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Management for Diverse Pastures ?

Stephen K. Barnhart,
Extension Forage Specialist
Iowa State University
Ames, IA
515-204-7835
Email sbarnhar@iastate.edu

Diverse Pastures ???

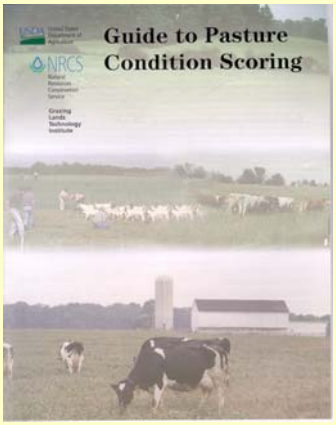
di·verse -- adj.
1. of a different kind, form, etc.; unlike:
2. of various kinds or forms; multi-form.

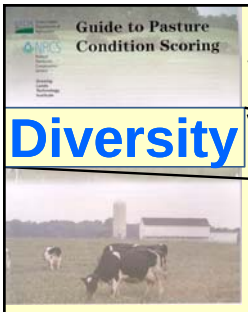
-- made up of distinct characteristics, qualities, or elements

Grass/Legume | Grass only | Annual Grasses | Stockpiled | Fall cover Sp graze

[Joe Sellers' guidance]

" …… developing stands with multiple, cool season species (legumes, forbs, etc.); could also include a little on getting more diversity into CRP and prairies."





From USDA-NRCS

'Pasture condition' scoring focuses on:

Diversity

Vegetation traits
desirability of species, plant cover, 'vigor', degree of plant residue, % legumes, uniformity of use, severity of use, diversity of species, tree/shrub canopy cover

Site / Soil traits
active erosion ?, livestock concentration areas, compaction,

Management
fertility insects & diseases

10 factors 0-5 ranking for each - - high score 50

Diversity - the number of different forage plants that are well represented (20% or more of plant cover) in a pasture

Rationale….. forage species grow and yield differently during the growing season;

having more species (diversity) will improve seasonal 'stability' of production

… and that limited diversity (fewer species & mono-culture) are less reliable

Species diversity not necessarily a ' fixed ' group of species, nor of a 'fixed' proportion, over time !

Productivity may be relatively stable

But…. species proportion & composition may change ….
time
weather
management

The goal ……. Mixed species pastures with….

-- at least two functional groups

Example of Functional Groups
- Cool Season Grasses
- Temperate climate legume
- Warm-season Grasses
- Palatable Forbes

-- 3 to 4 well represented (compatible & productive) forage species …. are generally the most productive.

Higher diversity (more than 6 species) does not assure higher productivity.

Improving species diversity ….

Seeding a new pasture

Adjusting the composition of an existing pasture

Adjusting the composition of an existing CRP field

Diversity Considerations - when selecting species

Is it/are they adapted to the climate?

Tolerant of site conditions ?
(Fertility, drainage - and wet soil diseases !)

Compatibility of species if in mixtures ?
Height
Palatability
Seedling vigor

Appropriate for intended use ?
- grazing – & degree of grazing intensity
- mechanical harvest suitability
- habitat, soil & water management
- multiple uses

Is it/are they adapted to the climate?

Humid, Continental Climate …..

- def.
Found over large areas of landmasses in the temperate regions of the mid-latitudes where there is a zone of conflict between polar and tropical air masses.

Moderate temperatures
Precipitation to support plant growth

Generally hot temperatures
Precipitation variable

Moderate temperatures
Precipitation to support plant growth

M A M J J A S O

Moderate temperatures
Precipitation to support plant growth

Generally hot temperatures
Precipitation variable

Moderate temperatures
Precipitation to support plant growth

Perennial forage species have to have adaptive characteristics to live through our winters !!!!

? ?

J F M A M J J A S O N D

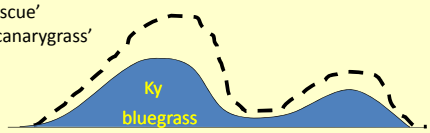
Moderate temperatures
Precipitation to support plant growth

Generally hot temperatures
Precipitation variable

Moderate temperatures
Precipitation to support plant growth

A more productive Cool-Season grass
'Bromegrass'
'Orchardgrass'
'Tall Fescue'
'Reed canarygrass'

Cool Season Grasses



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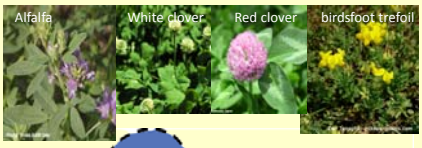

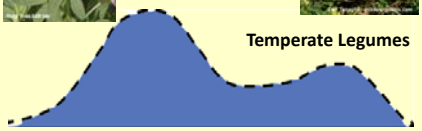

M A M J J A S O

Moderate temperatures
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Generally hot temperatures
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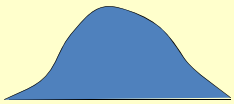
Moderate temperatures
Precipitation to support plant growth

Warm-Season Species



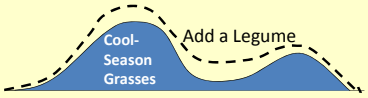
M A M J J A S O

One of our greatest challenges ….
Choices to increase (stabilize) 'mid-summer' productivity ??????

