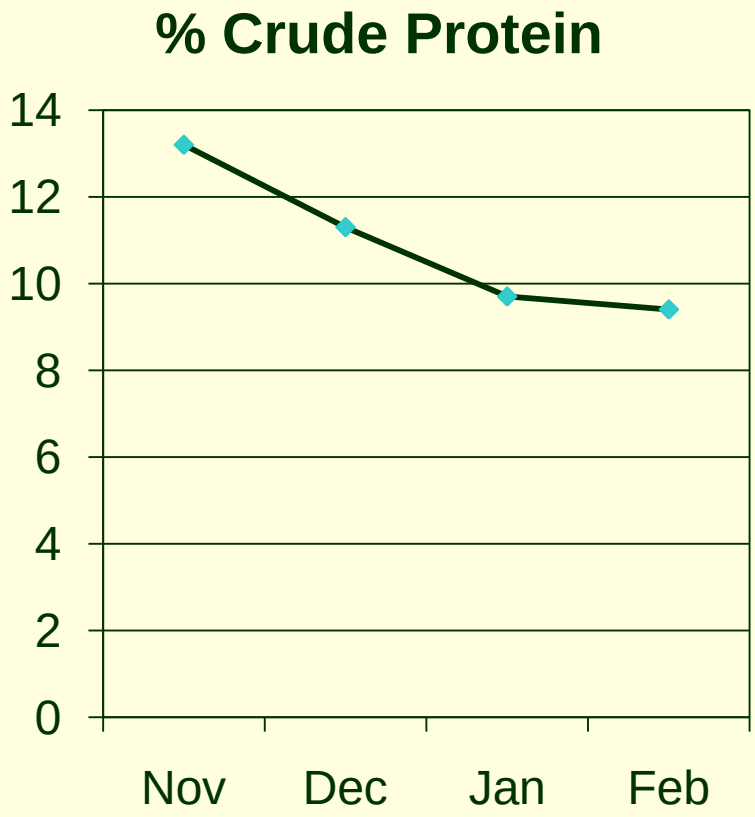


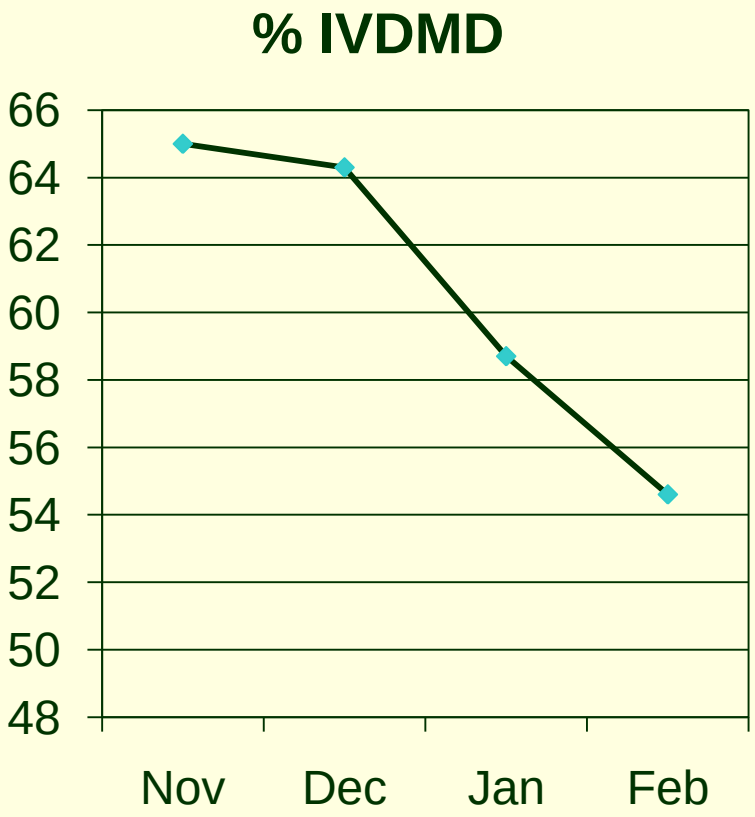
Average 68% increase with 60 lb N/acre applied in August

