Cover crop mixes to meet grazing needs
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Introduction
Although cover crops, green manure, etc. have traditionally been used in the agroecosystem to better manage soil fertility, soil moisture, weeds, pests, and crop diseases; livestock grazing also can be added to the list of services cover crops can provide. There are literally hundreds of potential cover crop species that can benefit the agroecosystem therefore, matching cover crop species to soil types, management objectives, and future uses is critical to getting the most out of any cover crop program. This seminar will outline some decision points producers will need to consider when evaluating cover crops for grazing.

Cover crops for grazing
There are literally hundreds of species that can be used as cover crops. For the sake of simplicity, there are six major categories of cover crops. A few of the major species are listed under each category.

Table 1. Categories of cover crops and major species.

<table>
<thead>
<tr>
<th>Brassicas</th>
<th>Clovers</th>
<th>Legumes</th>
<th>Cereal grains</th>
<th>Annual grasses</th>
<th>Summer annuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnip</td>
<td>White clover</td>
<td>Hairy vetch</td>
<td>Rye</td>
<td>Annual ryegrass</td>
<td>Sorghum</td>
</tr>
<tr>
<td>Radish</td>
<td>Crimson clover</td>
<td>Sweet clover</td>
<td>Barley</td>
<td></td>
<td>Sudangrass</td>
</tr>
<tr>
<td>Rape</td>
<td>Red clover</td>
<td>Winter peas</td>
<td>Oats</td>
<td></td>
<td>Sorg.xSudan</td>
</tr>
<tr>
<td>Kale</td>
<td>Burnett clover</td>
<td>Alfalfa</td>
<td>Triticale</td>
<td></td>
<td>Millets</td>
</tr>
</tbody>
</table>

Cover crop decision tree

Cost
The primary concern for a cover crop program is cost. Cover crop species and mixes can range from very cost effective to outrageous, depending on the objectives of the program and the cover crop species involved. Later on in the program I will talk about potential species mixes and costs for different grazing scenarios.

Moisture
The second major issue with using cover crops for grazing is moisture content of the forage. Moisture content of grazable forage from cover crops can range dramatically depending on species planted and management. Moisture content will affect animal performance greatly and therefore should be managed carefully. Brassica species like turnips, rape, kale, and radishes will contain roughly 90% water in the field. Cereal grains will contain about 60% water and warm-season annuals like millet will contain about 50% water. In contrast, corn stalks will contain about 10% moisture.

Carbon to nitrogen ratio is another key to influencing animal performance in a grazing situation. Generally speaking, the greater the carbon to nitrogen ratio of a forage, the more fiber the forage contains. More fiber means lower digestibility and less performance from grazing livestock. However, in reality there is an optimum range of C:N ratio of 40-45:1. Using different species of cover crops that have different moisture contents and C:N ratios in mixes is the best way to manage animal performance. However, it also is important to understand that cover crop species that have a C:N ratio of 40:1 are much more expensive than species that have a C:N ratio of 25:1. Therefore, it is important to manage cost at the same time.

Cold tolerance
Another critical aspect to any cover cropping program is cold tolerance of target species. Considering that the vast majority of cover crop grazing occurs in late-fall to early winter, cold tolerance of grazing species becomes very important. Brassicas species have excellent cold tolerance and will stay green well into the winter before finally freezing out by January or February. Cereal grains such as rye, barley, oats, and annual ryegrass also have pretty good cold tolerance. However, summer annual species such as sorghums, sudangrass, sorghumx.sudangrass hybrids, and the millets have very poor cold tolerance. These species will brown-up and die at the first hint of frost. Unfortunately, cold tolerance and yield of grazable forage are generally inversely related, so it is important to have a conceptual idea of when species are going to be grazed before planting.
Residual

Contrary to popular belief, grazing is generally not a very efficient process and the amount of forage that is actually removed by grazing animals is largely overestimated. For many producers, this has led to problems concerning field residue following grazing. As a general rule, less than 40% of forage in a field will actually be consumed by grazing livestock. Much of it will be trampled on, urinated on, and defecated on; leaving large quantities remaining in the field. This concern becomes paramount when considering spring field work for subsequent crops.

Summary

When managed properly, cover crop species can provide quality grazing at a reasonable price; in addition to other agronomic goals of the producer. The key to a successful cover crop program is balancing the objectives of the program and cost. Keeping the cover crop decision tree in mind when developing the cover crop program will enhance its effectiveness to the producer.