PASTURE FORAGE PLANT VARIETIES AND PASTURE FERTILITY

Dryland Pasture Workshop

Thursday, June 4, 2020

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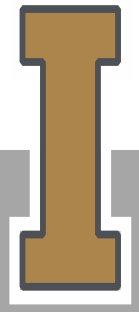

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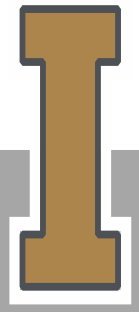
WHAT PASTURE MANAGEMENT AND GOLF HAVE IN COMMON

- It's something you do outdoors
- Doing it well is more difficult than it looks
- Many people "talk" a much better game than they play
- Studying about how to do it can be helpful, but real success requires practice and experience
- Weather can have a huge influence on the results obtained
- There are many products you can buy to better your game, but a real expert only needs a few basics
- No matter how good you are, there is always room for improvement



PASTURE DEFINED

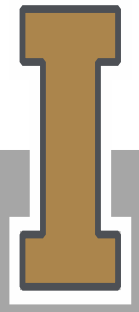
The major differences between rangelands and pastures are the kind of vegetation and level of management that each land area receives.

Rangeland:

- Supports native vegetation.
- Includes areas that have been seeded to introduced species (e.g., crested wheatgrass), but which are extensively managed like native range.

Pastures:

- Lands that have been seeded, usually to introduced species (e.g., tall fescue) or in some cases to native plants (e.g., switchgrass).
- Are intensively managed using agronomy practices and control of livestock.



DOES YOUR PASTURE NEED HELP?

- ✓ Fertilization
- ✓ Weed control
- ✓ Proper management
- ✓ Renovation

Resources:
Pasture and Grazing in the Northwest https://www.extension.uidaho.edu/publishing/pdf/pnw/pnw0614.pdf
Idaho Forage Handbook https://www.extension.uidaho.edu/publishing/pdf/BUL/BUL0547.pdf

PASTURE FERTILITY

- Better results begin with good information.
- Most important information is current soil condition.
- A proper soil test will provide the best parameters of current soil condition.
- Sampling tools, soil bags, and submission forms available a county Extension office.

TEST YOUR SOIL!

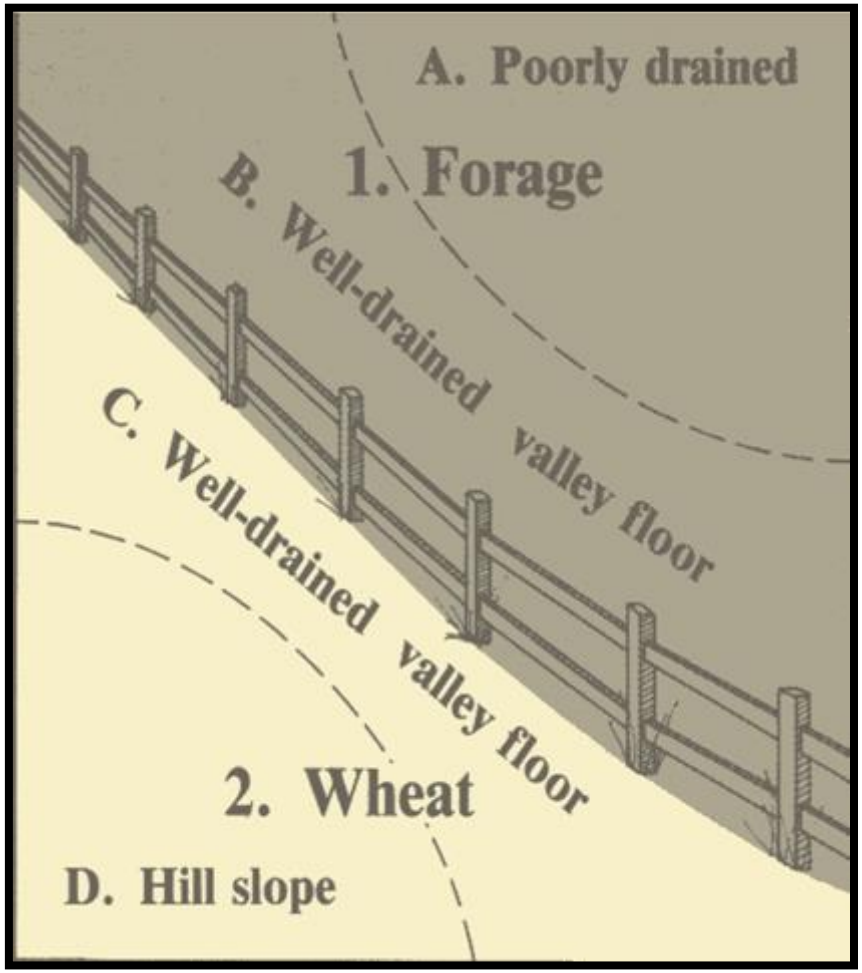
WHAT INFORMATION DOES A SOIL TEST PROVIDE?

