Appendix 1. Clover Cover Crops for Pecan Orchards

Objective

To establish a legume cover crop that prevents soil erosion and promotes soil health. It also provides a source of nitrogen (N) fertilizer by scavenging existing sources or by fixing atmospheric N and provides a food source for pollinators and a habitat for other beneficial insects. The cover will also compete with weeds.

Varieties

- **Crimson clover.** “Dixie” has been reported to grow well in the area of the state where pecans are produced. Other crimson clover varieties to consider are “Chief”, “AU-Sunrise”, “AU-Robin” and “Flame”.
- **White clover.** Purchase “Durana” or “Patriot” durable white clover.

Planting conditions, rates and times

<table>
<thead>
<tr>
<th>Clover</th>
<th>PLS 1 Seeding Rate (lb./acre)</th>
<th>Seeding Date (New 2008 Standard)</th>
<th>Planting Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mountain – Limestone Valleys</td>
<td>Piedmont</td>
</tr>
<tr>
<td>Crimson</td>
<td>15-20</td>
<td>9/1-10/15</td>
<td>9/15-11/1</td>
</tr>
<tr>
<td>White</td>
<td>3-4</td>
<td>9/1-10/15</td>
<td>9/1-10/15</td>
</tr>
</tbody>
</table>

1 See Cover Crop Standard (Code 340) for the definition of pure live seed (PLS). Use the low rate when drilling and the high rate when broadcast and aerial seeding.

Plant white or crimson clover under conditions favorable for establishment. Soil moisture is very important. Consider the availability of irrigation and the soil type. Establishing clover is more difficult in sandy soil than in loamy soil.

Use a drill with a small seed attachment and place the drop tubes outside the furrow. A drag chain or wide furrow closer will firm or drag soil and debris over the seed. Planting seed directly in the furrow may result in deeper-than-desired placement and reduced stand.

Orchard characteristics

<table>
<thead>
<tr>
<th>Orchard Age (Yrs)</th>
<th># Trees/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-60</td>
<td>8-10</td>
</tr>
<tr>
<td>23-30</td>
<td>12-15</td>
</tr>
<tr>
<td>10-12</td>
<td>24-27</td>
</tr>
</tbody>
</table>
Adequate sunshine is essential for the establishment and continued growth of clover. Use the table above to estimate if adequate sunlight reaches an orchard floor. For example, clover should grow well in an old orchard (50-60 years) if there are less than 10 trees/acre.

Inoculate crimson clover seed with the appropriate bacteria if this is the first time this legume has been produced in this field. “Durana” and “Patriot” inoculant is added to the seed coat by the seed company. The soil pH in most orchards already should be about 6. Apply lime according to the University of Georgia recommendations if the pH is less than this level.

**Other production practices**

Do not harvest or graze the cover crop.

Control weeds and/or excessive clover growth by a combination of mechanical and chemical means according to University of Georgia recommendations.

Controlling the growth of clover is essential for easy harvest of the pecans.

The crimson clover will grow back if it is allowed to reseed. The white clover will grow back from its roots and seeds.

**NRCS practices to document in the conservation plan addition to Cover Crop Standard (Code 340)**

Nutrient Management Standard 590 – Obtain the results of a current soil test. Use the CPA-051 spreadsheet and the UGA “Soil Test Handbook” to create a nutrient budget for both crops (Kissel, 2003). The amount of nitrogen contributed by the legume is greater according to this reference than according to the “Southeastern Pecan Growers Handbook” (Wells, 2007).

- **Clover.** Provide phosphorous (P) and potassium (K) fertilizer at recommended rates to establish the clover in the fall. The P and K requirements for clover are greater than for pecans.

- **Pecans.** Estimate the N contribution from the legume cover at the spring mowing by using UGA’s Nitrogen Availability Calculator, or current recommended laboratory analysis, in a nutrient budget (100-200 lbs/ac) for the current year of the pecan crop. Clover should supply the crop’s N requirement in an “off” year (Wells, 2007). However, the production and the rate of the release of N depends upon environmental factors.
Appendix 2. Crimson Clover Cover Crops for Row Crops

Objective

To establish a legume cover crop that prevents soil erosion and promotes soil health. It also provides a source of nitrogen (N) fertilizer by scavenging existing sources or by fixing atmospheric N and provides a food source for pollinators and a habitat for other beneficial insects. The cover will also compete with weeds.

