

No Till Notes: Diversity I

By Mark Watson, Panhandle No Till Educator

In past articles we have talked about crop diversity in cropping rotations is an agronomic benefit. We have shown that diverse crop rotations are very beneficial in breaking up persistent weed and disease problems that occur in mono culture crop rotations such as wheat/fallow/wheat. We have also talked about diversified crop rotations also promote healthier soils by increasing soil micro organism populations within the soil.

I would like to now talk about the possibility of improving a crop's performance by increasing the diversity within the growing cycle of a crop which we are growing for grain. Will improving the diversity in a growing crop improve the yield potential of that cash crop? I think it is a possibility worth exploring in our grain production.

If we add diversity into a growing crop by adding additional plant species which could produce additional diverse populations of soil micro organisms, and possibly produce additional nitrogen for a growing crop, would this improve our yields and our soils? Another possible benefit would be adding a plant species which would continue to grow after a cash crop has been harvested, producing additional biomass along with providing an additional food source for soil micro organisms and possibly producing additional nitrogen for subsequent crops.

The benefits may be similar to planting a cover crop after the cash crop has been produced. The advantage would be the cover crop would already be growing in the field and aiding the grain production of the crop it is planted with.

The idea of adding plant diversity in crop production is an intriguing one. We have always viewed crop production as being a mono culture plant growing in a field and anything else growing in the field has been classified as a weed. Maybe there is a better way of producing grains and improving our soils at the same time by adding diversity into our grain production. I'll discuss why I think this may be a good idea worth exploring and some examples of how adding diversity has proved beneficial in forage and grain production in the next article.

No Till Notes: Diversity II

I started thinking about diversity in crop production after seeing several presentations on forage production from the producers and NRCS staff members from Burleigh County, North Dakota. They have found that diverse forage mixtures have increased the amount of forage they have been able to produce off an acre of land as compared to producing a mono culture of forage. These producers have also found these diverse mixtures performed better than mono culture forages during difficult growing conditions such as drought.

The diversified forage mixes improve soil health by providing a wide array of food sources for the soil microorganisms which increases the populations of these important soil microorganisms. I would speculate that part of the reason these

diverse forage crops produce better forage may have to do with improving the soil which they are growing in.

The other benefit to producing these forages when relating to soil health is the amount of time the soil has with a living plant growing in the soil. With grain production we typically have a plant growing on the soil only part of the growing year, where in forage production plants are growing for longer periods of time during the growing season. Would the same idea work in grain production?

I attended and spoke at the winter conference of No Till On The Plains this past January in Salina, Kansas. One of the other producers who gave a presentation at this conference was a farmer from Oklahoma. I would like to tell you his experience with adding diversity to his grain production that he stumbled on by accident. I will relate this story in the next article.

No Till Notes: Diversity III

Tom Cannon farms near Blackwell, Oklahoma. Tom has utilized no till crop production practices for the past decade on his farm. He is also involved in the family's ranching operation. Tom spoke at the No Till On The Plain's winter conference this past January.

As I stated in earlier articles I suspected that diversity in our grain production may improve the yields of our crops and after hearing Tom speak, I think adding diverse plant mixtures to our grain crops may prove beneficial.

Tom's farm is located in a river bottom with good soils to produce his crops. He also has land up away from the river bottom in the breaks and hills. This land in the breaks has poorer soils. This hill area is also where the ranching part of their operation exists.

One field in particular in this hill ground had a history of relatively poor wheat production. The highest yield they had ever grown on this field was 28 bushels/acre of winter wheat. Tom's son runs the ranching part of their operation and his winter pasture lay next to this particular field. Tom's son convinced Tom that this would be a good field to plant back to grass to increase their winter pasture for the cattle. Tom agreed and planted the field back to pasture in the fall of 2007. His pasture mix was 3 different types of grasses along with 3 clovers. He soon discovered the grass seed would not feed through the rollers on his air drill so he decided to mix wheat in with the grasses to get the grass seed to flow through his drill. Tom isn't sure how much wheat he added to the mix, but estimated he planted about 40 lbs. of wheat seed per acre.

In the spring of 2008 the pasture mix looked good with a good stand of grasses and clover, along with the winter wheat he had seeded. Later in the spring Tom noticed the winter wheat looked to be doing pretty good and decided to harvest the winter wheat crop that was growing in the pasture he had seeded. Tom used his stripper head to combine the wheat and to his surprise the wheat crop yielded 50 bushels/acre. This 50 bushel crop was 22 bushels/acre better than any wheat crop he had harvested of this field. He was convinced that the diversity of the crop mixture was the reason for his increase in wheat yield.

After hearing Tom's presentation, along with the producers from North Dakota talking about increased forage production by adding diversity, I wonder if there is a possibility of increasing grain yield by adding diversity into our grain production. I think it is an idea worth exploring and I'll share some of my ideas in the next article.

No Till Notes: Diversity IV

The crop I am looking at experimenting with when adding diversity to a cash grain crop is winter wheat. My plan is to introduce a legume mixture into the established field of growing winter wheat. I will use a combination of lentils and red clover and seed them into the growing wheat.

My long term goal is to find a legume mixture which can be seeded with relatively low cost, will establish in winter wheat and over winter with the crop, and will continue growth after the winter wheat has been harvested. I am looking at winter lentils as one of these crops. I can plant the winter lentils with the winter wheat and planting depth will work for both crops. By inoculating the lentils they should produce nitrogen during their growing cycle. The winter lentils have a similar growth pattern to the winter wheat and should die off much the same as the winter wheat. The winter lentils are fairly short in stature, so shouldn't interfere with wheat harvest.

The other crop I want to look at is red clover. Ideally the red clover would be frost seeded in early spring after the winter wheat crop has been established. I plan to broadcast the red clover over the top of the growing winter wheat. The red clover should be a good fixer of nitrogen and will continue to grow after the winter wheat has been harvested. The red clover is also low in height and shouldn't interfere with wheat harvest. Ideally the red clover will have some moisture to work with after wheat harvest and will continue to grow. I would terminate the red clover late in the fall when I spray the volunteer wheat to ready the field for spring planting of corn or proso millet.

These are a couple of experiments I would like to try in my attempt to add diversity into a growing cash crop. I think my seeding rates will be 5-10 lbs./acre of the lentils and 1-2 lbs./acre of the red clover. I have a mixture of spring and winter lentils I will use this spring. I want enough plants to accomplish the benefits but not so many they become competition for the wheat crop. I plan to have small test plots for this summer. I'll be interested to see if adding this diversity proves to be beneficial in grain production.