

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

COVER CROP

CODE 340

SPECIFICATIONS

Selecting Cover Crops

The first step in selecting a cover crop is to assess the purpose for planting the cover crop with the producer. Document one or more of the purposes, outlined in the Cover Crop standard, in the Cover Crop jobsheet and/or assistance notes.

There are many reasons to plant a cover crop. Aside from the obvious benefit of soil cover and reduced erosion, cover crops can potentially:

1. Scavenge nutrients
2. Increase water infiltration
3. Increase plant root diversity and soil microbial diversity
4. Fix atmospheric nitrogen
5. Suppress weeds
6. Minimize soil compaction
7. Increase organic matter and improve overall soil health
8. Provide habitat and food for wildlife and/or pollinators

Many reduced-till or no-till systems in Louisiana have not shown any increases in organic matter over the years. This has been attributed to Louisiana's climate and year-round growing season which accelerates the degradation of organic matter. Researchers and producers are discovering that with the introduction of cover crops into a rotation with little soil disturbance, soil organic matter can be significantly increased.

Once the producer's goals are established, select cover crops, planting dates and seeding rates using the files [Planting Rates for Louisiana by MLRA's](#) and [Louisiana Conservation Seed Mixture Worksheet](#) (located in eFOTG, Section IV, References folder). Document discussions with the

landowner, and decisions made, in the assistance notes.

[Managing Cover Crops Profitably](#) was published by the Sustainable Agriculture Research and Education (SARE) program, with funding from the national Institute of Food and Agriculture, USDA. It is a key reference publication, and is mentioned several times throughout this document. It is a critical guide when discussing and selecting cover crop species. Special attention should be paid to Charts 1-4 when deciding on the best cover crops to accomplish specific goals. The content categories are:

- [Chart 1 – Top Regional Cover Crop Species](#)
- [Chart 2 – Performance and Roles](#)
- [Chart 3A – Cultural Traits](#)
- [Chart 3B – Planting](#)
- [Chart 4A – Potential Advantages](#)
- [Chart 4B – Potential Disadvantages](#)

One cover crop species that is frequently recommended, but is not covered in detail in [Managing Cover Crops Profitably](#), is Sunn Hemp (*Crotalaria jucea*). This tropical Asian plant is a member of the legume family. It grows best during warm weather and is best suited for well drained sites. It has a tremendous capacity to fix nitrogen, often exceeding all other legume cover crop species, and can exceed 6' tall 60 days after planting. This plant offers an excellent option for quick soil cover, a high protein forage, and companion crop for cow peas during Louisiana's growing season.

Establishing Cover Crops

Cover crops may be established using a variety of methods, including broadcasting, interseeding, drilling, and aerial seeding. In general, seeding depth is related to seed size: larger seeds should be planted deeper. Care

should be used to avoid planting small seeds too deep or large seeds too shallow. Seedbed preparation will depend on the species used, and the timing and method of planting. It is essential to provide good seed-soil contact. Most cover crops will not perform well if broadcast on a compacted or crusted surface.

If seeding the cover crop prior to harvest of the primary crop, no seedbed preparation is needed. Cover crops that are established with a grain drill are much more effective and economical than those established via broadcast. Planting rates will often be 20% higher for seed that is broadcast.

If herbicides with residual action were used in the preceding cash crop, they may affect germination and seedling growth. Conservationists must discuss herbicide use with the producer to ascertain if cover crops will be affected.

Fertility

Cover crops that follow heavily fertilized crops typically do not require fertilization. A good example of this is a cover crop planted after several years of sugarcane production. In situations where a goal is to produce a lot of biomass and build organic matter with a crop like cereal rye, or produce a large root to reduce soil compaction with a crop like forage radish, a soil test is necessary to assess the soil nutrient status. If additional nutrients are needed, it is important to apply them. Conservationists should explain to producers that, aside from some potential nitrogen losses, other nutrients will just be cycled back to the cash crop and that the investment will pay dividends. It is also important to adjust the pH as advised by the recommendations. If the pH is not adjusted, performance will be impacted. Legumes are especially sensitive to a low pH, and typically thrive in a pH range of 6.0 – 7.0.

Interseeding

Interseeding in this guide refers to the process of broadcasting a cover crop into an actively growing cash crop. Companion planting refers to the simultaneous planting of 2 or more crops. Nurse crops refer to rapidly growing crops that assist with the

establishment of a perennial crop or other crop that is slow to establish.

Interseeding can be an effective way to establish cover crops before the harvest of a cash crop. This technique is important in states where the winter months are especially cold. It is important that cover crops establish themselves and put on as much growth as possible. In the Deep South, however, we typically have adequate time, after a cash crop is harvested, to establish a cover crop.

Interseeding is typically accomplished by aerially broadcasting seed into the cash crop when it is near maturity. Establishment of a cover crop at this time will assure that the cover crop does not compete with the cash crop, but will also help the cover crop better compete with germinating weed seeds. Interseeding rigs have also been developed by producers on modified spray rigs. This assures that the equipment has clearance above the cash crop and does not cause damage.