Cool season , perennial grasses

+

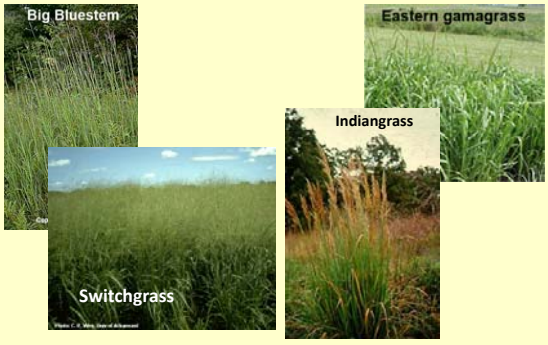
Perennial, temperate legumes



J F M A M J J A S O N D

Choices to increase (stabilize) 'mid summer productivity ??????

Perennial , Warm Season Grasses ???



Sideoats grama

Little bluestem

Shorter grama grasses

Buffalo grass

Choices to increase (stabilize) 'mid summer productivity ??????

Annual , Warm Season Grasses ???

'Traditional, emergency crops'

Sudangrass, Sudan X Sorghum hyb. , Millets ?

These do best in monoculture !

Selecting species (& varieties) for a site and / or use .....

Tolerant of site conditions

(Fertility, drainage - and wet soil diseases !)

Compatibility of species if in mixtures ?

Height

Palatability

Seedling vigor

Compatibility of species if in mixtures ?

Height

Tall species together or short species together

Similar Palatability

More palatable at risk of decreasing in the stand
Less palatable ... to become dominant

Ex. Ky bluegrass vs. tall fescue
Ex. Big bluestem vs. switchgrass

Seedling vigor

Early stand dominance vs. !! survival as seedlings !!

Ex. Cereal grain companion crops vs. Ky bluegrass, or BFT
Ex. Annual ryegrass vs. slower growing perennial species

Are components appropriate for intended use ?

Grazing

Continuous, close defoliation ?

Rotational stocking (with appropriate rest)

Mechanical harvest suitability

Tall vs. Short

Wildlife habitat

Provide cover, nesting habitat, food/seed, food/insects

Soil & water management

'Sod formers' vs. 'bunchgrasses'

Choices to increase (stabilize) 'mid summer productivity ??????

How about that 'functional group 'Forbs" ????

Expanded to include .....

Other non-legume, palatable, broadleaf plants (! weeds ! ?)

and

Weedy grasses

Forbs and weedy grasses ??

plantains, dandelion chicory cropland weeds (many !)

Crabgrass

Foxtails

Less palatable

Downy brome

Squirrel tail barley
Foxtail barley

Little barley

Not palatable

Canada Thistle

Musk Thistle

Bull Thistle

Plumeless Thistle

Blue vervain

Horse nettle

Buffalo bur

Giant ragweed

Goldenrod

Burdock

Most forage seeding rate recommendations are base on applying about 70 to 100 seeds per square foot.

See ISU Extension pub Pm-1792. Selecting Forage Specie http://www.extension.iastate.edu/Publications/PM1792.pdf for seeding rates and suggested mixtures.

A number of seeding mixtures are suggested.

To calculate your own seeding rates for mixtures of species:

Species	lb/A for a pure stand	% desired in the mixture	lb/A of Component In mixture
Alfalfa	12-15 lb/A	50	6-8 lb/A
Orchardgrass	8-10 lb/A	50	4-5 lb/A

Seeding a new pasture (hay mixture ?)
Diversity Considerations

Complete renovation

- No competition from the sod
- significant erosion potential

No-till renovation

- No competition from a dead sod,
- lower erosion potential

Issues .....

Species & Variety selection

Metering of seed
Precision seed placement
Seed-to-soil contact

Erosion control
Dead residue
Companion / cover crop

Weed / Shade competition management during seeding year

Enhance plant species diversity in existing hay or pasture stands:

Frost seeding
Interseeding

Keep the existing species
But- competition from the sod, less potential for erosion

Frost seeding (ISU Ext Pub Pm-865):

Goal: establish a partial new stand while maintaining the existing sod.

Simple – broadcast seed on pasture in late winter / very early spring

Frost seeding

Forage seed is broadcast onto grasslands, in late winter or very early spring, late Feb to early March in Iowa

Ground is still frozen

Freezing and thawing and early spring rains move seed into the sod / soil surface

Much less successful in dry springs or with early summer weather

On snow ???? Not necessarily an advantage.
Safety risk when driving on steep slopes with frozen or melting surfaces !