- Soil Organic Matter
- Soil pH
- Soil nutrient content
- Other information such as soil texture or fertilizer recommendations

HOW OFTEN SHOULD I TAKE A SOIL SAMPLE?

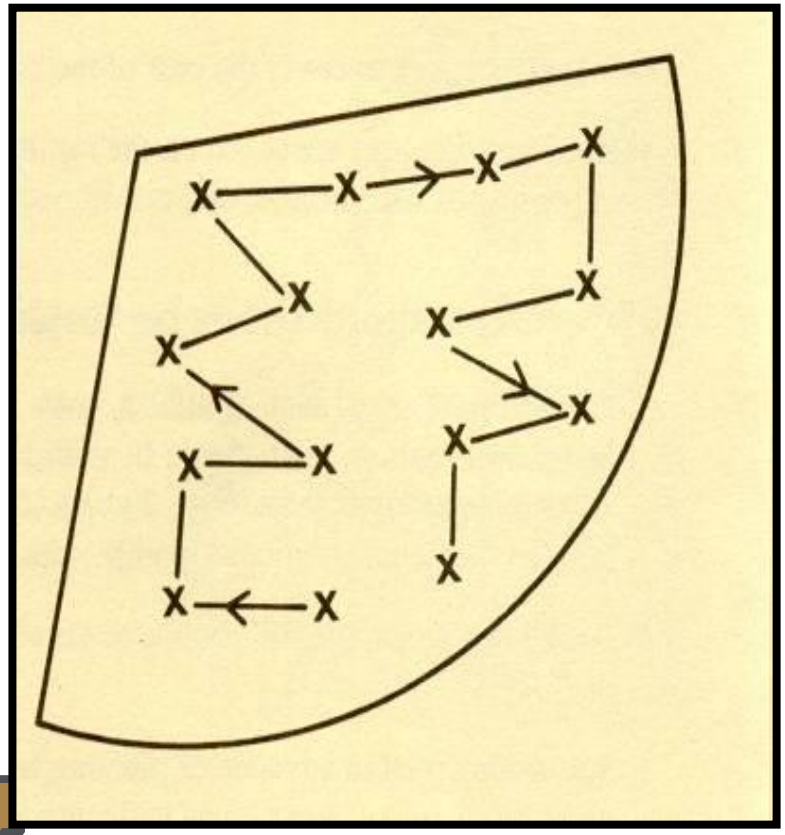
- Prior to seeding a crop in new ground
- At least every three years for established perennial crops
- Frequently enough to make good decisions on fertilization

