Summer Cover Crop Species Adapted to North-Central West Texas and Southwestern Oklahoma

Plant Materials Technical Note

**Background:**
Protecting our soils has been a goal of the NRCS for many years, but recently, improving the overall health of soils has become a central component of that goal. Cover crops have long been used in combination with cash crops to prevent soil erosion from wind and water. Years of research has shown that cover crops can also improve the health and productivity of cultivated soils. Summer and winter cover cropping
provides many advantages when implemented into row crop farming and ranching operations. Some of these advantages include:

- Added organic matter
- Reduce soil erosion
- Provide nitrogen
- Provide weed control
- Reduce disease inoculums (Roozeboom, 2013)
- Improve soil structure (aggregation, infiltration, available water capacity)
- Manage nutrients
- Furnish moisture conserving mulch and lower soil temperature
- Provide habitat for beneficial organisms (Clark, 2007)

Producers must also understand how to manage a cover crop to reap their full benefits. In addition to many of the advantages of cover cropping, there are also potential drawbacks such as:

- Cover crop residue may delay soil warming and drying in the spring, resulting in delayed planting of the cash crop.
- Heavy cover crop residue may interfere with planting operations
- Nitrogen may become tied up and not readily available to cash crop
- Some cover crop species may become weeds
- Disease inoculums may increase (Roozeboom, 2013)
- Planting dates between cash crop harvest and cover crop establishment may be difficult to manage

Sullivan (2003) states that, “cover crops could be considered the backbone of any annual cropping system that seeks to be sustainable”. Taking advantage of cover crops may provide producers the opportunity to continue to produce food and fiber for a growing population while reducing input costs and maximizing precipitation while protecting the soil resources.

These benefits are only achieved if the selected cover crop species are adapted to the environmental conditions in the areas where they are used (Bodner et al., 2009). Growing conditions differ from one region to another and plant species will not perform the same under every environmental condition. For instance, species that require large amounts of water will not thrive in arid, dry regions. A basic understanding of the area’s growing condition is critical when choosing cover crops.

Purpose:

The purpose of this technical note is to provide information on commercially available cover crop species evaluated in replicated plots at USDA-NRCS James E. “Bud” Smith Plant Materials Center, Knox City, Texas for soil health improvement in North central Texas and southwestern Oklahoma. Plant growth attributes, compatibility with other cover species, and cultural information are provided for each cover crop to assist producers and NRCS field office personnel with making decisions on which cover crop species are suitable to meet the objective of the cover crop planting (e.g. soil structure

The technical note covers plant growth attributes (e.g. days of 75% emergence, percent ground cover and days to 75% emergence and biomass yield obtained from research plots established at the James E. “Bud” Smith Plant Materials Center), cultural specifications (e.g. planting depth and rate, and seeds per pounds) and other species attributes, and photographs of each cover crop species at different growth stages to help producers and conservationists with plant identification.
Grasses

**Common Name:** Forage Sorghum  
**Scientific Name:** *Sorghum bicolor*  
**Planting Depth:** ½ to 1 inch  
**Planting Rate:** 20-35 lb/acre  
**Seed per Pound:** 16,000  
**Plant Height:** 40-48 inches  
**Residue Persistence:** Excellent  
**Biomass Potential:** 12,000-15,000 lb/acre  
**Facts:** prevents soil erosion, quick forage for grazing, improve soil structure, scavenge nutrients, adds organic matter, and suppresses weeds  
**Mix with:** legumes, other grasses

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**Common Name:** Grain Sorghum  
**Scientific Name:** *Sorghum bicolor*  
**Planting Depth:** ½ to 1 inch  
**Planting Rate:** 5-7 lb/acre  
**Seed per Pound:** 16,000  
**Plant Height:** 24-34 inches  
**Residue Persistence:** Excellent  
**Biomass Potential:** 12,000-15,000 lb/acre  
**Facts:** soil erosion prevention, weed suppression, scavenges nutrients, adds organic matter, grazing  
**Mix with:** legumes, other grasses
Common Name: Sorghum Sudangrass
Scientific Name: Sorghum bicolor × S. bicolor var. sudanense
Planting Depth: ½ to 1½ inches
Planting Rate: 20-40 lb/acre
Seed per Pound: 18,000-22,000
Plant Height: 35-65 inches
Residue Persistence: Excellent
Biomass Potential: 16,000-18,000 lb/acre
Facts: soil builder, weed suppression, prevent erosion, nutrient scavenger, grazing
Mix with: other grasses, legumes