Decline in yield over winter



Decline in quality of stockpiled grass* forage over winter





Data from Voleski et al

**Note: Legume forage quality declines much more rapidly*

Calculating acreage needs

- Rule of thumb
  - Need ~ 2 acres per AU (1000 lb of animal) for pasture and hay for 12 months
- Assume 3% body weight dry matter intake per day
  - 1200 lb cow needs ~36 lb/day or 1080 lb/month
  - 100 1200 lb dairy cows need ~54 tons per month
  - At 1.2 tons/acre, you'd need to stockpile 45 acres for a month of grazing

Role of nitrogen fertility

- *Stockpiling takes advantage of the second flush of growth of cool-season grasses*
- Requirements:
  - Nitrogen
  - Water

Organic nitrogen sources
(60 lb N/acre application rate)

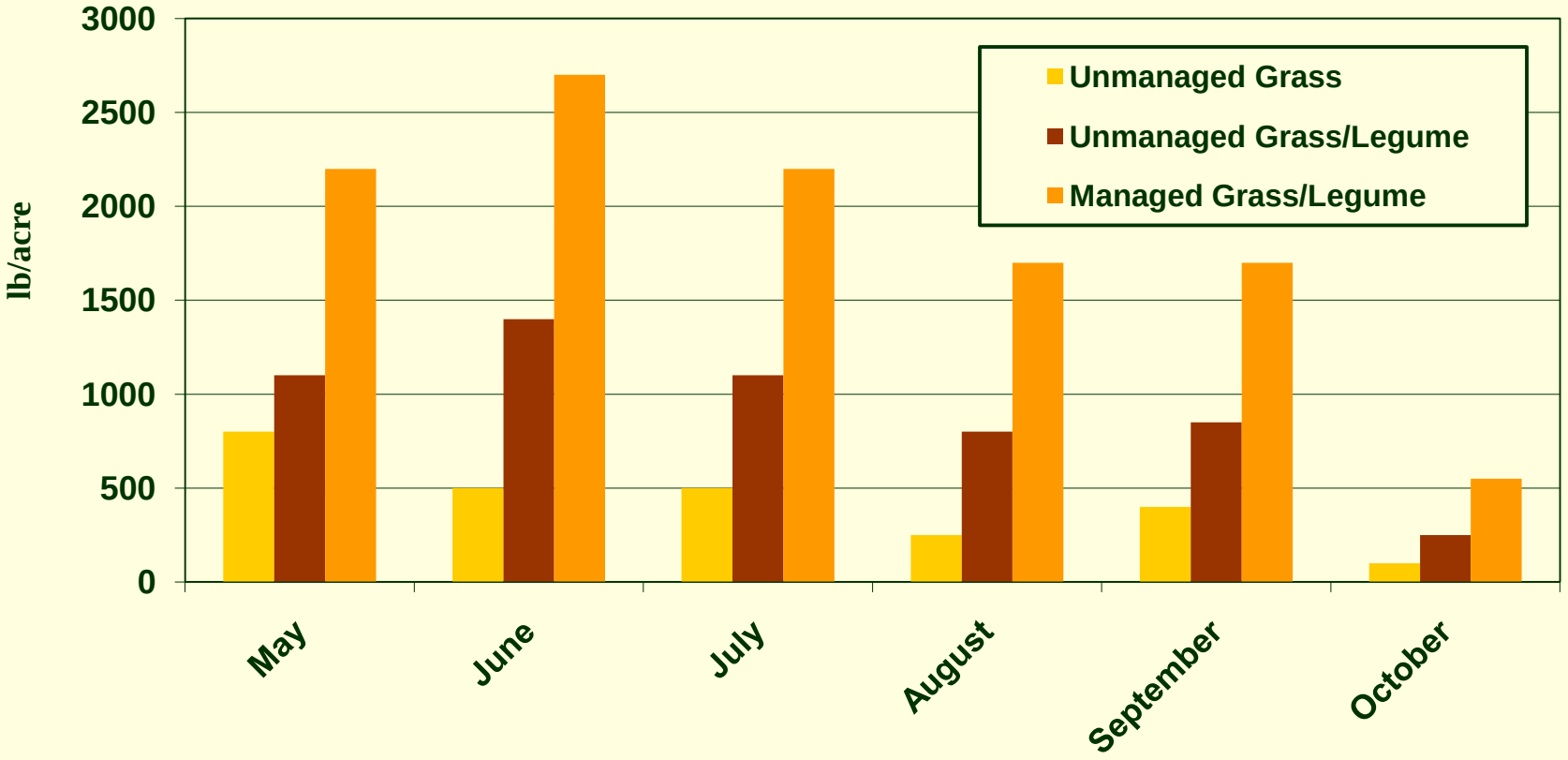
- Manure: 3 to 5 lb N per ton (dairy/beef)
  - Need ~12 to 20 tons/acre
- Compost:
  - 12 lb per ton (dairy) = 5 t/a
  - 17 lb/ton (poultry) = 3.5 t/a
- Fish based fertilizers: 5-0-0
  - Need ~1200 lb per acre
- *These are all slow release nitrogen sources—results may differ.*

