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## **"Winter Legumes as a Nitrogen Source"**

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Rising nitrogen prices have generated great interest in using fall/winter planted legumes as a source of nitrogen for corn and other crops the following spring. Organic growers are also increasingly using legumes in their crop rotations as green manures.

Two legumes species that have received much attention in the past are crimson clover and hairy vetch. There are many other legumes such as lupines, common vetch, winter pea, and other clover species but crimson clover and hairy vetch have proven to be reliable in research studies and farm demonstrations.

Data collected in Georgia and Alabama over the past thirty years indicate that hairy vetch and crimson clover can replace from 30 to 120 lbs N per acre depending on variety, stand establishment, growing conditions, and termination date.

### **Does it pay?**

For conventional growers, the question arises - Can legumes save me money on nitrogen fertilizer? So let's do the math. Currently, commercial nitrogen fertilizer costs from \$.79 to \$.95 per lb, not including delivery or application cost. Conventional legume seed cost approximately \$2.00 per lb. Seeding rates range around 15 to 20 lbs per acre depending on the species. Given previous studies, legumes can provide \$24 to \$96 worth of nitrogen per acre, if nitrogen is \$.80 per lb. Given the price of seed, it will cost \$30 to \$40 per acre plus \$5.00 to \$15 per acre to establish a legume. Obviously, there is some risk to using legumes as an alternative nitrogen source. However, in the majority of studies, the benefits of using legumes have been positive both economically



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and physically in terms of improving soil quality and soil organic matter.

For organic growers, legumes are an important nitrogen source and their use can help reduce dependence on manures, and more expensive organic fertilizers.

To maximize the benefits of using legumes, very careful management of both the winter and summer crops is required.

### Which legume to use?

The current seed supply basically dictates the answer to this question. It will be crimson clover! It is unfortunate that new improved varieties of several legume species that have been recently released to the public (and beg to be tried) are not available due to lack of seed. The two best varieties are AU Robin crimson clover and AU Early Cover hairy vetch. However, no AU Early Cover vetch is available for fall 2008. Are there other varieties

of both crimson and hairy vetch? Yes..... Tibbee and Dixie are two crimson clovers that are quite productive. AU Robin is a favorite because it is earlier and a more productive clover. Both of the others can also be used with success. There is also a common hairy vetch that is much later and less productive than AU Early Cover.

For conventional growers, the advantage that hairy vetch has over crimson clover is that it is easier to kill in the spring. Crimson will require applications of 0.5 lbs ai of paraquat and 0.5 lbs ai of 2,4-D per acre while hairy vetch can be easily killed with 1.0 lb ai/ac glyphosate alone.

For organic growers, crimson clover can be easier to kill than vetch. There are several alternatives for killing the cover crop: roller/crimping, flail mowing or turning the cover crop in. Don't use a rotary mower: it does a poor job of distributing the biomass. Crimson clover should be killed at late bloom/early seed set for maximum nitrogen. It is typically easier to kill at full bloom than at a vegetative stage.



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## How should these legumes be managed?

1). Purchase high quality seed with good germination.

If you can find certified seed, it is worth the extra cost. The tag will come with a traceable germination test and should be free from any noxious weeds. Certified organic growers should be careful to buy untreated seed if certified organic seed is not available.

2). Purchase and apply a fresh, high quality inoculant.

Legumes require nitrogen fixing bacteria and the right inoculant will provide the necessary species. Crimson and vetch have different specific inoculants. Make sure and ask your seed dealer for the correct inoculant. Keep it cool and away from direct sunlight. (In other words, do not put it on the dashboard of the truck). Apply the inoculant to the seed just prior to planting. IF the seed is coated, then make sure it was coated the same year you will plant. Old coated seed may germinate well but will need additional inoculant.

3). Plant early in October to obtain the most fall growth.

Planting later has a significant and negative impact on growth. Less growth means less nitrogen.

4). Use a conventional drill for prepared soil and a no-till drill in conservation tillage systems.

It is best to have a small seed attachment on the drill. In this way, the tubes leading from the small seed attachment can be placed outside the furrow openers in order to keep seed from being planted too deeply. Crimson clover seed should be planted  $\frac{1}{4}$  inch to  $\frac{1}{2}$  inch deep. Vetch should be planted  $\frac{1}{2}$  inch to  $\frac{3}{4}$  inch deep. While legume seeds can be planted by broadcasting and using an implement to lightly cover the seed, it will take a much heavier seeding rate to compensate for seed left on the surface and seed planted too deeply. Prepared seed beds usually are best because good seed to soil contact is more easily attained and you begin with a clean field. If planting in conservation systems, plant with a no-till drill to be able to push residue aside and better obtain seed contact with the soil.



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In a conventional system, if weedy species are present, then use glyphosate or paraquat to kill existing weeds in order to reduce any competition during the early fall growth. These legumes are not very competitive with weeds such as henbit.

In organic systems, a clean seed bed should provide a headstart on weeds.

5). Use 12 to 18 lbs per acre of crimson clover seed or 20 to 25 lbs per acre of vetch seed.

If the clover seed is coated then increase seeding rates by 30%. Use the higher seeding rates for broadcasting and lower rates for drilling.

6). Make sure the soil pH is near 6.0 and adequate phosphorus and potassium are available (according to soil test).

7). Kill the cover crop three to four weeks ahead of planting the summer crop.

If possible allow the legumes to flower to maximize growth and nitrogen production. Generally this will occur late March to early April.

Most agricultural seed dealers either carry both crimson and common hairy vetch or can obtain a supply.

For more information, look at "Success with Cover Crops" - <http://pubs.caes.uga.edu/caespubs/pubcd/EB-102/EB-102.html>

Or Managing Cover Crops Profitably - <http://www.sare.org/publications/covercrops/covercrops.pdf>



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