HOW TO TAKE A SAMPLE



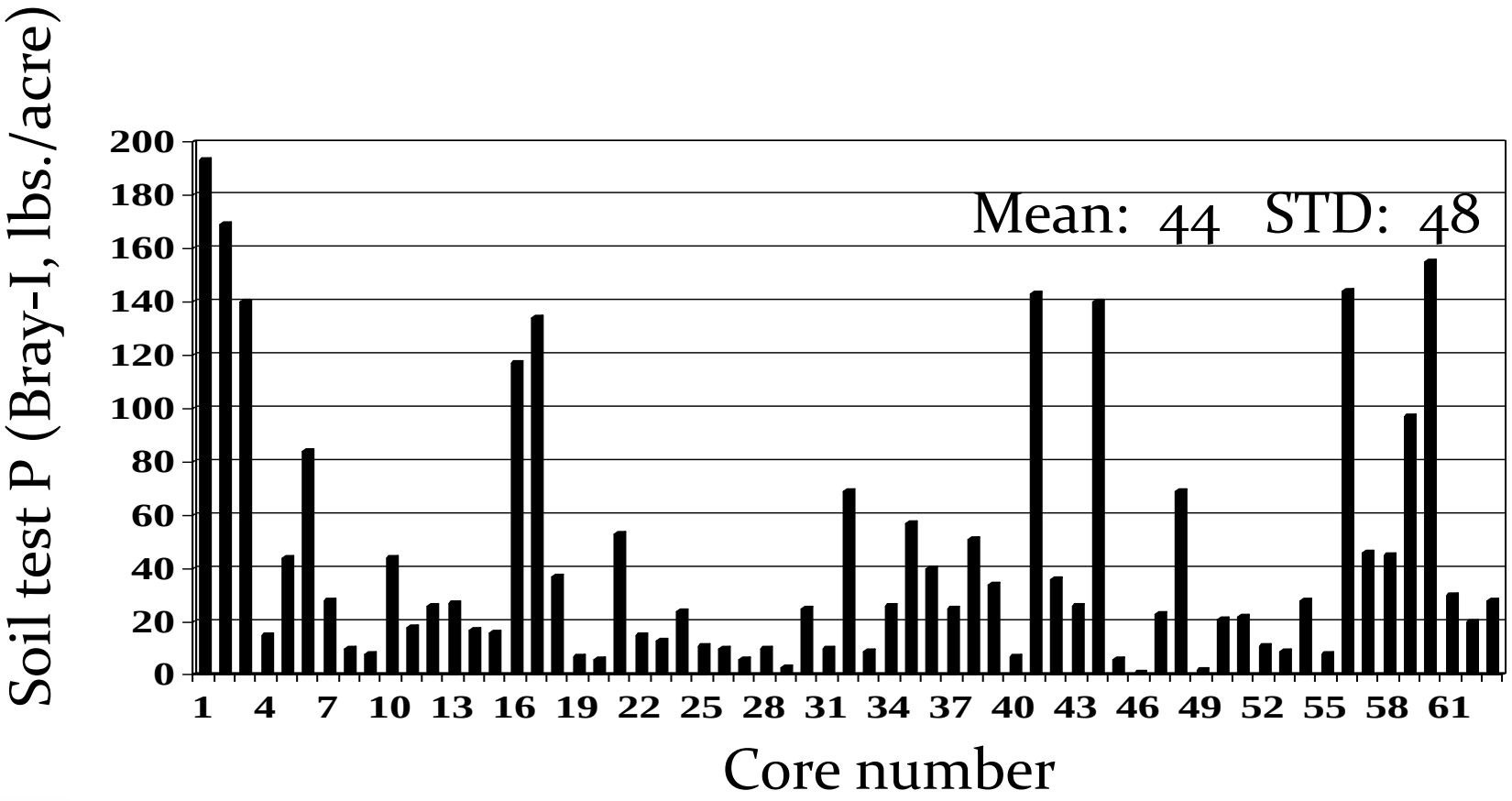
First select the site. Your soil sample should represent only one soil type or soil condition.