Common Name: Pearl Millet
Scientific Name: Pennisetum glaucum
Planting Depth: ½ to 1 inch
Planting Rate: 15-30 lb/acre
Seed per Pound: 82,000
Plant Height: 30-40 inches
Residue Persistence: Good
Biomass Potential: 12,000-13,000 lb/acre
Facts: rapid growth gives quick cover and good weed suppression. Can also be used for erosion control
Mix with: clover, pea, vetch, brassicas, or small grains
Common Name: Browntop Millet  
Scientific Name: *Urochloa ramosum*  
Planting Depth: ½ to 1 inch  
Planting Rate: 10-12 lb/acre  
Seed per Pound: 145,000  
Plant Height: 30-32 inches  
Residue Persistence: Very Good  
Biomass Potential: 6,000-8,000 lb/acre  
Facts: good organic matter and weed suppression, forage, prevent erosion  
Mix with: legumes, other small grains

Common Name: Proso Millet  
Scientific Name: *Panicum miliaceum*  
Planting Depth: ½ to 1 inch  
Planting Rate: 12-15 lb/acre  
Seed per Pound: 82,000  
Plant Height: 36-38 inches  
Residue Persistence: Good  
Biomass Potential: 6,000-8,000 lb/acre  
Facts: adds organic matter, nutrient scavenger, and weed suppression, can be used to prevent erosion  
Mix with: legumes, other small grains
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Foxtail Millet</th>
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<tbody>
<tr>
<td>Scientific Name</td>
<td><em>Setaria italica</em></td>
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<tr>
<td>Planting Depth</td>
<td>½ to 1 inch</td>
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<tr>
<td>Planting Rate</td>
<td>8-12 lb/acre</td>
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<tr>
<td>Seed per Pound</td>
<td>213,000</td>
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<tr>
<td>Plant Height</td>
<td>32-34 inches</td>
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<tr>
<td>Residue Persistence</td>
<td>Fair</td>
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<tr>
<td>Biomass Potential</td>
<td>4,000-6,000 lb/acre</td>
</tr>
<tr>
<td>Facts</td>
<td>provides excellent organic matter and weed suppression, forage, prevent erosion</td>
</tr>
<tr>
<td>Mix with</td>
<td>small grains and legumes</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Japanese Millet</th>
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<tbody>
<tr>
<td>Scientific Name</td>
<td><em>Echinochloa frumentacea</em></td>
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<tr>
<td>Planting Depth</td>
<td>½ to 1 inch</td>
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<tr>
<td>Planting Rate</td>
<td>10-12 lb/acre</td>
</tr>
<tr>
<td>Seed per Pound</td>
<td>143,000</td>
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<tr>
<td>Plant Height</td>
<td>28-30 inches</td>
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<tr>
<td>Residue Persistence</td>
<td>Good</td>
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<tr>
<td>Biomass Potential</td>
<td>5,000-6,000 lb/acre</td>
</tr>
<tr>
<td>Facts</td>
<td>adds organic matter and provides weed suppression, can be used for forage and also used to prevent erosion</td>
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<tr>
<td>Mix with</td>
<td>legumes and other small grains</td>
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</tbody>
</table>
**Common Name:** Corn  
**Scientific Name:** Zea mays  
**Planting Depth:** 1 to 1½ inch  
**Planting Rate:** 6-10 lb/acre  
**Seed per Pound:** 2,500  
**Plant Height:** 24-26 inches  
**Residue Persistence:** Good  
**Biomass Potential:** 6,000-8,000 lb/acre  
**Facts:** rapid growth provides excellent organic matter and weed suppression, forage, prevent erosion, nutrient scavenger  
**Mix with:** legumes or other small grains

**Common Name:** Bengal Rice  
**Scientific Name:** Oryza sativa  
**Planting Depth:** 1 to 1½ inch  
**Planting Rate:** 20-30 lb/acre  
**Seed per Pound:** 16,500  
**Plant Height:** 18-20 inches  
**Residue Persistence:** Poor  
**Biomass Potential:** 2,000-3,000 lb/acre  
**Facts:** organic matter, nutrient scavenger, weed suppression  
**Mix with:** legumes or other small grains
**Legumes**

**Common Name:** ‘Red Ripper’ Cowpea  
**Scientific Name:** *Vigna unguiculata*  
**Planting Depth:** ½ to 1½ inches  
**Planting Rate:** 25-35 lb/acre  
**Seed per Pound:** 16,000  
**Plant Height:** 16-20 inches  
**Residue Persistence:** Very Good  
**Biomass Potential:** 4,000-6,000 lb/acre  
**Facts:** erosion control, weed suppression, nitrogen source, and soil builder  
**Mix with:** small grains, millets, corn, and sorghum