Companion planting is another option for producers, although it comes with some risk. Cover crops, actively growing along with cash crops, will compete for water, nutrients, and sunlight. Companion planting also may cause crop insurance issues. If a producer is thinking about testing companion cropping systems, and wants cover crops to act as a 'living mulch', please work with your area or state specialist in planning this system.

Common examples of nurse crops are planting of annual cover crop species before perennial grasses are established. If a producer is converting cropland to pasture, a cover crop mixture may be planted during the preceding winter. Also, if native perennial plants are being established, cover crops could be planted before to help rejuvenate soils that were under years of agricultural production.

Mixes

Always recommend that a producer plant a cover crop mix. Cover crop mixes have several advantages over a monoculture. For producers trying to add plant diversity to the landscape, a mix is essentially adding several crops into the crop rotation. The diverse root

system encourages balance in the soil ecology and helps reduce the chance of any one disease species becoming prevalent. A mix also introduces different root structures. A mix of shallow and deep-rooted plants will help to maximize water infiltration and nutrient scavenging. A mix also buffers the cover crop from stand failure. Adverse weather or seed viability may impact growth of a single species. With a cover crop mix, the chance of success increases.

Cover crop mixes also help to balance the carbon to nitrogen ratio (C:N). If a producer plants a monoculture of wheat, the C:N of the resulting biomass will be around 80:1. This will result in nitrogen immobilization and will not be available to the following cash crop for months. Conversely, if a monoculture of hairy vetch is planted, the C:N in the biomass will be about 11:1, resulting in a rapid decomposition of the residue and release of nutrients. This will provide less cover and may not provide nutrients, especially nitrogen, when the plants can utilize it. With a mix of legumes and grasses, the C:N ratio will allow for a cover that persists throughout the growing season and a release of nutrient closer to the time cash crops can utilize them.

Ideally, producers should plant species from three plant Families. The three most commonly recommended are the mustard family (Brassicaceae), the legume family (Fabaceae), and an annual grass (typically Poaceae). If producers are looking to maximize nitrogen production, for example, the mix should contain more clovers and vetches. If soil cover and organic matter is the goal, more annual grasses should be present in the mix.

When calculating a seeding rate for crops mixtures, ensure that the sum of the proportional rates used exceeds 100%. For example, if the full seeding rate for oats is 140 lbs/ac and hairy vetch is 35 lbs/ac, the combination of 80 lbs/ac oats ($80/140=57\%$) and 20 lbs vetch ($20/35=57\%$) would be acceptable because the $57\%+57\%=114\%$. A combination of 80 lbs/ac oats (57%) and 10 lbs/ac vetch (28%) would not be acceptable because $57\%+28\%=85\%$. The calculator **Louisiana Conservation Seed Mixture Worksheet** should be used to calculate seed mixtures.

Ryegrass (not cereal rye) should not be included in any cover crop mixture in Louisiana. Northern states have no issues controlling this annual grass, but in the Deep South it can persist and become a nuisance.

Inoculants

All legume seed shall be **inoculated** with a pure culture of nitrogen-fixing bacteria prepared specifically for the species. For best results, consider selecting pre-inoculated, coated seed when available.

Inoculum is alive and must be kept in a cool environment and not exposed to harmful chemicals. Sticking agents, often used by producers inoculating their own seed, include 10:1 water to molasses mixture, cola, or milk. Mixing should not be done in the seed hopper, but on a tarp, or in a tub or cement mixer to ensure complete coverage.

Grazing

A number of cover crops can be grazed prior to termination to provide high-quality forage, improve overall soil health and to accelerate nutrient cycling. Soil moisture conditions should be considered prior to grazing. Livestock bogging in wet conditions can have negative effects. Check each cover crop to ensure that the crops pose no danger to livestock. A few examples are: (i) sorghum-sudangrass may cause prussic acid and nitrate poisoning if the young growth is grazed or if the crop is grazed after frost, (ii) turnips may cause copper toxicity in sheep, (iii) red clover contains phytoestrogens that may complicate sheep breeding, and (iv) many of the legumes may cause bloat and should not be grazed when wet.

Terminating Cover Crops

In general, terminate cover crops at least 2-3 weeks prior to planting the cash crop. This is to ensure that the 'green bridge' is removed. Many cover crops provide food and habitat for insect species that can affect the following cash crop.

Monitor crop maturity carefully to time termination. When terminating cover crops by mowing or crimping, plants must often be in

flower or fully mature in order to completely kill. Avoid future weed problems by ensuring that cover crops are terminated prior to seed set (unless a reseeding cover is the goal).

