Management for Diverse Pastures

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Diverse Pastures

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

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 is to develop Mixed species pastures with:

- at least two functional groups

- 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.

**Example of Functional Groups**

- Cool Season Grasses
- Temperate climate legume
- Warm-season Grasses
- Palatable Forbs

**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**

  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

Perennial forage species have to have adaptive characteristics to live through our winters!!!
A more productive Cool-Season grass
'Bromegrass'
'Orchardgrass'
'Tall Fescue'
'Reed canarygrass'

Cool Season Grasses

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

Cool season, perennial grasses
Perennial, temperate legumes

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

Perennial, Warm Season Grasses ???
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

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’

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

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  Bull Thistle  Musk Thistle  Plumeless Thistle

Blue vervain  Horse nettle  Buffalo bur

Giant ragweed  Goldenrod  Burdock

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

See ISU Extension pub PM-1792. Selecting Forage Species for seeding rates and suggested mixtures.

A number of seeding mixtures are suggested.

To calculate your own seeding rates for mixtures of species:

<table>
<thead>
<tr>
<th>Species</th>
<th>lb/A for a pure stand</th>
<th>% desired in the mixture</th>
<th>lb/A of Component in mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>12-15 lb/A</td>
<td>50</td>
<td>6.8 lb/A</td>
</tr>
<tr>
<td>Orchardgrass</td>
<td>8-10 lb/A</td>
<td>50</td>
<td>4.5 lb/A</td>
</tr>
</tbody>
</table>

Seeding a new pasture (hay mixture?) Diversity Considerations

Complete renovation

No competition from the sod

No 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**
- Keep the existing species
- But-competition from the sod, less potential for erosion

**Interseeding**

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

• 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 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

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

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**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

Grazing seeding year to allow establishment

Grazing later years to keep new plants !!!!!

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**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)
  - 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

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**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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