

CROP ROTATION

Most Imperial perennial blends fix nitrogen, which can reduce fertilizer costs for rotational crops.

Improve Forage and Soil Quality – and Save Money!

By William Cousins

When you read the title of this article, you probably thought, “I know that planting Imperial blends can increase the carrying capacity of my property and drastically improve nutrient availability for my deer. But, how can planting improve the quality of my soil and save me money at the same time?”

The answer starts with an understanding of how to use existing and new forage plantings to improve soil quality in a given site, so let’s look at that first. We’ll look at crop rotation, nitrogen-fixing forages and how to combine both for maximum results.

CROP ROTATION – WHEN IS IT NECESSARY?

The answer is, “When it appears to be necessary

based on your observations of specific things.” Now, let’s look at what those specific things are.

Imperial perennial blends are designed to last three to five years or longer when planted according to directions and with Mother Nature’s cooperation. In many cases (but not all), it is possible to extend the life of a planting even further by over-seeding an existing plot with more of the same seed blend. At some point, though, the soil may become so depleted of specific nutrients or sufficiently saturated with detrimental organisms that future growth and quality of that plant type is hindered. In such cases, the answer is crop rotation.

In the food-plot context, crop rotation refers to the practice of removing a long-term planting and replacing it with completely different plant varieties for a

while to help restore the soil. Crop rotation is usually not as big an issue to food-plot farmers as it can be to commercial farmers who, for example, might plant alfalfa on the same site for many years in a row. This is especially true given that most Imperial perennial blends contain multiple plant varieties, and this diversity can help keep the soil fresh. Accordingly, we generally see no problems with re-establishing most Imperial perennial plots at least once by simply over-seeding them with more of the same blend once at the end of the original planting’s life. (Alfa-Rack Plus is the exception because of alfalfa’s autotoxicity characteristics.)

There may come a time, though, when you notice that your existing stand of your favorite Imperial perennial blend is starting to decline or that it is not performing as well as it did in the past. The most common

cause of these symptoms is a buildup of disease organisms in the soil. These often appear either in the form of root-rot organisms like fungus, which can cause crop failure, or an increase in root-eating insects and their larvae. In such cases, rotating out of the perennial and into Imperial Winter-Greens for one fall and winter can be a great idea and help prepare your soil for a new planting of your favorite Imperial perennial the following spring or fall.

If you are noticing a stand decline in your existing Imperial perennial, diagnosis is usually simple. Just pull a few plants up and look at the roots. Disease and insect problems are usually obvious if they exist. Roots should be firm and fleshy. There will naturally be some root decay even in a healthy stand, but if most or all the plants examined have root problems, it is time to plant entirely different plant varieties in the site for at least one growing season.

When you have made the decision to rotate, start by choosing what forage you will use for your rotation planting. When it comes to forages for cleaning the soil between Imperial perennial plantings, none is better than Imperial Winter-Greens. That's because Winter-Greens consists of plant varieties that are completely different from those in Imperial perennials.

When you are ready to rotate out of your Imperial perennial using Winter-Greens, start by performing a soil test. Use a soil-test kit that sends soil off to a lab, and be sure to check the block beside "Winter-Greens" on the soil-test form. That way the lab can specifically tailor its recommendations. Also be sure to send the sample in early so that you don't run out of time when your planting dates arrive. Other high-quality soil-test kits are available from agricultural universities, county



Imperial perennials such as Alfa-Rack Plus contain diverse components, which can help keep soil fresh.

agents and most farm supply stores. If you use a kit other than one from the Whitetail Institute, be sure that it is one that will actually send the soil sample off to a lab, and again, be sure to let the lab know that you will be planting brassicas so that they can more precisely advise you.

Once you receive your soil-test results, take note of how much lime, if any, is recommended. Then, during the Winter-Greens planting dates for your area, spread the recommended amount of lime over your existing forage, and disk the lime and the existing forage right into the ground about four to six inches deep. Then, smooth the seedbed with a cultipacker (heavy roller)

or a weighted, fence-type drag. Then, broadcast your fertilizer and Winter-Greens seed. If you used a weighted drag to smooth the plot before seeding, do nothing further. If, and only if, you used a cultipacker to smooth the seedbed, roll the plot once again after seeding just to press the seed down and seat it against the surface of the seedbed. This is in line with our published planting instructions for Winter-Greens, which are listed on the back of the product bag and are also available online at www.whitetailinstitute.com/info/planting.

Again, regardless of what Imperial perennial you have had growing in the site, Winter-Greens is an excellent rotation-crop choice. By disking any needed lime and your existing Imperial perennial into the soil during your Winter-Greens planting dates, and then allowing the Winter-Greens to grow in the site over the fall and winter, your plot site should be ready to accept your favorite Imperial perennial blend again the following year. In rare cases of extreme disease or insect infestation, it may be advisable to continue with the rotation crop for two growing seasons before returning to the original product.

IMPROVING SOIL QUALITY WITH NITROGEN FIXATORS

One subject about which our customers ask our in-house consultants is "nitrogen fixation." Most folks already know that nitrogen is directly related to foliage growth and protein production in plants. However, many folks do not know exactly what nitrogen fixation is, and we have to understand that before its role in improving soil quality can be made clear.

Nitrogen fixation is the process by which some for-

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age plants, such as the legumes in Imperial Whitetail Clover, Chicory Plus and Alfa-Rack Plus, produce abundant nitrogen in a form plants can use. This process produces all the nitrogen these plants need, which is why nitrogen-fixing legumes are so high in protein.