Legumes are most successful for frostseeding, and respond in relation to their seedling vigor

Red, alsike, ladino clover > alfalfa, trefoil

Grasses- more limited success

Orchardgrass > timothy > tall fescue > bromegrass

Frost seeding

- **Best success into bunchgrass sod (orchardgrass) or into thin sod areas**
  in sod-forming grasses (Kentucky bluegrass, smooth bromegrass)
- **Where sod competition is moderate or high:**
  - **Close clip or graze, prior fall**
  - **Higher seeding rates**

Advantages of frostseeding:

- **Keep desirable species**
- **Reduces erosion potential**
- **Reduced labor, energy, inputs (fuel, herbicides)**
- **Does not require expensive equipment**
- **Herbicides may not be required**
  (if weeds are already under control)
- **Shortened "non-grazing period**

Other 'follow-up' considerations with Frostseeding……

- Frequent (but not continuous !) grazing during the seeding year reduces sod competition
- Avoid grazing on wet ground --- surface damage
- Graze only on well established sod, do not want to destroy young sod
- Sheep better than cattle, sheep graze lower into the canopy, closer to the soil surface

There are several important steps that make frost seeding more consistently successful.

Weeds should be under control

Fertility – good enough for legumes ?

Grass sod should be short

Moderate, periodic grazing after pre-existing sod starts to grow

! Light availability to new seedlings is important !

Graze later years to keep new plants !!!!!

Interseeding (ISU Ext Pub Pm-1097) :

Goal: establish a partial new stand while maintaining the existing sod.

- Using drill to place the seeds
- Similar success with legumes and grasses !!
- Seeding, before 1 June or mid-Aug. to mid-Sept. ** in Iowa (** legumes early in this period)
- Need more sod suppression with spring interseeding

Reduce sod competition !

'Mechanical'

– Graze or clip existing sod, particularly in spring,

– Regraze after interseeding with grazing height above the new seedlings, less loss of grazing time

'Chemical'

- use contact herbicide, Gramoxone Extra (paraquat)
- need a few inches of grass growth
- annuals and biennials may be killed
- perennial grasses suppressed for 3 to 4 weeks
- follow herbicide label, and any grazing restrictions
- graze after interseeding with grazing height above the new seedlings, less loss of grazing time

When using herbicides for sod suppression: factor in the loss of grazing time & forage

Reduce sod competition !

'Chemical'

– Use contact chemical, Gramoxone (paraquat),

- need a few inches of growth;

- When: 3 days before,
at interseeding,
not more than 3 days after interseeding

When you remove grass competition, annual grassy and broadleaf weeds become more competitive.

Interseeding considerations:

Seeding rates more similar to those for tilled seedbed establishment, less than frost seeding

Compatibility of existing and introduced species:

- Alfalfa or red clover into … bromegrass,
tall fescue
reed canarygrass

- BFT, red or white clover into… Ky bluegrass
orchardgrass

(Other mixtures, seeding rates: Ext pub Pm-1097)

Sod-Seed or Inter-seed

Use no-till pasture drill to seed into existing pasture sod in early spring (March and April)

No-till drills provide:

A disk-type or other sod/ seedbed opener

A seed metering & placement mechanism with depth control

A press wheel to provide seed-to soil contact

Sod-Seed or Inter-seed

Most interseeding is done in early spring (March and April)

Consider late summer (Aug thru very early Sept) IF soil moisture is adequate soil moisture is adequate

Some county conservation agencies rent these

Sod-Seed or Inter-seed - continued

As with frost seeding, some management practices improve interseeding success

- **Weeds should be under control**
- **Fertility – good enough for legumes ?**
- **Grass sod should be short**
- **Consider sod suppression herbicides**
- **Drill seed to a depth of ¼ to ½ in. and cover**
- **Graze seeding year to allow establishment**
- **Graze later years to keep new plants !!!!!**

No-till renovation (ISU Ext Pub Pm-1097)

- **Goal: total change of plant species**
- **Killed sod or crop residue of previous grain crop**
- **Chemical, glyphosate (Round-Up)**
  - **need 4-6 in. of grass growth (for growing sod fields) (or for weed 'burn-down' in row crop fields)**
  - **apply chemical before or just prior to planting**
  - **leads to relatively late spring planting if spring-killed sod**
  - **harder to establish seedlings if hot and dry**
  - **use similar seeding rates as interseeding or for a tilled seedbed establishment**

Adjust / change the composition of an existing CRP field

Inadequate initial stand ???

More of the same species mixture

Boost the % of a needed component

Frost seed ?

Interseed"

Start over ?

Mid-Contract Management ??

Improve wildlife habitat value

Erosion repair / prevention

- Frost seed ?
- Interseed
- Selective complete reseeding ?

Weed / Brush management

Prescribed burning ?

End-of-Contract Changes (for contract renewal or production/use

Improve wildlife habitat value (legumes, forbs)

Erosion repair / prevention

More/more productive species (legumes, grasses)

- Frost seed ?
- Interseed
- Selective complete reseeding ?

Weed / Brush management (mowing, herbicides)

Prescribed burning ?

Questions ?? Comments ??

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