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**Common Name:** ‘Iron and Clay’ Cowpea  
**Scientific Name:** *Vigna sinensis*  
**Planting Depth:** ½ to 1 inch  
**Planting Rate:** 20-40 lb/acre  
**Seed per Pound:** 16,000  
**Plant Height:** 26-28 inches  
**Residue Persistence:** Very Good  
**Biomass Potential:** 4,000-6,000 lb/acre  
**Facts:** erosion control, nitrogen source, soil builder and weed suppression  
**Mix with:** small grains, millets, corn, sorghum, and other legumes
**Common Name:** ‘California’ Black-eyed Cowpea  
**Scientific Name:** *Vigna* spp.  
**Planting Depth:** ½ to 1 inch  
**Planting Rate:** 20-40 lb/acre  
**Seed per Pound:** 12,000  
**Plant Height:** 22-26 inches  
**Residue Persistence:** Good  
**Biomass Potential:** 4,000-5,000 lb/acre  
**Facts:** nitrogen source, weed suppression, erosion prevention, and soil builder  
**Mix with:** corn, sorghum, small grains, millets, and other legumes

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**Common Name:** Guar  
**Scientific Name:** *Cyamopsis tetragonoloba*  
**Planting Depth:** ½ to 1 inch  
**Planting Rate:** 12-15 lb/acre  
**Seed per Pound:** 16,000  
**Plant Height:** 16-20 inches  
**Residue Persistence:** Fair  
**Biomass Potential:** 4,000-6,000  
**Facts:** erosion prevention, weed suppression, soil builder, and nitrogen source  
**Mix with:** other legumes, small grains, grasses

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NRCS-Texas  
Technical Note: TX-PM-14-01
Common Name: Lablab Bean  
Scientific Name: *Lablab purpureus*  
Planting Depth: ½ to 1 inch  
Planting Rate: 10-15 lb/acre  
Seed per Pound: 1,800  
Plant Height: 18-22 inches  
Residue Persistence: Very Good  
Biomass Potential: 4,000-5,000 lb/acre  
Facts: weed suppression, erosion control, nitrogen source, and soil builder  
Mix with: small grains, other legumes, millets

![Lablab Bean](image1)

Common Name: Mung Bean  
Scientific Name: *Vigna radiata*  
Planting Depth: ½ to 1 inch  
Planting Rate: 15-20 lb/acre  
Seed per Pound: 9,000  
Plant Height: 20-24 inches  
Residue Persistence: Very Good  
Biomass Potential: 5,000-6,000 lb/acre  
Facts: weed suppression, nitrogen source, soil builder, erosion control  
Mix with: small grains and other legumes

![Mung Bean](image2)
Common Name: Partridge Pea  
Scientific Name: *Chamaecrista fasciculata*  
Planting Depth: ¼ to ¾ inch  
Planting Rate: 13.4 lb/acre  
Seed per Pound: 65,000  
Plant Height: 24-28 inches  
Residue Persistence: Poor  
Biomass Potential: 6,000-7,000 lb/acre  
Facts: nitrogen source, weed suppression, soil builder, erosion prevention  
Mix with: grasses, brassicas, and other legumes

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Common Name: Catjang Pea  
Scientific Name: *Vigna* spp.  
Planting Depth: ½ to 1 inch  
Planting Rate: 20-30 lb/acre  
Seed per Pound: 8,000  
Plant Height: 22-26 inches  
Residue Persistence: Fair  
Biomass Potential: 4,000-5,000 lb/acre  
Facts: soil builder, erosion prevention, nitrogen source, weed suppression  
Mix with: grasses, brassicas, other legumes
**Common Name:** Peanut  
**Scientific Name:** *Arachis hypogaea*  
**Planting Depth:** 1 to 1½ inches  
**Planting Rate:** 35 lb/acre  
**Seed per Pound:** 800  
**Plant Height:** 10-12 inches  
**Residue Persistence:** Poor  
**Biomass Potential:** 4,000-6,000 lb/acre  
**Facts:** weed suppression, soil builder, erosion prevention, nitrogen source  
**Mix with:** Grasses, small grains, other legumes

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**Common Name:** Soybean  
**Scientific Name:** *Glycine max*  
**Planting Depth:** 1 to 1½ inch  
**Planting Rate:** 20-40 lb/acre  
**Seed per Pound:** 4,500  
**Plant Height:** 18-20 inches  
**Residue Persistence:** Fair  
**Biomass Potential:** 4,000-5,000 lb/acre  
**Facts:** soil erosion prevention, weed suppression, nitrogen source, soil builder  
**Mix with:** other legumes, grasses
Common Name: Sunn Hemp
Scientific Name: *Crotalaria juncea*
Planting Depth: ½ to 1 inches
Planting Rate: 15 lb/acre
Seed per Pound: 9,600
Plant Height: 26-34 inches
Residue Persistence: Fair
Biomass Potential: 5,000-7,000 lb/acre
Facts: weed suppression, erosion prevention, soil builder, nitrogen source
Mix with: small grains, brassicas, other legumes
Brassicas

