

Water Quality Enhancement Activity– WQL10 – Plant a cover crop that will scavenge residual nitrogen



Enhancement Description

Plant a cover crop that will scavenge nitrogen left in the soil after the harvest of a previous crop.

Suitable cover crops include those with at least a “Very Good” rating for scavenging nitrogen as documented in “*Managing Cover Crops Profitably, 3rd Edition*” (Sarrantonio, 1998), Chart 2

Performance & Roles, pg 67. Examples include cereal rye, barley, forage radish and sorghum sudan.

Land Use Applicability

This enhancement is applicable on cropland.

Benefits

Planting an annual cover crop to scavenge residual nutrients from cropland after the harvest of a previous crop effectively utilizes residual nutrient resources to supply following crops with nutrients required to efficiently produce food, forage, fiber, and cover while minimizing environmental degradation.

Criteria for Planting a Cover Crop That Will Scavenge Residual Nitrogen:

Implementation of this enhancement requires:

- 1) The cover crop selected shall have the growth rate and rooting depth required to scavenge excess nitrogen from the root zone of the previous crop. Suitable cover crops include those with at least a “Very Good” rating for scavenging nitrogen as documented in *Managing Cover Crops Profitably, 3rd Edition, Chart 2 Performance & Roles, pg 67*. Examples include cereal rye, barley, forage radish and sorghum sudan.
- 2) Timing of planting and seeding rates for cover crops shall follow the recommendations in the respective NRCS Field Office Technical Guide (FOTG).
- 3) The producer must have a current soil test (no more than 3 years old).
- 4) Nitrogen application rates for the crop following the cover crop must be reduced by at least 15% from the “Land Grant University (LGU) recommendations to account for the recycling of N by the cover crop.
- 5) The producer shall not increase soil surface disturbance over existing benchmark conditions.



United States Department of Agriculture
Natural Resources Conservation Service

Documentation Requirements

Documentation for each Treatment area (field) and year of this enhancement describing these items:

- a. Cover crop species planted
 - b. Cover crop planting date
 - c. Cover crop seeding rate (bu/ac)
 - d. Annual crop planted
 - e. Nitrogen application rates/amounts for the annual crop
 - f. Treatment acres
- 2) A map showing where the activities are applied.

ALABAMA SUPPLEMENT TO WQL10 – PLANT A COVER CROP THAT WILL SCAVENGE RESIDUAL NITROGEN

The following annual cover crops are acceptable to meet this enhancement:

Annual ryegrass	Barley
Oats	Rye
Wheat	Sorghum-Sudangrass
Radish	Canola
Berseem clover	

How Much N?

To find out if you might need more N than your green manure will supply, you need to estimate the amount of N in your cover crop. To do this, assess the total yield of the green manure and the percentage of N in the plants just before they die.

To estimate yield, take cuttings from several areas in the field, dry and weigh them. Use a yardstick or metal frame of known dimensions (1 ft. x 2 ft., which equals 2 ft² works well) and clip the plants at ground level within the known area. Dry them out in the sun for a few consecutive days, or use an oven at about 140° F for 24 to 48 hours until they are “crunchy dry.” Use the following equation to determine per-acre yield of dry matter:

$$\text{Yield (lb./Acre)} = \frac{\text{Total weight of dried samples (lb.)}}{\text{\# square feet you sampled}} \times \frac{43,560 \text{ sq. ft.}}{1 \text{ Acre}}$$

While actually sampling is more accurate, you can estimate your yield from the height of your green manure crop and its percent groundcover. Use these estimators:

At 100 percent groundcover and 6-inch height*, most nonwoody legumes will contain roughly 2,000 lb./A of dry matter. For each additional inch, add 150 lb. So, a legume that is 18 inches tall and 100 percent groundcover will weigh roughly:

$$\text{Inches } >6: 18 \text{ in.} - 6 \text{ in.} = 12 \text{ in.}$$

$$\times 150 \text{ lb./in.: } 12 \text{ in.} \times 150 \text{ lb./in.} = 1,800 \text{ lb.}$$

$$\text{Add } 2,000 \text{ lb.: } 2,000 \text{ lb.} + 1,800 \text{ lb.} = 3,800 \text{ lb.}$$