HOW TO TAKE A SAMPLE

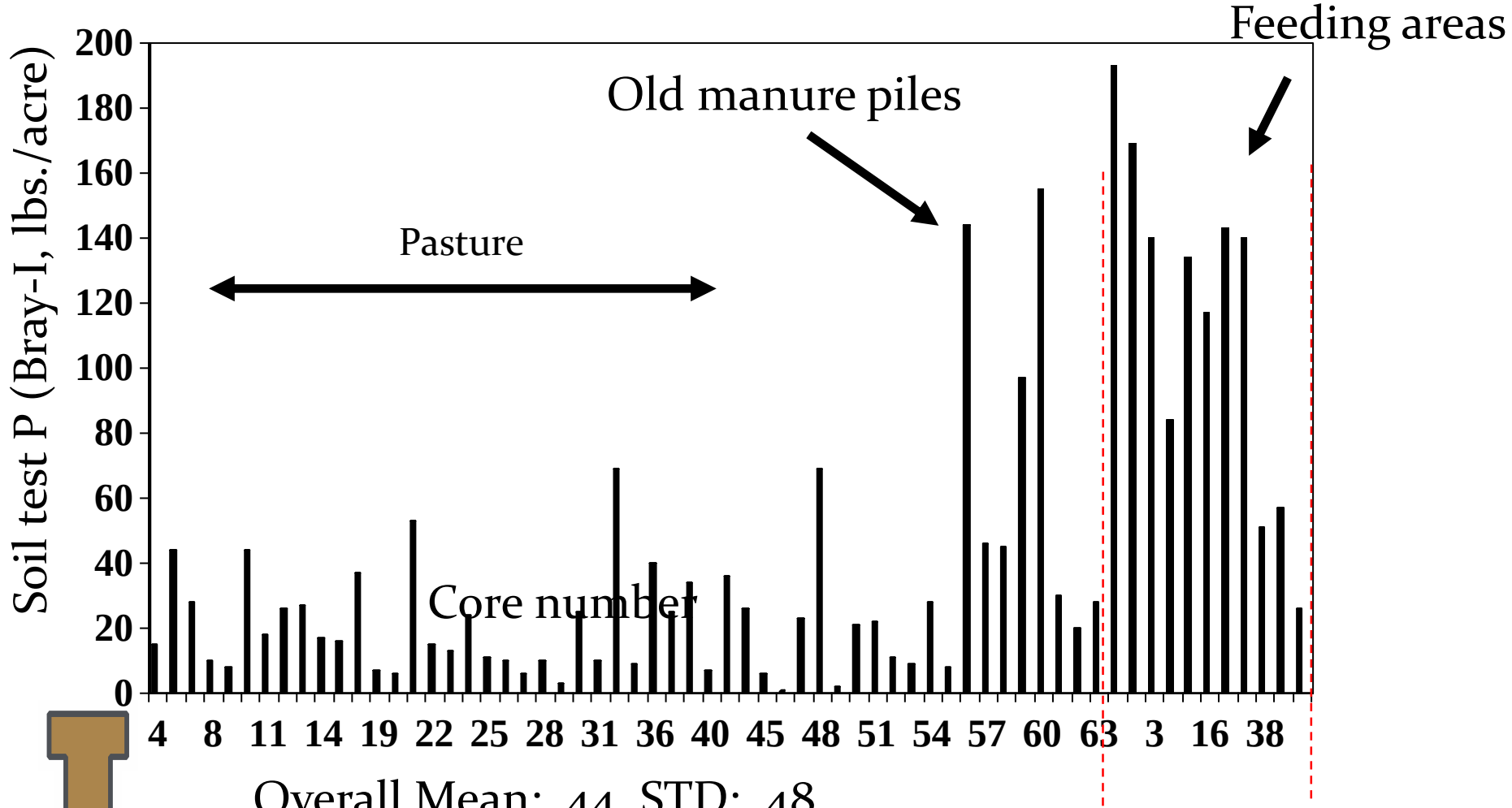


Each sample should consist of sub-samples taken from about 15 locations within the same soil type or sampling area.

SOIL CORE VARIABILITY



INCREASING ACCURACY BY DIVIDING FIELDS BASED ON KNOWN VARIABILITY



Overall Mean: 44, STD: 48

Pasture mean: 20, STD: 17

Feeding area mean: 114, STD: 52

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HOW TO TAKE A SAMPLE

Use the “slice” method for a representative sample.

A soil probe is a good tool for collecting samples.

SOIL TEST RESULTS

- What do my soil test results mean?
- What nutrients do plants need?
- How can I supply those nutrients?

SOIL ORGANIC MATTER (OM)

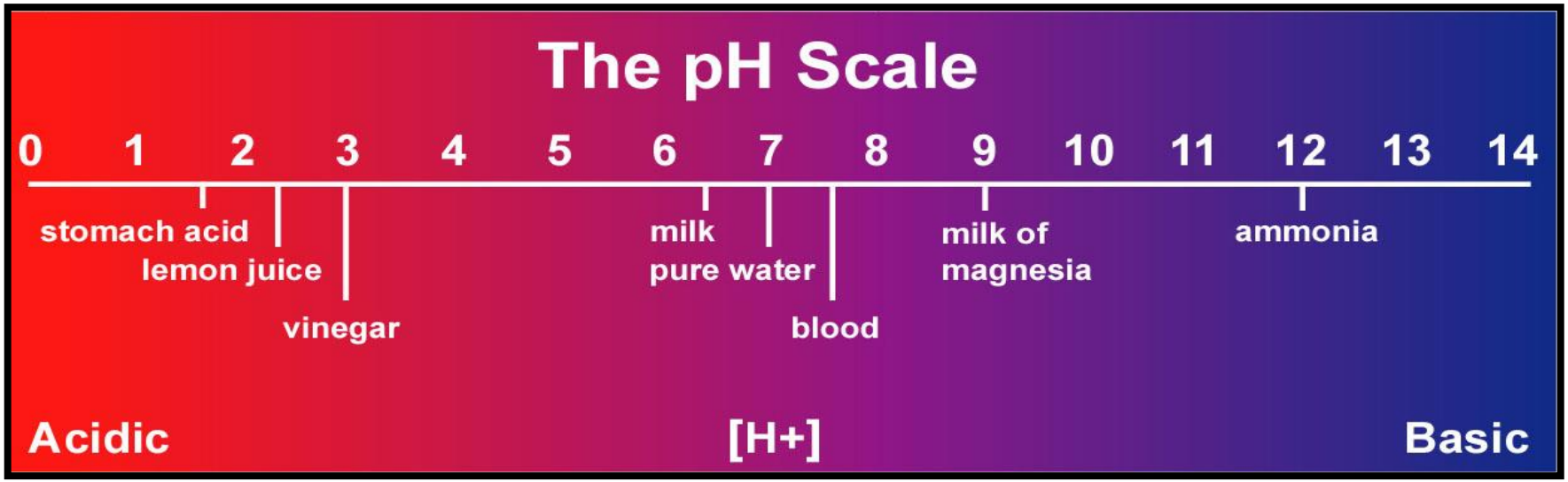
- Living or dead plant and animal residue
- Measured in percent
- OM content is highly variable
- Generally, 3% to 8% OM content is good for plants