Organic nitrogen sources
(60 lb N/acre application rate)

- Chilean Nitrate (16-0-0)
  - Need ~375 lb/a
- Cost—*it may not be worth it*
  - $953/ton (online source)
  - 320 lb/N per ton
  - 5.3 acres @ 60 lb N/a
  - $180 per acre
  - 1 to 1.2 tons additional yield with N
  - $150 per ton of additional yield

Creating an Effective Nutrient Distribution System

Role of legumes in pasture productivity & nutrient cycling



Information from Undersander and Antoniewicz, 1997. Pastures for Horses, bull. #3680.

Nitrogen Fixation of Common Legumes

Lb N/acre	Alfalfa	Birdsfoot Trefoil	Red Clover	White Clover
Alone	151	72	81	128
With Reed Canarygrass	150	71	70	N/A

Data adapted from Heichel and Henjum (1991).

How most of the N fixed by legumes gets back into the system

Management intensive grazing

- 30 days
- 1 paddock

- 30 days
- 30 paddocks

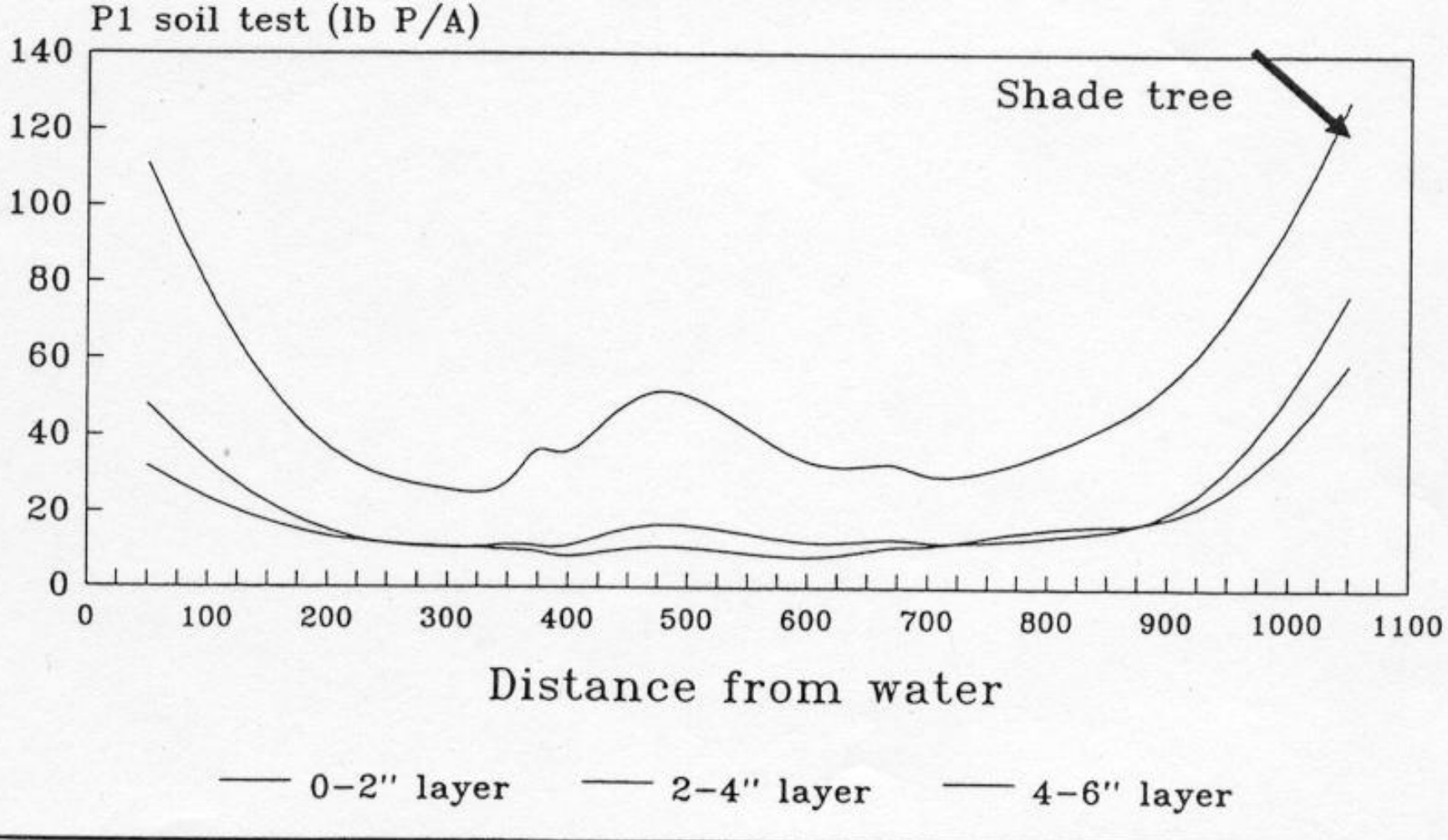
Rest-Rotation Continuum

- Higher quality
- Higher yield
- More diversity
- More flexibility

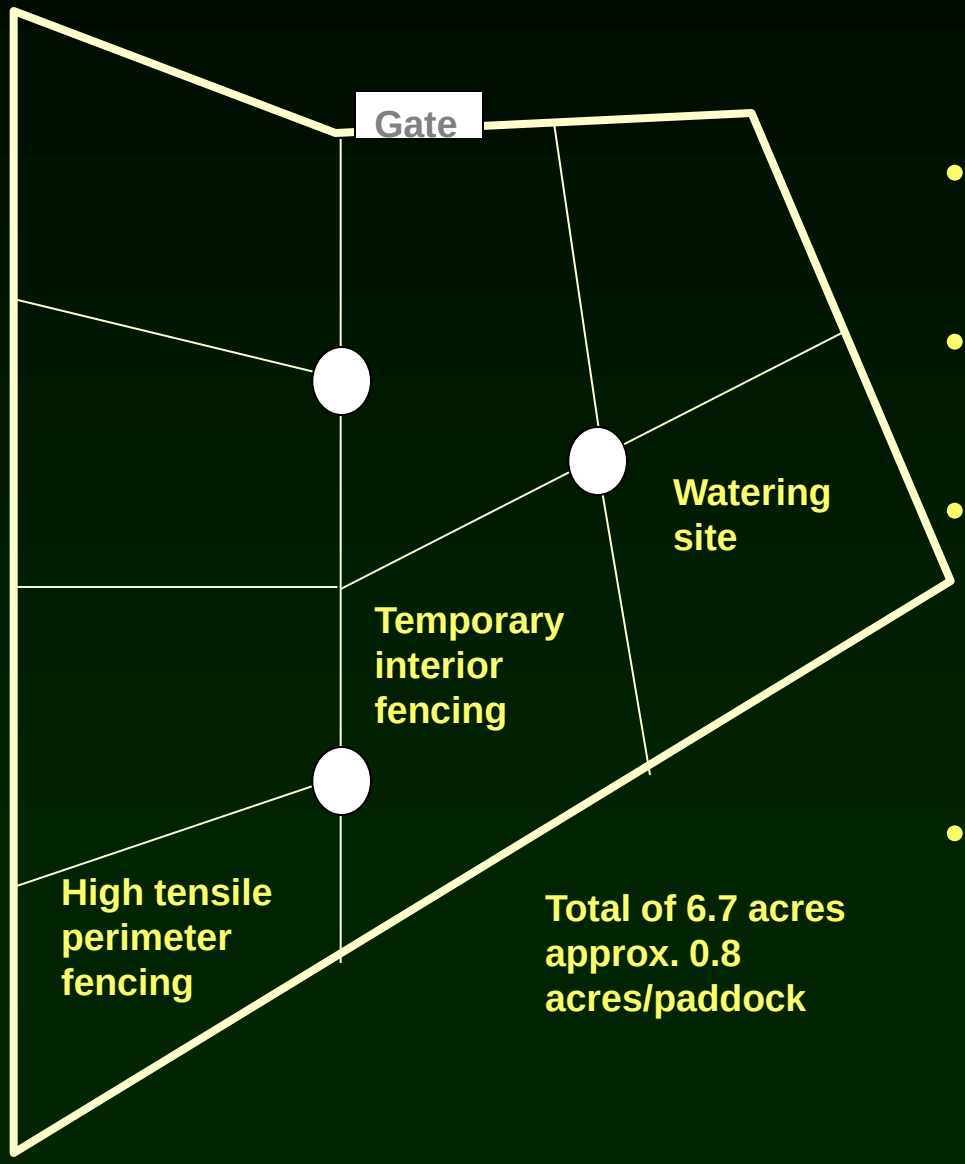
Nutrient Cycling

- Feed on pasture
- Mineral on pasture
- Water on pasture
- Avoid single trees
- Paddocks square

Figure 4. Impact of shade and water on distribution of soil phosphorus in a grazed pasture.