However, nitrogen comes in many forms, and while some forms are useable by plants for foliage growth and protein production, others aren't. We've all seen the advertisement where the guy with the blown engine emphatically states, "Motor oil is motor oil." The point of the commercial is that not all motor oils are equal, and the same observation certainly applies to nitrogen. The most common form of nitrogen in our atmosphere, N₂, is not readily usable by plants. Nitrogen fixation is the process by which N₂ is converted into NH₃, a form of nitrogen that plants can readily use.

This conversion is accomplished by bacteria, or "rhizobia," that attach themselves to the roots of a nitrogen-fixing plant and live in a mutually beneficial relationship with it. Nitrogen-fixing plants give the bacteria nutrients and a safe place to live. In return, the bacteria set up what amounts to a nitrogen-conversion factory within the plant's roots, where they convert N₂ into NH₃.

But, how does this improve soil quality? The answer lies in the fact that the bacteria in the nitrogen-conversion factory produce far more NH₃ than is used by the host plant, and the excess is available for use by other nearby plants in their own foliage and protein production.

And the excess available to other plants is substantial. For example, after just two full years of production, a well managed alfalfa stand can fix up to 170 more

pounds of nitrogen than the alfalfa plants need themselves, and a well-managed clover stand can fix up to 150 pounds of excess nitrogen.

Since this process takes place on the plant's roots, a little nitrogen needs to be applied when the forage is planted to help the seedling grow to the point that the nitrogen-fixation process can start. Once that happens, no additional nitrogen needs to be applied. Most of the excess nitrogen becomes available starting in the second year of the forage's life.

So, you can see one way in which the nitrogen-fixing forages such as Imperial Whitetail Clover, Chicory Plus and Alfa-Rack Plus can save you money — you don't have to apply any nitrogen fertilizer to them once they are growing.

USING NITROGEN FIXATORS TO SAVE MONEY IN CROP ROTATION

Now let's dig a little deeper — let's look at how you

In addition to providing a high-protein food source for deer, what are some of the other benefits of legume planting and crop rotation?

- Improves soil structure
- Can help reduce erosion
- Enhances disease, insect and weed management strategies
- Improves yields
- Can save money, especially in fertilizer costs when rotating crops

can use nitrogen fixators in conjunction with Winter-Greens to actually save money.

Let's say, for example, that you have an existing stand of Alfa-Rack Plus that is several years old and you notice that the stand seems to be starting to decline. Let's say that you then pull up a few of the plants and find that the roots look thin and weak. Being the educated food plot farmer you are, you then make the decision to rotate into a Winter-Greens for one fall and winter.

Winter-Greens is not a nitrogen fixator. That's why our planting instructions call for the use of a high-nitrogen fertilizer at planting and again 30-45 days later. The good news is that even though Winter-Greens is not a nitrogen fixator, there may be enough nitrogen left in the ground when you remove your Alfa-Rack Plus crop to plant your Winter-Greens without having to add nitrogen. Let's look at how that can work.

Our Winter-Greens instructions call for you to fertilize Winter-Greens at planting with 80 pounds of nitrogen at planting, and again with 33 pounds of nitrogen 30-45 days later for a total of 113 pounds of nitrogen.*

As I mentioned earlier, the mature Alfa-Rack Plus you just removed may have produced up to 170 pounds of excess nitrogen (nitrogen above the amount used by the Alfa-Rack Plus) per acre. That means that there should be plenty of nitrogen in the soil to cover the nitrogen needs of your new Winter-Greens planting without any additional nitrogen having to be added.

It's important to remember that unlike phosphorous and potassium, nitrogen fertilizer tends to dissipate rather quickly once it is exposed to the air. That's why our Winter-Greens planting instructions call for the second high-nitrogen fertilizer application. However,

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the underground nitrogen left after the Alfa-Rack Plus is removed should last longer in the soil than nitrogen applied by top dressing.

As with any new planting, be sure that soil pH is at 6.5 or higher before you plant, and if it is not, incorporate (disk in) sufficient lime to raise soil pH to 6.5 or higher. Your Whitetail Institute soil test report will tell you exactly how much lime to add before you plant.

Also, remember that the fertilizer recommendations made on the back of our forage bags assume that you have not done a soil test. If you have done a soil test, use the fertilizer recommendations on the soil-test report.

To get all the available nitrogen for your new rotation planting, disk the existing forage into the soil after three to four years of full production. Incorporating the existing vegetation into the soil in this way can also improve the overall quality of your soil.

In addition to the benefits I've already mentioned, planting nitrogen-fixing legumes also improves overall soil health. For example, legume roots help break up hard pans and help soil structure. In all cases, though, planning is the key to obtaining maximum value from a legume food plot.

***How did I come up with 113 pounds of nitrogen?**

Blended fertilizers usually carry three numbers separated by dashes on the front of the bags. In order from left to right, these numbers stand for how many pounds of nitrogen, phosphorous and potassium are in 100 pounds of the fertilizer blend.

Our Winter-Greens planting instructions call for Winter-Greens to be fertilized at planting with "20-20-20" or equivalent fertilizer at a rate of 400 pounds per acre. So, "4" (from 400 pounds) times "20" (the first number in 20-20-20) equals 80 pounds of nitrogen per acre.

Also our instructions call for an additional application of 33-0-0 at a rate of 100 pounds per acre 30-45 days after planting.

80 + 33 = 113 pounds of nitrogen per acre.

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