Selecting Species and Varieties for Pasture

Edward N. Ballard
Animal Systems Educator
Effingham Center

Illinois has the climate and soil that allows the use of most forage species presently available for humid, temperature regions of the United States. The landscape is dominated by cool season grasses and legumes and their mixtures. The major grasses would be tall fescue, orchardgrass, bromegrass and timothy. Major pasture legumes would include red and white clover, annual lespedeza, alfalfa and birdsfoot trefoil.

However, a multitude of choices may make for difficult decisions in designing a beef pasture system. In addition, after a species is chosen, what variety of that species should be sown. Data exist to aid in selecting varieties, but an understanding of the value of better varieties is important to making an informed decision.

Selecting A Species

Surely no decision about a species can be made unless there is a clear definition of what "good" is. For this discussion a "good" forage is one that is high in nutritive quality, is persistent, and supplies, these nutrients cheaply. This forage should not have any "unmanageable " flaws. To decide if one should replace the forage that you have with something else, a good question to ask is can the new forage do the job and do it cheaper than what I presently have.

Species selected for use as pasture for beef cattle should be high yielding, persistent, tolerant of the anticipated level of management and adapted to the region and to the soil conditions in the pasture to be seeded. To generalize, nearly all species of forage crops can be utilized for pasture, especially if rotational grazing is practiced (Table 1). However, if pastures are to be frequently and closely grazed then mixtures containing combinations of Kentucky bluegrass, orchardgrass, endophyte-free tall fescue, ryegrass (perennial and annual) and/or white clover are best. Endophyte-infected tall fescue can be used alone or in mixtures in areas that could be used for winter pasture or as a calving pasture in early spring.
Table 1. Suitability of several forages species for grazing and stored feed.

<table>
<thead>
<tr>
<th>Species</th>
<th>Frequent, Close Grazing</th>
<th>Rotational Grazing</th>
<th>Stored Feed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>![suitable]</td>
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<tr>
<td>Red Clover</td>
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<tr>
<td>White Clover</td>
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<td>![not suitable]</td>
</tr>
<tr>
<td>Ryegrass</td>
<td>![suitable]</td>
<td>![suitable]</td>
<td>![suitable]</td>
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<tr>
<td>Tall Fescue, endophyte infected</td>
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<td>![suitable]</td>
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<tr>
<td>Tall Fescue, endophyte free</td>
<td>![suitable]</td>
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<td>![suitable]</td>
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<tr>
<td>Orchardgrass</td>
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<td>![suitable]</td>
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<tr>
<td>Brome grass</td>
<td>![suitable]</td>
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<td>![suitable]</td>
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<tr>
<td>Bluegrass</td>
<td>![highly suitable]</td>
<td>![suitable]</td>
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</tbody>
</table>

| ! Not Suitable                  | ![suitable]             | ![suitable]        |

There are many questions that must be answered to properly select the forage or forages that would make up the ideal or optimal system for beef cattle. The producer must define the role, the forage production goal, the method of use and the "utilizer", the level of management available, the soil/land limitations, and the time limitations.

Defining the role.

There must be a clear understanding as to what role forage will play. Will it be the primary base grass in a pasture system or will it be supplemental forage interseeded into existing forage? Will the forage be permanent (a perennial) or a temporary (an annual) addition to the system? What will be the primary season of use? A species selected for fall or winter grazing will probably be of little value during the heat of August. Likewise, productive summer forage will likely have a relatively short (but productive) growing season compared to a species like tall fescue.

Defining the forage production goal.

Ultimately, a forage system must provide enough dry matter to carry a given set of animals for the year and also meet the desired quality standards of the cattle that will be grazing or consuming the forage. Forages must therefore produce enough dry mater yields per acre to meet these needs. Also, that yield should come at such a time as can be used efficiently. The most efficient method of forage utilization is grazing; it is estimated that nutrients supplied by grazing cost approximately half of those supplied by stored feeds such as hay and silage. Therefore, production during the time of animal need would be highly desirable. Forage crops adapted to Illinois can be classified as "cool season" or "warm season" species based on their optimum season of growth. Tall fescue, orchardgrass, ryegrass, bluegrass, timothy, red clover, alfalfa, and white clover are cool season forages, while bermudagrass, pearl millet, and big bluestem are examples of warm season species. Even though species like alfalfa and red clover are known to be more productive during mid-summer than fescue or bluegrass, these are still cool season species whose growth slows greatly during hot, summer months.
Defining the method use.