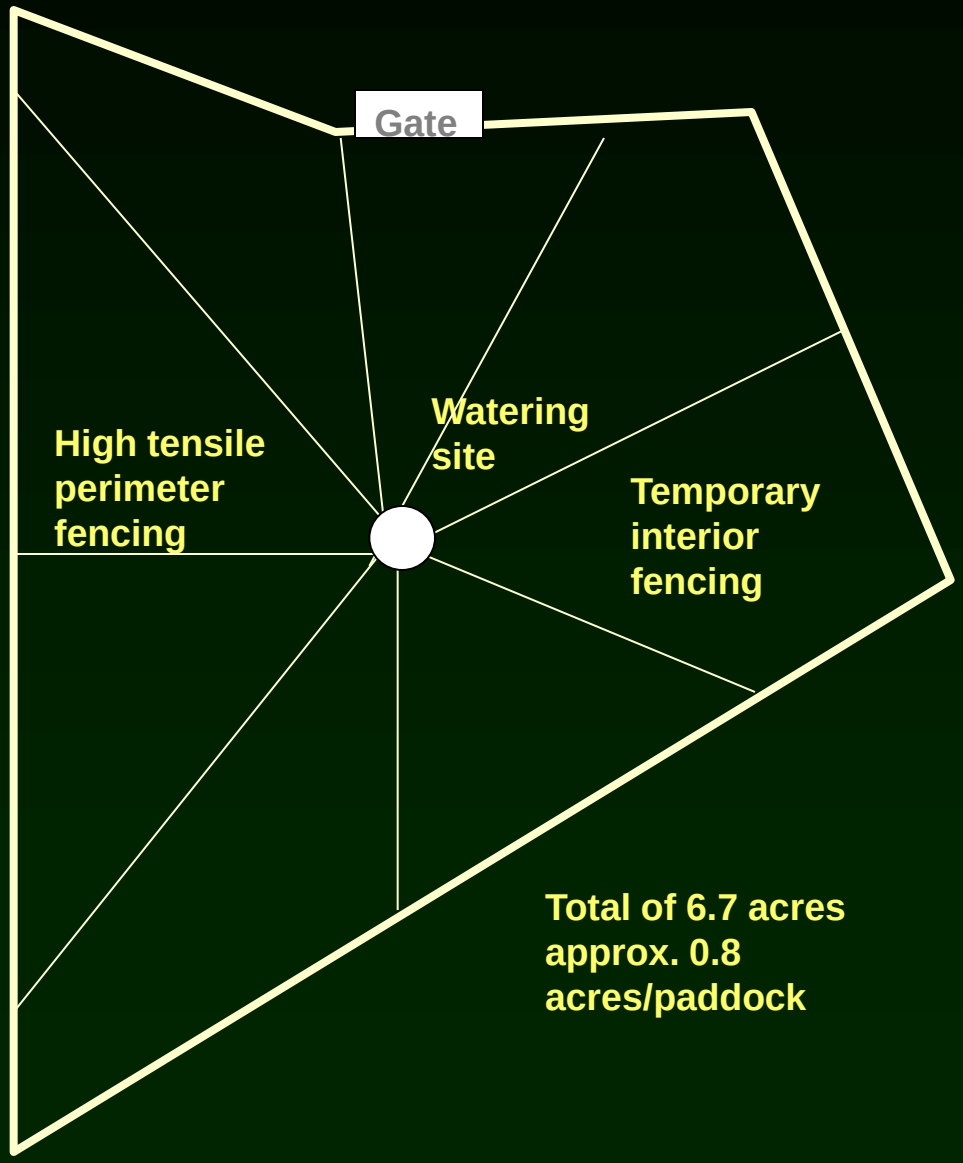


Enhancing Nutrient Cycling



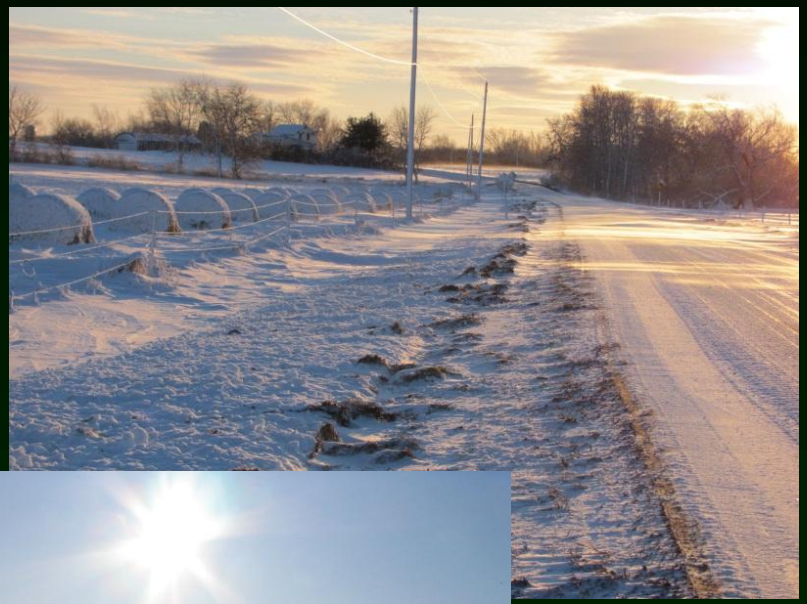
- Make paddocks as square as possible.
- Avoid sharp angles or narrow areas.
- Make water available in each paddock if possible.
- Feed grain or other supplements on pasture.