Most cover crops can be terminated with typical spring burn-down herbicides. One exception is the daikon-type radish (often referred to as Tillage Radish™). LSU AgCenter research has noted that if this class of radishes is allowed to begin flowering, or 'bolt', in the spring that control with herbicides is difficult. Because of this, daikon-type radishes should be terminated in February if possible. Early termination will allow adequate time for the plants to decompose. This is especially important if daikon-type radishes are planted in a monoculture, or a significant part of cover crop mixture. If daikon-type radish are not terminated before bolting (due to weather, equipment issues, etc.), physical destruction may be necessary with tillage equipment.

Cover Crop Considerations within Louisiana's Diverse Rotations

There are several well-defined cropping systems in Louisiana. All of them offer unique opportunities and challenges when cover crops are introduced. Management of the cash crops will change. New insect and disease complexes may be introduced and will have to be monitored. Some crop rotations are an easy fit for cover crops, but others are more difficult. Here is a summary of how best to work with cover crops in our most common cropping systems:

Row Crops – Typically found along the Red River and in northeast LA, these systems are composed of cotton, corn, soybean, wheat and milo. Sweet potatoes and rice are also a part of these rotations on the appropriate soil types. Cover crops easily fit between cash crops in these systems, and are especially important in rotations that lack a high-residue crop like corn, wheat, or rice.

Cover crops are critical in stabilizing residue in these systems during the winter months. When fall tillage must be conducted, due to herbicide resistant weeds or rutting during the harvest, cover crops can hold the remaining residue in place and help to add organic matter to the soil system.

The most common concern in these systems is planting cover crops before a corn cash crop. Since the majority of biomass is generated in the spring, cover crops that are terminated in the late winter and early spring, to accommodate early planting of corn, will often fail to provide much growth.

Rice-fallow/crawfish/soybean Crops –

Typically found in southwest and central LA, these rotations are a difficult fit for cover crops. Soils often have high clay content, topography is level, and planting is usually a flat surface. Standing water hinders germination, so any irregularities in the soil surface may hold water and result in spotty seedling stands. Many producers in this area hold water during the winter for waterfowl habitat, preventing the use of cover crops during the winter months. The LSU AgCenter is continuing to work on ways to introduce cover crops into this system.

Sugarcane Crops – Typically found in southeast LA in the Mississippi Alluvial Valley, this system offers several options for cover crop integration. Sugarcane consists of a single planting of stalks in the fall, with 4-5 cuttings of growth from that same planting.

During the 'fallow' period, or winter period after the last cutting of the ratoon crop to the planting of a new crop, producers have the opportunity to plant both winter and summer annual cover crops. After the sugarcane harvest in the fall, winter annuals can be planted and either terminated in preparation of another cash or summer cover crop, or allowed to continue to grow and naturally die before soil preparation activities for the fall planting event. Producers are also seeing the benefits of planting winter annuals, after the last ratoon harvest, in preparation of a soybean crop during the fallow period.

Cover crops can also be planted after the plant cane is planted in the fall. This is a critical time to address soil erosion. Since sugarcane requires aggressive soil preparation activities, erosion during these next few months can exceed several times the soil loss tolerance.

Another option is to plant cover crops after each successive harvest of sugarcane. This is

particularly productive if residue is burned and the soil is manipulated.

The primary concern with cover crops in sugarcane systems is excessive residue inhibits warming of beds in the spring. Research has shown that the cooler temperatures significantly impact the yields of this tropical plant. Research is being conducted by ARS in Houma to continue to study this phenomenon.

Vegetable Crops – both small and large producers of tomatoes, strawberries, winter greens, etc. are scattered throughout all of Louisiana. These operations usually offer the most opportunity to utilize cover crops, as they often have the ability to rotate the area they plant each year within a larger farm. Land that can be taken out of production and planted to a cover crop will return in subsequent years more productive and with more balanced soil ecosystem. Vegetable operations are usually aggressively tilled, so cover crops are essential in limiting soil erosion around cropped areas. Vegetable producers typically have more flexibility in experimentation, since acreage is limited, their equipment is designed to accommodate many different seed types and planting methods, and producers are accustomed to handling a diversity of vegetables.

Nitrogen fixation, especially for organic producers, can be very important. National Organic Policy (NOP) forbids organic producers from using inorganic fertilizer sources. Most organic producers use organic by-products for their nitrogen, phosphorus, and potassium inputs. This is a challenge for most organic producers, as organic amendments typically contain too much phosphorus and potassium in relation to nitrogen. The only solution for an organic producer is to fix nitrogen with legumes. Organic producers, that need a significant supplemental nitrogen source, will want to plant a legume-heavy cover crop mix. If planted immediately before cash crops, nitrogen credits of up to 100 lbs./nitrogen per acre can be recommended. Even in this system, however, a mix is still recommended. A legume-only monoculture will provide all of the nitrogen at the beginning of the growing season, whereas a legume-heavy mix will help to spread the mineralization process over

the life of the cash crop. As mentioned above, the text Managing Cover Crops Profitably offers guidance on advice to offer producers.