

## Cover Crops and Cover-Crop Management

Cover crops are crops grown in the fall, winter and/or early spring which will be killed and left as mulch into which another crop is planted. Some research has been done with corn in North Carolina comparing hairy vetch, crimson clover, or rye with no cover crop. It would also apply to grain sorghum with only a few exceptions. For soybeans, we are generally not interested in growing a legume cover crop, so small grain cover crop or stubble are the only covers usually considered.

### Benefits from Cover Crops

Cover crops are of interest for several reasons: (1) They supply some erosion control during the fall, winter and spring. (2) When combined with no-till planting, they continue to provide erosion control because of the mulch left on the soil surface. (3) They reduce water evaporation from the soil surface but on the other hand lower soil temperature. (4) Legume cover crops produce nitrogen which is available to the subsequent corn or grain sorghum crop. (5) Cover crops aid in weed control by providing early shading.

Legume cover crops need to be seeded during September to be most successful, although October seedings in the southern Coastal Plain may be satisfactory. Late seeding results in weak plants which provide little erosion control during the winter, may be lost due to heaving during the winter, and seldom provide robust growth in the spring prior to corn planting time.

A September seeding date is practical when corn follows tobacco or corn silage-or in eastern North Carolina corn for grain. However, in the Piedmont or Mountains corn for grain is frequently not harvested in September. Soybeans are never harvested this early. Therefore, in these cases the cover crops would need to be seeded into or over the previous crop. Especially with the legume cover crops, seeding into standing soybeans has been very unsuccessful in a limited number of trials. Therefore, we do not expect the use of a legume cover crop following soybeans in a soybean-corn or soybean-grain sorghum rotation to work very well.

When a legume cover can be established in September, we have found that 60 to 100 pounds of nitrogen per acre from the cover crop is available to corn or grain sorghum.

There have been problems with management of cover crops, however:

(1) Hairy vetch has been difficult to kill. Paraquat or Roundup mixed with commonly used preemergence herbicides have not been effective enough.

(2) Both hairy vetch and crimson clover depleted so much of the soil moisture that it was frequently difficult to obtain a good stand of corn. This problem could be reduced in grain sorghum by killing the cover crop about two weeks prior to planting the sorghum. Early killing prior to planting corn does not work out well because the legume needs every day possible during this part of the season to grow and produce the desired nitrogen.

(3) The legume cover crops provide minimal erosion control during the winter.

### Small Grain as Cover Crop

In contrast to legume cover crops, small grain cover crops work quite well in some areas of North Carolina. Rye, wheat and oats all have been used. Rye usually works best because it is easiest to kill and provides maximum erosion protection. In the Piedmont, yield advantages have been consistently obtained when no-till planting into rye compared to conventional tillage with no cover crop. This practice should not be used where johnsongrass is a problem. In contrast, no-till into rye has been less favorable in the Coastal Plain where corn yields at several locations have been lower than conventional tillage yields. The reason for the lower yields is unknown.

In summary, we find that legume cover crops, hairy vetch and crimson clover work well when they can be seeded in a conventional seed bed during the month of September. During dry springs it may be difficult to obtain a good corn stand. Rye works very well in Piedmont locations where johnsongrass is not present, but not as well in the Coastal Plain. No-till corn or grain sorghum seeded directly into soybean residue works well but again should not be used where johnsongrass is present. No-till planting of double-crop soybeans into the small grain residue is preferable to conventional tillage.

A modification of the cover crop concept is that of using the cover crop as silage and following the no-till corn or sorghum for silage. This can work very well, but does delay corn planting and increases the risk of the second crop suffering from drought and heat stress, and insect damage (true armyworm).