UNCE, Reno, NV

PH

Indicates relative acidity or alkalinity

pH 7 = neutral; less than 7 = acid; more than 7 = alkaline or basic



Adapted from library.thinkquest.org

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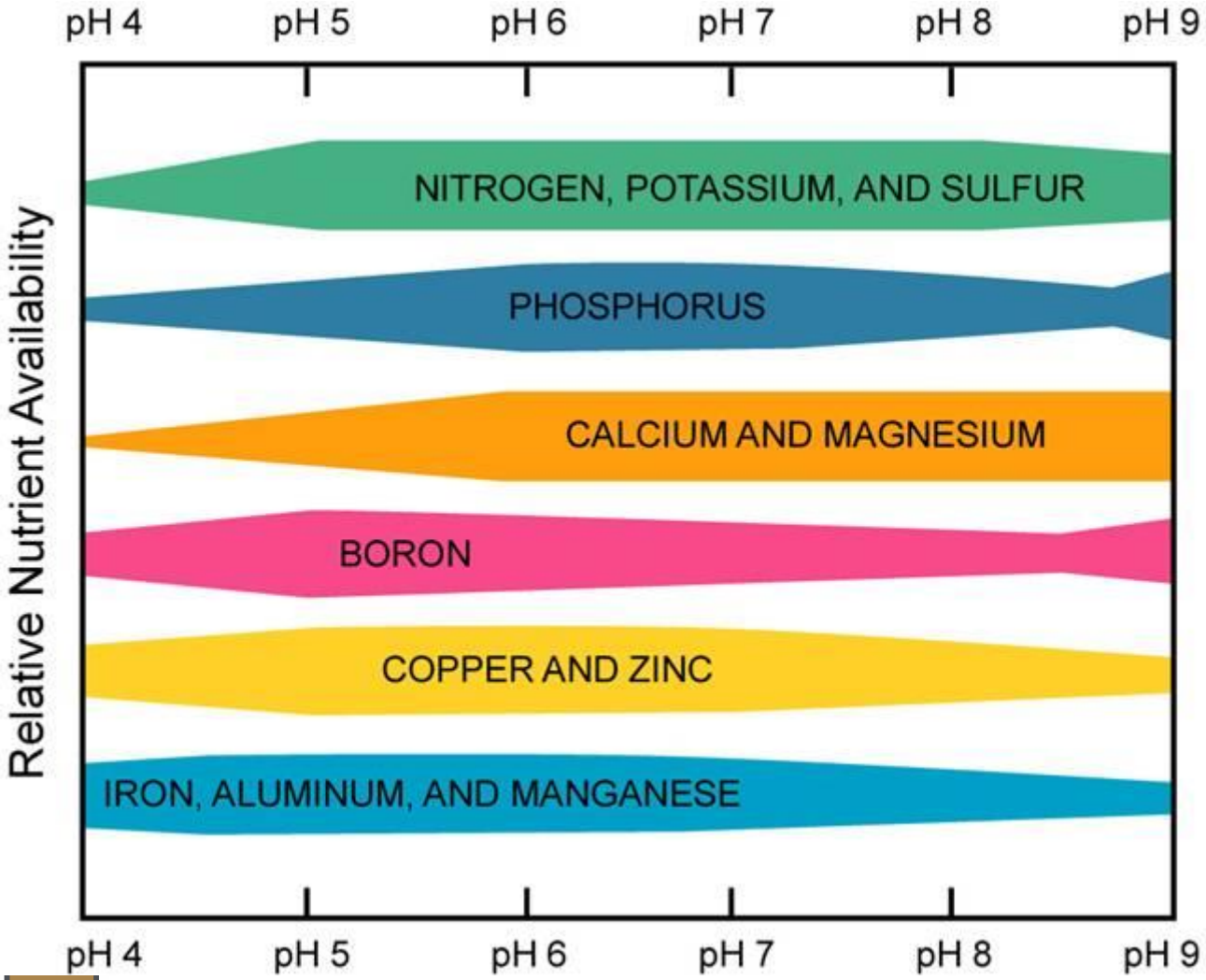


SOIL PH AND NUTRIENTS

Widest part of the bar indicates maximum availability

Adapted from www.soil.ncsu.edu

RAISING THE PH OF ACID SOILS

- Add lime to raise the pH (making soil less acid)
- Lime most often consists of calcium carbonate
- Lime scores: CCE (Calcium Carbonate Equivalent), FI (Fineness Index), Moisture Content
- Plant response will be relatively slow, taking weeks or months
- Liming to adjust pH needs to take place on a annual schedule

NUTRIENT MANAGEMENT GOALS

- Meet crop nutrient needs
- Maintain soil quality
- Conserve resources
- Protect water quality -- reduce leaching and runoff risk

