Cover Crops and Crop Residues

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In Kentucky, erosion hazard is by far the major limitation for use of cropland. It has been estimated that about 11.4 million acres are subject to erosion hazards. This means that approximately 75% of the soils potentially suited for cropland is sloping enough that risk of erosion is the greatest limitation in its use for crop production. Probably the greatest risk of erosion results from leaving row-cropped fields unprotected over winter. The use of cover crops and proper management of crop residues to stabilize these soils during the winter months are relatively inexpensive agronomic practices that are very effective in controlling erosion. These agronomic practices are especially appealing because they can control erosion losses without interfering with the use of the land to produce Kentucky's primary acreage of corn, soybeans, and tobacco.

Use of Cover Crops

Cover crops in Kentucky are grown for the purpose of protecting the soil during the winter. They are plowed under at or near planting time in conventional tillage systems or are chemically-killed in no-tillage systems. They add versatility since they can provide late fall and early spring grazing or can be harvested as silage for livestock operations. The wheat or barley-soybean double crop system is an example in which the small grain serves as a winter cover crop and is harvested as a grain crop. On the commonly used cover crops seeded in Kentucky, rye, wheat and barley are most often used. A much smaller acreage is seeded to oats, fescue, rye-grass, hairy vetch, and crimson clover. Recommended seeding rates for the purpose of fall cover crops and/or grazing are given in Table 1.

Seeding of these cover crops following tobacco and early harvested corn usually provides excellent ground cover for winter and spring. To obtain the best cover, fescue, and rye-grass seedings should be made before mid-September. For later seedings the seeding rate should be increased to the high side of the range shown. However, conventional seeding after late harvested corn and soybeans may be too late to obtain sufficient cover before winter weather conditions prevail. One means to overcome late cover crop seeding due to late corn or soybean harvest would be to aerially seed the cover crop over the standing corn or soybean crop. Such seedings should be made on corn prior to mid-September, and on soybeans just ahead of leaf-drop.
<table>
<thead>
<tr>
<th>Crop</th>
<th>Seeding Rate</th>
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<th>Seeding Rate</th>
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</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>2-2½</td>
<td>Ryegrass</td>
<td>18-25</td>
</tr>
<tr>
<td>Rye</td>
<td>2-3</td>
<td>Hairy vetch</td>
<td>30-45</td>
</tr>
<tr>
<td>Barley</td>
<td>3</td>
<td>Crimson Clover</td>
<td>20-25</td>
</tr>
<tr>
<td>Oats</td>
<td>3½</td>
<td>Fescue</td>
<td>15-25</td>
</tr>
</tbody>
</table>

Management of Crop Residues

There are certain advantages to managing cover crops and previous primary crops so that the residues will be left on the soil surface. These include controlling soil erosion, greater water storage capacity in the soil (especially in the seed zone), increased water infiltration, and reduced water evaporation from the soil. The amount of soil protection provided by the residues is directly related to the percentage of soil surface covered. The less cover, the less protection. The amount and kind of tillage is also a major factor in residue management. Turn-plowing leaves the soil surface almost totally bare; chisel plow operations leave 70 to 80% of the residues at the soil surface; chiseling plus one disking operation leaves about 65% of the residue at the soil surface; and the true no-tillage leaves virtually all the residues on the soil surface.

The amount of residue produced annually is influenced by the growing season and varieties used. A reasonable residue level produced from a single crop might be as follows: corn - 6000 lb/a, rye - 4,500 lb/a, wheat - 4,000 lb/a, hairy vetch - 4,000 lb/a, and soybeans - 3,000 lb/a. Of the crops listed above, soybean residues provide the least soil protection. This is due to a lower level of dry matter produced and a rapid rate of decomposition. Additionally, the soil is generally much "looser" following soybeans, which adds further to overwinter erosion risks when soybeans are grown. Corn stalks are quite effective, especially when chopped or shredded to provide uniform coverage over the soil surface.

In addition to overwinter erosion protection from fall-seeded small grains and winter legumes, residues from these cover crops provide sufficient material and distribution to effectively control spring and summer erosion when they are left in place as a mulch for no-till planting. During the summer growing season, half or more of these residues are usually decomposed, bringing on the need to seed a cover crop again in early to mid-fall, so that a continuous year-round system of erosion control is provided.