A significant constraint to forage selection is the intended method of utilization. Systems that allow for a rotation of pastures and periods of rest/recovery from grazing offer many more forage selection options (Table 1). On the other hand, systems that involve continuous grazing or that will suffer excessive traffic during dormant or wet seasons have fewer options. In extreme cases (such as winter feeding pastures) there may not even be a good permanent solution. Often, the question of "Am I willing to rotate pastures?" must be answered very early in the forage selection process. Not being realistic in this area can lead to unrealized expectations, disappointment, and often-significant financial losses. For example, alfalfa is a species that must be rotationally grazed for maximum stand persistence and maximum economic animal performance. As good as it is alfalfa cannot and will not persist nor give proper animal performance when grazed continuously.

Defining the "utilizer."

The type of cattle to be grazed and their growth stage will determine its nutritional needs and also will help define the forage options available. This is especially important relative to the use of existing, old fields of tall fescue. Old fields of tall fescue are probably infected with a fungal endophyte that spends its whole life cycle inside the plant. The presence of this endophyte makes the plant more drought tolerant but causes reduced conception rates in breeding stock and reduced weight gains in growing cattle. Fescue is a good pasture base for a cowherd and can be used for stocker pasture, even if it is infected with the endophyte. However, it is very important to understand when the grazing animal is most sensitive to the toxic products of the fungal endophyte and either avoids it or mange around it during these times. This management minimizes the effect while using a cheap source of feed.

Many if not most proposed changes to a pasture system of beef cattle will come from taking out tall fescue and replacing it with something else. These changes should be made carefully and only after a full understanding of the pros and cons of the new forage to be planted.

Defining the level of management available.

Requirements for good forage growth and persistence may include pasture subdivisions (to aid in good rotations), soil fertility, weed control, rotational grazing, residual height management, fall rest for winter hardiness, and insect control. Without pasture subdivisions and the ability to rotate pastures, certain forages (such as alfalfa) will not be viable options. Meeting fertilizer needs of a crop are necessary for production and persistence. Likewise, more intensive pest management is required for some crops, such as alfalfa. While controlling the alfalfa weevil and potato leafhopper do not always require the use of insecticides, the economic thresholds of each one as well as the proper cultural controls must be understood and be incorporated into the grazing plan.

The level of management available determines what can be achieved from a forage system. In particular, the ability to maximize forage growth rates by using a good, fast (3 to 5 days of grazing followed by 30 to 35 days of rest) rotation will allow the maximum production of high quality forage per acre and consequently, animal output should be equally high. Also, soil nutrient must be managed to supply the mineral needs of the plant.
Defining the soil resource.

What are the soil limitations of the fields in the pasture system? Is the soil fertility and pH known on pasture fields? Acid soils and low soil-P are severe limitations to legume production. While some legumes such as lespedeza and birdsfoot trefoil are tolerant of acid soils and lower fertility, most are not productive or persistent under the same conditions.

Other significant soil limitations include rooting depth, drainage, and topography. Shallow soils are droughty and stress forage plants during hot, dry weather. Soils that are poorly drained place stressed on the root systems of forage crops and may be unsuitable for species like alfalfa and many of the native warm season grasses. Severely rolling topography may remove annual crops such as sudangrass or millet as options for forage systems because of their inaccessibility to planting equipment. Even applying fertilizer and lime on these fields is a challenge in some cases.

Soil fertility is an addressable limitation in forage systems, and forage systems recycle a large portion of nutrients that plants take up during the growing system. However, seldom can all fields be brought up to soil test at one time. But the important point is to know what the fertility limitations are, where they are, and to have a plan for best using these fields in the forage system.

Defining the time constraints.

Making changes in a forage system take time. Making big changes in a forage system take a lot of time. Some forages by nature can have an immediate effect, but their effect is often short-lived. Sudangrass, pearl millet, german millet, wheat and rye can have immediate effects but these are annuals. Perennials like tall fescue, orchardgrass, bromegrass, and bluegrass have longer periods of usefulness.