MACRONUTRIENTS

N = nitrogen

P = phosphorus

K = potassium

Ca = calcium

Mg = magnesium

S = sulfur

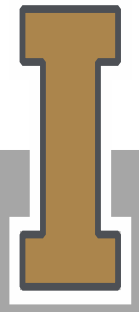
MICRONUTRIENTS

Fe = iron
Mn = manganese
Zn = zinc
B = boron
Mb = molybdenum

Ni = nickel
Cu = copper
Co = cobalt
Cl = chlorine

QUESTIONS TO ASK YOURSELF BEFORE YOU ADD FERTILIZER:

1. Which elements do I need? (N, P, K, S, Ca)
2. How much do I apply?
3. What type of material do I use?
4. Which application method is best?
5. When is the best time to apply it?



TYPES OF FERTILIZERS

- Chemical fertilizers
- Organic fertilizers (bone meal, compost, manure,etc.)

www.farmphoto.com

ORGANIC MATERIALS

Little or no processing

Low nutrient content

Slow release of nutrients

Plant, animal, or mineral sources

HOW MUCH FERTILIZER DO I NEED TO APPLY?

- Estimate the amount of fertilizer needed based on soil test results, crop needs and area to receive fertilizer
- Most fertilizer recommendations are in pounds per 1000 square feet, or pounds per acre

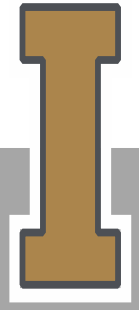
PRIMARILY HAY OR GRAZING?

- Hay – Removal of Nutrients
- Pasture – Concentration and Recycle of Nutrients
- Feeding Areas – Tactics to Minimize Concentration of Nutrients

PRIMARILY HAY OR GRAZING?

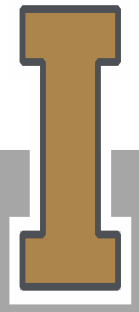
Nutrient	Dry Matter Concentration	Removal per ton of hay
Nitrogen	2.0 % N	40 lb N
Potassium	3.0 % K_2O	60 lb K_2O
Phosphate	0.65 % P_2O_5	13 lb P_2O_5
Sulfur	0.25 % S	5 lb S

- In grazed pastures, 85 to 90% of nutrients returned in manure and urine.
- Uneven distribution of nutrients in grazed pastures.
- Test hay fields annually, pastures every 3 years.



NITROGEN FOR GRASS AND GRASS-LEGUME MIXES

Stand Composition		YIELD POTENTIAL		
	1-2 tons/acre	2-4 tons/acre	4-6 tons/acre	6-8 tons/acre
	----------	Nitrogen recomm	endation (lbs/ac)	----------
100% grass	50	75	100-150	150-200
75% grass, 25% legume	25	50	75-100	100-150
50% grass, 50% legume	0	25	50	75
25% grass, 75% legume	0	0	25	50



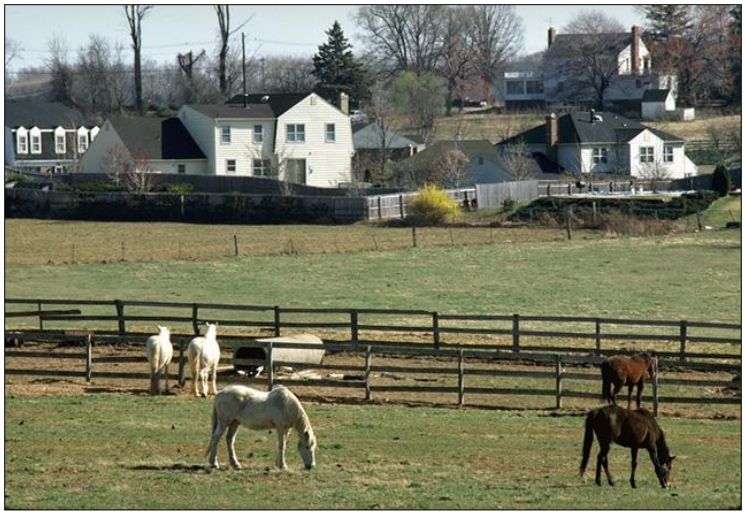
DEFINITIONS

Species - refers to the type of plant such as alfalfa, sweet clover, smooth bromegrass, etc.

Cultivar - refers to a specific variety within a specie. York, Saratoga, and Bravo are all improved varieties of smooth bromegrass.