Not the best paddock layout



Control Access to Surface Water

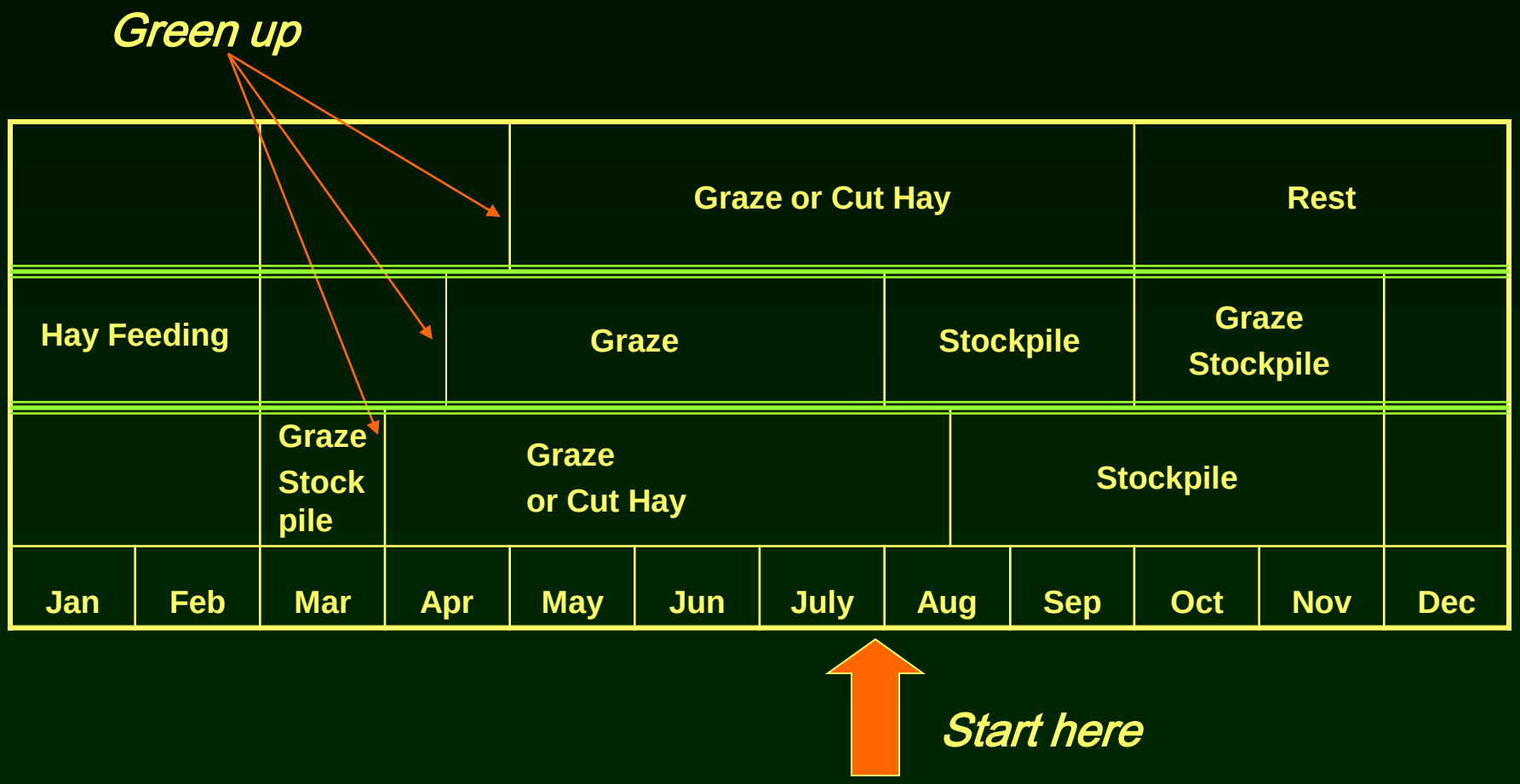
Outwintering



Tools for managing nutrient cycling and distribution

- Pasture species composition
- Rotation and paddock layout
- Watering and feeding management
- Outwintering
- Stockpiling

Managing the System



Staging Pasture Growth

- **Stockpiled, spring grazed paddocks accumulate root reserves until frost and go through the winter protected by fall growth. They will green up first.**

- **Stockpiled, fall grazed paddocks accumulate root reserves until frost, but are left exposed over the winter. They will green up more slowly.**

- **Non-stockpiled paddocks go through winter with few root reserves and green up the slowest in spring.**

Example

- Hayfield
- Main-season pastures
- Stockpile
- Outwintering area
- Calving pastures

Extending the grazing season with stockpiled pasture

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- If we start by maximizing the amount of energy we capture, all other steps in the process have greater potential to yield profits.

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