Designing a forage system must allow time for perennials to become established. Not allowing enough time for establishment is perhaps the greatest cause of stand failure and reseeding in new seedlings of pasture. If adequate time cannot be planned or provided for, plan or re-seeding that area every other year or so. A species such as Italian ryegrass can be good for this purpose, since it is a fast starter and only lives two years.

Choosing Cool Season Grasses for Grazing

Orchardgrass: Earlier maturing than bromegrass or timothy, orchardgrass is highly palatable to grazing livestock and is a good complementary grass to alfalfa or red clover. Orchardgrass has good regrowth after the first grazing. Orchardgrass varieties differ greatly in maturity or date of head emergence. Choose mid to late maturing varieties for pasture.

Tall fescue: A strong perennial that is widely adapted. The presence of a fungal endophyte in older tall fescue enhances persistence and stress tolerance but lowers animal performance. New varieties that are free from the endophyte (the label will state this) and some appear to be tolerant of heavy grazing. Tall fescue is the best to use for fall and winter grazing (stockpiling) because it holds its quality and palatability better than other cool season grasses.
Bromegrass: A strong perennial that matures later than tall fescue and orchardgrass but at about
the same time as timothy. Forms a tight sod that may become less productive with age. Seed is
fluffy and somewhat hard to get to flow. Brome is highly palatable to grazing livestock.

Perennial Ryegrass: Establish rapidly, have a long growing season, have the potential to be high
yielding under favorable environments when supplied with adequate nutrients, posses high
nutrient contents, and rotational grazed. Ryegrasses grow best on fertile, well-drained soils and
are heavier users of water and their performance is less than optimum during a drought or
periods of extended high temperatures. Ryegrasses are considered to be high quality forages.

Timothy: A very high yielding perennial with very little regrowth after the first harvest. Lack of
summer growth makes it much less valuable in a pasture program. Highly palatable to livestock.

Kentucky bluegrass: A strong perennial grass that forms a tight sod. Fine bladed and highly
palatable to livestock, bluegrass produces best in spring and fall. Goes dormant during hot dry
periods. Lower yielding than tall fescue or orchardgrass.

**Choosing Cool Season Legumes for Grazing.**

Alfalfa: Highest quality, highest yielding forage legume with a wide variety of uses. Provides
good to excellent summer growth and supports excellent animal gains. Can be used with
orchardgrass, tall fescue or brome in pasture systems or can be grazed as a pure stand. Must be
rotationally grazing to persist, but can last 5 years or longer in well managed pasture systems.
Grazing tolerant varieties are available. Will not establish by frost seeding onto closely grazed
sod as red clover can. Interseeding into existing grass stands require controlling grass
competition by either herbicides or tillage. 

Red Clover: High yielding, palatable legume with good summer production. Less tolerant of
hot weather than alfalfa, and stands last only 2 to 3 years maximum. Better varieties have better
persistence and much higher yields than common or uncertified seed. Can be established into
existing cool season grasses.

White Clover: Low growing but high quality legume. Less heat and drought tolerant and less
productive during summer than red clover. Ladino types are giant white clovers that are higher
yielding. Ladino/white is a good addition to a pasture. Typically sown with red clover, it is very
productive in spring and fall. White clover has the highest bloat potential of all forage legumes.
White clover stands appear to persist longer than red clover and alfalfa because it is prolific
reseeded.

Birdsfoot Trefoil: A low growing legume that does not cause bloat and must be allowed to reseed
for stands to persist. Trefoil has low seeding vigor and can often be slow to establish into
existing grass. Not good for hay. Birdsfoot trefoil sets more seed in northern locations because
it flowering response is better under long day lengths. Seed cost is high relative to other forage
legumes.
Selecting Improved Forage Varieties:
The Value of Improved Forage Varieties

A forage variety should be high yielding, persistent, adapted to Illinois, nutritious, palatable, and free from known antiquality components. In addition, it should be tolerant of the anticipated methods of utilization and level of management. The variety chosen should be "improved," which means that it has bred, tested, and proven to have better traits or performance than older varieties. The variety should be certified (denoted by a blue tag on the bag) or at least a proprietary variety on which performance data is available.

References:


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