FACTORS TO CONSIDER

- Pasture inventory
  - Land available
  - Climate
  - Soil characteristics
- Forage use
  - Livestock
  - Grazing vs. hay production
  - Continuous grazing vs. rotational grazing

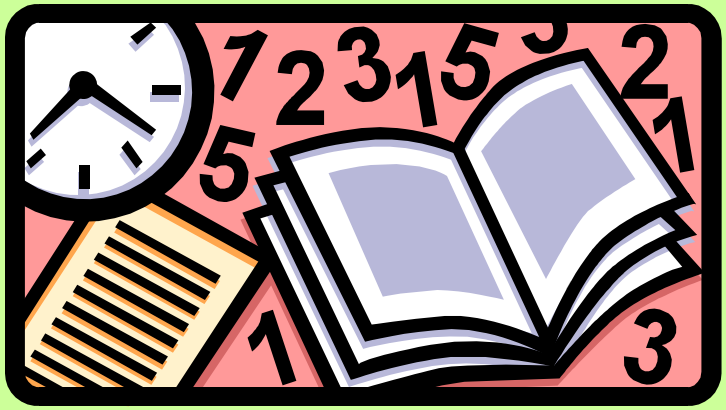


USDA

SEEDING GUIDELINES

Planting dates

- Late winter - early spring
- Late summer - early fall



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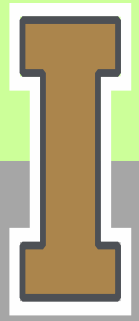
PLANTING DATES

Late winter- early spring seeding

- Late February to early May
- More common in northern U.S.
- Soil moisture usually good
- If too early soil can be cold, resulting in fungal diseases
- If too late, soil can be dry and seedlings desiccate



PLANTING DATES

Late summer - early fall seeding

- August to mid-October
- Less competition from weeds
- Liming, fertilization, and tillage done during drier weather thereby reducing compaction
- Fungal diseases reduced

Note: Seedlings need to have at least six weeks of growth before killing frost

SEEDING GUIDELINES

Seeding depth

- Approximately ¼ inch
- Varies with:
  - Soil type
  - Soil moisture
  - Time of seeding
  - Firmness of seedbed

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SEEDING GUIDELINES

Inoculation of legumes

- All legumes should be inoculated with the proper strains of N-fixing bacteria prior to seeding
- Ensures that proper bacteria will be present for nitrogen fixation

SEEDING RATES

Desired Stand - Varies based on:

- Forage species planted
  - Ability to fill in (rhizomes, etc.)
  - % Hard seed
  - Mixture, pure-stand, companion crop
- Availability of water

SEEDING RATES

Pure live seed percent (PLS)

%PLS = %Purity x %Germination

%Purity = % of seed that is the desired forage seed

%Germination = % of seed that germinates when planted

Other factors to consider

- Seeding method used
  - ➢Seeding rate affected by uniformity of seed placement
- Condition of seedbed
- Allelopathic toxins

PLANT CHARACTERISTICS

Grasses

Legumes

Seasonal growth patterns

Disease resistance

Forage quality

Pure stands or Mixtures

GRASSES

- Growth habit
  - Bunchgrass
  - Sod-forming grass
    - Stolon
    - Rhizome
- Re-growth
  - Jointing
  - Non-jointing

Grasses are more tolerant of poor soil conditions

Require nitrogen fertilizer

LEGUMES

Legumes fix nitrogen from the air

Growth habit

- Upright (Sainfoin)
- Prostrate (Birdsfoot Trefoil)

New Growth

- Axillary (Sweet Clover)
- Crown (Red Clover)
- Axillary & crown (Alfalfa)