If the stand has less than 100 percent groundcover, multiply by (the percent ground cover / 100). In this example, for 60 percent groundcover, you would obtain:

$$3,800 \times (60/100) = 2,280 \text{ lb.}$$

Keep in mind that these are *rough estimates* to give you a quick guide for the productivity of your green manure. To know the exact percent N in your plant tissue, you would have to send it to a lab for analysis. Even with a delay for processing, the results could be helpful for the crop if you use split applications of N. Testing is always a good idea, as it can help you refine your N estimates for subsequent growing seasons.

The following rules of thumb may help here:

- Annual legumes typically have between 3.5 and 4 percent N in their aboveground parts prior to flowering (for young material, use the higher end of the range), and 3 to 3.5 percent at flowering. After flowering, N in the leaves decreases quickly as it accumulates in the growing seeds.

* For cereal rye, the height relationship is a bit different. Cereal rye weighs approximately 2,000 lb./A of dry matter at an 8-inch height and 100 percent groundcover. For each additional inch, add 150 lb., as before, and multiply by (percent groundcover/100). For most small grains and other annual grasses, start with 2,000 lb./A at 6 inches and 100 percent ground cover. Add 300 lb. for each additional inch and multiply by (percent groundcover/100).

- For perennial legumes that have a significant number of thick, fibrous or woody stems, reduce these estimates by 1 percent.

- Most cover crop grasses contain 2 to 3 percent N before flowering and 1.5 to 2.5 percent after flowering.

- Other covers, such as brassicas and buckwheat, will generally be similar to, or slightly below, grasses in their N content. To put it all together:

$$\text{Total N in green manure (lb./A)} = \frac{\text{yield (lb./A)} \times \% \text{ N}}{100}$$

To estimate what will be available to your crop this year, divide this quantity of N by:

- 2, if the green manure will be conventionally tilled;
- 4, if it will be left on the surface in a no-till system in Northern climates;
- 2, if it will be left on the surface in a no-till system in Southern climates.

Bear in mind that in cold climates, N will mineralize more slowly than in warm climates, as discussed above. So these are gross estimates and a bit on the *conservative* side.

Of course, cover crops will not be the only N sources for your crops. Your soil will release between 10 and 40 lb. N/A for each 1 percent organic matter. Cold, wet clays will be at the low end of the scale and warm, well-drained soils will be at the high end. You also may receive benefits from last year's manure, green manure or compost application.

Other tools could help you refine your nitrogen needs. On-farm test strips of cover crops receiving different N rates would be an example. Refer to Appendix A, *Testing Cover Crops on Your Farm* (p. 189) for some tips on designing an on-farm trial. In some regions, a pre-sidedress N test in spring could help you estimate if supplemental N will be cost-effective. Bear in mind that pre-sidedress testing does not work well when fresh plant residues have been turned in—too much microbial interference relating to N tie-up may give misleading results.

For more information on determining your N from green manures and other amendments, see the *Northeast Cover Crop Handbook* (361).

—Marianne Sarrantonio, Ph.D.

Refer to the Alabama NRCS Conservation Practice Standard, Pasture and Hayland Planting (512) for planting requirements.

Reference: Managing Cover Crops Profitably, 3rd Edition

<http://www.sare.org/publications/covercrops/covercrops.pdf>

ALABAMA SUPPLEMENTAL INFORMATION FOR THIS ENHANCEMENT

WQL10 - Plant a Cover Crop that will Scavenge Residual Nitrogen

Documentation Form

Producer Name:				Date:	
Tract Number(s):			County:		
Field Number(s):					
Cover Crop Species Planted:					
Planting Date:					
Seeding Rate (bu/a):					
Annual Crop Planted:					
Nitrogen Application Rates/Amounts:					
Treatment Acres:					

The supplied documentation accurately reflects the implementation of this enhancement.

SIGNATURE: _____