**Common Name:** Radish  
**Scientific Name:** *Raphanus sativus*  
**Planting Depth:** ¼ to ½ inch  
**Planting Rate:** 8 lb/acre  
**Seed per Pound:** 23,819  
**Plant Height:** 14-16 inches  
**Residue Persistence:** Fair  
**Biomass Potential:** 3,000-4,000 lb/acre  
**Facts:** prevent erosion, weed suppression, alleviates soil compaction  
**Mix with:** other brassicas, mustards, small grains, or crimson clover

**Common Name:** Rape  
**Scientific Name:** *Brassica napus*  
**Planting Depth:** ½ to ¾ inch  
**Planting Rate:** 5 lb/acre  
**Seed per Pound:** 134,500  
**Plant Height:** 26-28 inches  
**Residue Persistence:** Good  
**Biomass Potential:** 4,000-5,000 lb/acre  
**Facts:** weed suppression, biomass decomposes quickly  
**Mix with:** small grains, other brassicas, mustards, crimson clover
Common Name: Forage Collards
Scientific Name: *Brassica oleracea*
Planting Depth: ¼ to ½
Planting Rate: 8 lb/acre
Seed per Pound: 194,125
Plant Height: 30-32 inches
Residue Persistence: Fair-Good
Biomass Potential: 3,000-4,000 lb/acre
Facts: prevents erosion, suppress weeds, alleviate soil compaction, scavenge nutrients
Mix with: mustard, other brassicas, small grains, or crimson clover
**Forbs**

**Common Name:** Buckwheat  
**Scientific Name:** *Fagopyrum esculentum*  
**Planting Depth:** ½ to 1 inch  
**Planting Rate:** 20-30 lb/acre  
**Seed per Pound:** 20,400  
**Plant Height:** 20-24 inches  
**Residue Persistence:** Poor  
**Biomass Potential:** 2,000-3,000 lb/acre  
**Facts:** Smother crop, weed suppression, bee pasture, scavenge nutrients  
**Mix with:** legumes and other forbs

**Common Name:** Kenaf  
**Scientific Name:** *Hibiscus cannabinus*  
**Planting Depth:** 1-2 inches  
**Planting Rate:** 20-30 lb/acre  
**Seed per Pound:** 16,000  
**Plant Height:** 34-36 inches  
**Residue Persistence:** Fair  
**Biomass Potential:** 4,000-5,000 lb/acre  
**Facts:** soil builder, suppress weeds, and scavenge nutrients  
**Mix with:** grasses, legumes, and brassicas

NRCS-Texas  
Technical Note: TX-PM-14-01
Common Name: Sesame  
Scientific Name: *Sesamum indicum*  
Planting Depth: ½ to ¾ inch  
Planting Rate: 3-5 lb/acre  
Seed per Pound: 164,000  
Plant Height: 48-50 inches  
Residue Persistence: Fair  
Biomass Potential: 5,000-6,000 lb/acre  
Facts: soil builder, weed suppression, scavenge nutrients  
Mix with: grasses, legumes, and brassicas

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Common Name: Sesbania  
Scientific Name: *Sesbania exaltata*  
Planting Depth: ½ to ¾ inch  
Planting Rate: 25-30 lb/acre  
Seed per Pound: 48,000  
Plant Height: 50-52 inches  
Residue Persistence: Fair  
Biomass Potential: 5,000-6,000 lb/acre  
Facts: soil builder, suppress weeds, and scavenge nutrients  
Mix with: grasses, legumes and brassicas
Common Name: Sunflower
Scientific Name: Helianthus spp.
Planting Depth: ½ to 1 inch
Planting Rate: 25-30 lb/acre
Seed per Pound: 16,000
Plant Height: 24-26 inches
Residue Persistence: Fair
Biomass Potential: 3,000-4,000 lb/acre
Facts: soil builder, weed suppression, scavenge nutrients
Mix with: grasses, legumes, and brassicas
The one year data represented in this technical note were collected at the James E. “Bud” Smith Plant Materials Center near Knox City, TX. This information is to be used in general comparisons between species and sites and may not reflect actual results at all locations in Texas.
References


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NRCS-Texas
Technical Note: TX-PM-14-01