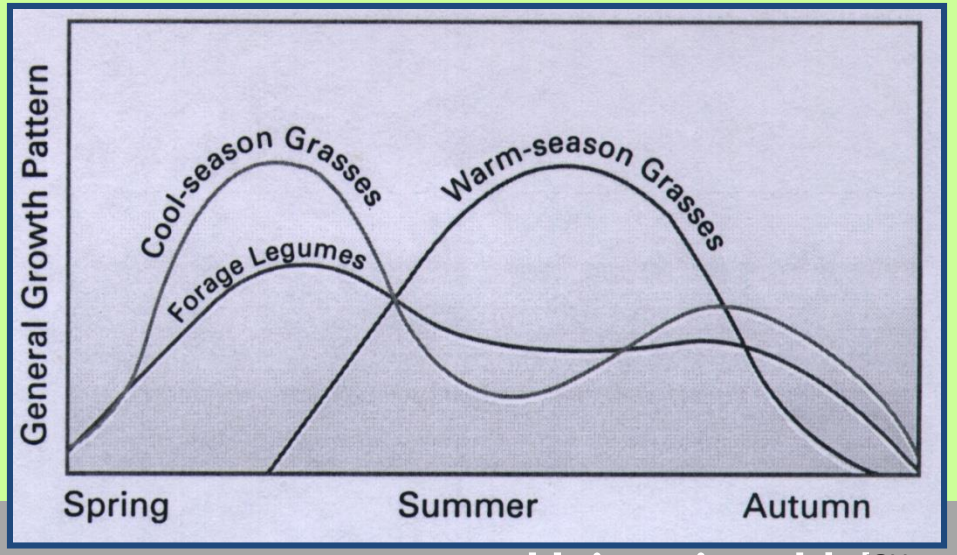
SEASONAL GROWTH DISTRIBUTION

Forages have different growth patterns

Grasses

- Cool Season
- Warm Season

Forages



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INSECT & DISEASE RESISTANCE & WINTER HARDINESS

Disease resistance/

winter hardiness

- Genetically inherited traits
- Select disease resistant varieties
- Select varieties with good winter hardiness if in cold climate

Intended years of use

SHOULD I PLANT A PURE STAND?

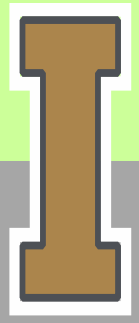
Advantages
- Management is easier
- Weed control easier

Disadvantages
- Lower yield

SHOULD I PLANT A MIXTURE?

Advantages

- Higher yields
- Legumes fix nitrogen, reducing the need for nitrogen fertilizer in grasses
- Tolerate wider differences in soil conditions
- More competitive against weeds



SHOULD I PLANT A MIXTURE?

Disadvantages

- Grazing management more difficult, especially if growth habits not similar
- If not managed properly grasses will dominate
- Weeds more difficult to control

PRINCIPLES FOR COMPOSING MIXTURES

- ✓ Keep the mixture simple
- ✓ Similar maturity date
- ✓ Similar palatability
- ✓ Similar growth habit

COOL SEASON GRASS CULTIVARS

Most productive in the spring and fall

Poor summer production

KENTUCKY BLUEGRASS

Advantages:

- Good quality
- Withstands animal traffic
- Good tolerance to close grazing

Disadvantages:

- Low yield potential
- Poor drought & heat tolerance
- Likes well-drained soil

MEADOW BROMEGRASS

Advantages:

Good yield potential

Good re-growth

Tolerant of close grazing

Disadvantages:

Not tolerant of acidic and poorly-drained soils

ORCHARD GRASS

Advantages:

Good quality

Good re-growth

Shade tolerant

Disadvantages:

Suffers when grazed continually

PERENNIAL RYEGRASS

Advantages:

Very good quality

Easy to establish

Good tolerance to close grazing

Disadvantages:

Poor drought & heat tolerance

Poor shade tolerance

Likes well-drained soils

REED CANARY GRASS

Advantages:

Good quality

Good re-growth

Adapted to wide range of conditions, including wet soils

Disadvantages:

Lack of palatability

Produces best when intensely grazed

Poor drought & heat tolerance

SMOOTH BROME

Advantages:

- Usually grown with a legume
- Graze after stem elongation
- Provides good mid-summer grazing
- High quality

Disadvantages:

- Aggressive and can take over a pasture

TALL FESCUE

Advantages:

Good quality

Tillering stimulated through frequent grazing

Moderately winter hardy

Active fall growth

Disadvantages:

Must be endophyte free

TIMOTHY

Advantages:

High quality

Easy to establish

Winter hardy

Disadvantages:

Sensitive to frequent defoliation

Poor re-growth

Poor summer production

Not suited to droughty soils

LEGUMES

Fix nitrogen from atmosphere
May cause bloat

ALFALFA

Advantages:

Excellent quality

Drought tolerant

Disadvantages:

Causes bloat

Potential for heaving

ALSIKE CLOVER

Advantages:

Excellent quality

Grows in variety of soils and conditions

Disadvantages:

Can graze frequently, but not closely

Much lower yielding than alfalfa

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BIRDSFOOT TREFOIL

Advantages:

Excellent quality

Grows in variety of soils and conditions

Non-bloat legume

Disadvantages:

Can graze frequently, but not closely

Slow to establish

CICER MILKVETCH

Advantages:

Non-bloat legume
Good forage quality

Disadvantages:

Slow to establish
Slow re-growth

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RED CLOVER

Advantages:

Good quality

Easy to establish

Works well with frost seeding

Disadvantages:

Generally does not persist after two growing seasons

SAINFOIN

Advantages:

Good quality

Well adapted to soils of the Rocky Mountain Region

Good drought tolerance

Non-bloat legume

Disadvantages:

Intolerant of frequent defoliation

WHITE CLOVER

Advantages:

Excellent quality

Good tolerance to close grazing

Withstands continuous grazing

Grows best during cool moist seasons on well drained soils

Disadvantages:

Low yielding

May cause bloat

PARTING SHOT

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