The legumes will seed in the spring and germinate the following fall.

Planting conditions, rates, times and varieties

Plant varieties of crimson clover. White clover is not an option in this production system.

<table>
<thead>
<tr>
<th>Species</th>
<th>1 Seeding Rate (lb./acre)</th>
<th>Seeding Date (New 2008 Standard)</th>
<th>Planting Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimson clover</td>
<td>15-20</td>
<td>Mountain – Limestone Valleys</td>
<td>9/1-10/15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Piedmont</td>
<td>9/15-11/1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coastal Plain</td>
<td>10/1-11/15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>¼-½</td>
</tr>
</tbody>
</table>

1 See Cover Crop Standard (Code 340) for the definition of pure live seed (PLS). Use the low rate when drilling and the high rate when broadcast and aerial seeding.

Plant crimson clover under conditions favorable for establishment. Soil moisture and soil type is very important for successfully planting clover. Loamy soils are better than sandy soils for establishing this crop.

Use a drill with a small seed attachment and place the drop tubes outside the furrow. A drag chain or wide furrow closer will firm or drag soil and debris over the seed. Planting seed directly in the furrow may result in deeper-than-desired placement and reduced stand.

Inoculate the seed if this legume has not been grown before in the field. Plant a variety that will mature early in the spring such as “AU Sunrise”, to reduce competition between the cash crop and crimson clover in untreated strips (Owsley et al., 2000). Other varieties are acceptable. Allow the clover to reseed from plants growing in these strips.

Producers have the option applying herbicide to strips of the clover crop where the cash crop will be planted or to the entire field.

- Apply herbicide from late bloom to early seed set in order to obtain maximum N from the legume cover crop when applying herbicide to strips (Clark, 2007)
- Applying herbicide to the entire field after seed set
Strip- or no-till the cash crop (No-till Strip-till Standard, Code 329) into crimson clover when 25-80% of the cover crop is killed by herbicide. Waiting for two to three weeks will reduce the possibility of stand reductions reported in cotton planted in winter legumes and other cover crops (Reeves, 2004). The problem is less severe in other cover crops. Corn and soybeans are less susceptible to stand reductions. In addition to waiting for the clover to dry, use equipment that will leave the clover residue on the soil surface rather than incorporate it into the soil where it will come into contact with the seed. Also, promote good contact between the cotton seed and the soil by using equipment that will remove the residue from the immediate area the seed is planted. Increased soil temperature in this area will also promote rapid germination.

Monitor cotton for the presence of cutworms as planting into a legume cover has reported to increase the presence of these pests.

NRCS practices to document in the conservation plan in addition to Cover Crop Standard (Code 340)

1. Nutrient Management Standard 590 – Obtain the results of a current soil test. Use CPA-051 spreadsheet and the UGA Soil Test Handbook (Kissel, 2003) to create a nutrient budget for both crops.
   - **Clover.** Provide phosphorous (P) and potassium (K) fertilizer at recommended rates to establish the clover in the fall. Lime applications may also be necessary to maintain the soil pH at about 6 in order for N fixation by the legume to occur.
   - **Cash crop.** Estimate the N contribution from the legume cover using UGA’s Nitrogen Availability Calculator, or current recommended laboratory method (Appendix 2, Nutrient Management Standard 590). The application of starter N and P is expected. Apply additional N according the expected yield of the crop (such as cotton), the results of petiole testing, the producer’s experience and the soil.
2. No- or Strip-Till Direct seed Standard 329 - Document requirements of the standard.
3. Crop Rotation Standard 328 – Document the benchmark and planned summer and winter crops and tillage systems.
4. Do not harvest or graze the cover crop.
References


Morse, R.D. 199. No-till vegetable production – its time is now. HortTechnology. 9(3):373-379.


