

# REGENERATING AGRICULTURE

A Keystone Bio-Ag Newsletter

September 2021



## Soil Regeneration Results in Crabgrass Dying

Welcome! It's once again time to fill up this page. I decided to reach into the archive and run this again; it's as true today as it was 3 years ago when it was in the first newsletter we printed:

Why not start with Regeneration? For the sake of this article we will talk about the soil and why regenerating soil results in much less weed seeds germinating and even the ones that do, don't thrive at all. See photo at right.

Most of us are always looking for that one silver bullet; that one thing that is easy to do. Well this is it; if your soils are regenerating, things get a whole lot easier. Now that field didn't always look like that; it grew its share of weeds and definitely has tons of weed seeds yet.

The crabgrass looks as if it was sprayed with roundup,



Crabgrass dying in Sam's alfalfa field

but it wasn't, or the alfalfa would be yellow too. Fusarium is eating away the roots and photosynthesis is completely shut down. It is actually the exact same process that happens with roundup applications. This is the power of regeneration!!! This is the call to action!!!

It's much easier than you think. These are the two most

important things to balance; balanced biology and balanced Carbon to Nitrogen; soil regeneration will not happen without these two. It's something that all good composters know and practice, and why Humus compost is a standard in all our dry fertilizer mixes.

- Samuel Zook

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Close-up of dying crabgrass

## Ask for Soil Testing Service!

A soil test is a great way to get a snapshot at what your soil is really needing. You can request our standard test which includes all the basics plus carbon and nitrogen levels. You can also request a more comprehensive test that includes all the above, plus key trace minerals such as cobalt, molybdenum, and selenium.

For your convenience, we pull the soil samples at no additional charge if we are in the area.

If you need soil tests taken, please call us soon to be placed on the list. Thank-you!

## Common Pitfalls in Cover Crop Usage

Growing a cover crop is a great way to start regenerating soil but be aware that cover crops are not all the same. Today, I want to talk about some of common pitfalls that are often made in using cover crops.

Don't just blindly put out a cover crop mix. First, write down what you are trying to achieve. Do you need more organic matter?

More nitrogen? More bees and pollinators? Better weed suppression? Improve water infiltration? Stimulate mycorrhizal fungi? Remediate compaction? The list goes on. The key is to understand the benefits of each cover crop and use them accordingly.

Secondly, don't forget to think about cover crop termination. Will you plow it down, use a roller crimper, spray it, or let it winter kill?

Also, some cover crops decay easier than others, mainly dependent upon the C/N Ratio of the cover crop. Cover crops with C/N Ratio greater than 24:1 will decompose more slowly while cover crops with C/N Ratio lower than 24:1 will decompose more rapidly in the soil. Understanding this is important if you are looking for lasting weed control from the mix.

C/N Ratio	Material
250:1	Sawdust
80:1	Wheat Straw
70:1	Oat Straw
57:1	Corn Stover
37:1	Rye at flowering
29:1	Soybean residue
26:1	Rye before flowering
25:1	Alfalfa hay
<b>24:1</b>	<b>Ideal microbial diet</b>
23:1	Clover residue
19:1	Mustard residue
19:1	Turnips (fresh)
17:1	Grass clippings (fresh)
11:1	Hairy vetch
8:1	Cow manure (fresh)
2:1	Root exudates

If you have trouble getting enough growth in your crops, you will want to pay particular attention to C/N Ratios. A young cover crop, having a lower C/N Ratio, will build more nitrogen in the soil while an older, more mature cover crop will build more carbon.

You will also want to focus more on crops that naturally have a low C/N Ratio such as

legumes. Materials with C/N Ratio greater than 24:1 will make nitrogen less available for plants while materials with C/N Ratio less than 24:1 will make nitrogen more available for plants. (Note: some labs test C/N Ratios differently so use this chart only as a general guideline).

Some cover crops may easily become a weed problem if not managed correctly, like buckwheat / annual ryegrass.

Understand seeding rates of your cover crops. More is not always better! A heavily seeded crop may not reach full potential or may smother itself slightly. Again, this is context dependent because using high seeding rates can be helpful if you intend to terminate the crop while it is young.

*This article adapted from a Weekly Hotline topic presented by Melvin Fisher on August 23, 2021.*

## Our Most Popular Soil Products

The Rejuvenate Program both feeds and adds biology for improved soil health & structure, more rainfall infiltration & recycling, better nutrient release, and faster residue breakdown to reduce overwintering diseases.



Rejuvenate



SeaShield



Santerra

The Rejuvenate Program is most effective when applied in the fall just before a light rain.

Typically used as a combination but can be used individually.

Call to discuss rates and prices.

## GROWING TIPS



### ROW CROPS

Incorporating crop stubble a few hours after harvest can improve next year's yield potential. Use Rejuvenate program, then sow a good cover crop mix that meets your goals & context. Subsoil if needed.



### DAIRY

Take soil tests every 2-3 years. Start learning about managed rotational grazing to take pasture productivity to the next level. Commit to learning about hay-in-a-day and how that can improve forage quality.



### PRODUCE

Educate yourself. "An investment in knowledge pays the best interest."

*-Ben Franklin*

Spray fall Rejuvenate program on soil before sowing cover crops, or spray on the cover crop after establishment.



### ORCHARD

Consider doing sap tests this fall to determine nutrient balance. Foliar feed accordingly, for healthier buds and fruit in the spring.

Apply dry fertilizer blend in late fall, according to soil test.



### GREENHOUSE

Greenhouses with high sodium levels should be treated with Rejuvenate and Spectrum DS this fall. Excessive sodium can create severe problems with poor fruit size and quality by restricting the potassium uptake.



### GARDENERS

Have a problem garden? Subsoil, then apply 1 pt. Rejuvenate and 1 oz. Santerra per 1000 square feet onto the soil with sprayer or watering can. Then sow a good cover crop blend.

## Principles for Regenerating Sick Soils

Soil has an amazing capacity to rebuild itself if it is given a decent chance and if some general principles are followed.

The first requirement, though, is that the person farming that land has to have a deep, intense desire to have his soil regenerate and is fully committed to making it work. You do know what committed means, right? It means doing it regardless what it takes, even if the going gets hard. Fully committed people will take some personal responsibility in learning to understand the ecosystem.

It is interesting that the 5 foundational principles of soil regeneration are all connected to supporting soil biology:

### **Principle #1: Limit Disturbance:**

Excessive tillage collapses pore space and aggregate structure in the soil. This prevents microbes from regenerating themselves fast by inhibiting proper gas exchange, (which is inhaling oxygen and exhaling carbon dioxide) especially after a rain has created a crust.

There is a lot of work that needs to be done in this area such as experimenting with no-till rolling, the use of winter kill cover crops, or with solarization (use of tarps - small scale) as described in No-Till Intensive Vegetable Culture.

If tillage is necessary for you, make the event as gentle and seldom as possible.

### **Principle #2: Keep Soil Covered:**

This principle is basically to keep the soil from getting too hot or too cold, and also to provide protection from beating rains that create crusting & soil erosion and from wind that blows the soil away. This can be done with a living cover crop (preferred) but a mulch is much better than leaving the soil bare.

### **Principle #3: Optimize Living Roots and Photosynthesis:**

This principle is how nature feeds the

soil biology. A living crop, in addition to providing all the benefits of principle #2, will send root exudates (sugars) out through the roots to feed biology.

However, the object is not just to have a living crop. The goal is to maximize the amount of sugars that the plant is producing; most plants are only producing about 20% of their potential (which you can check using a brix meter). This results in much too slow biology that is not providing the adequate amount of nutrition that the plants need.

This is where the Rejuvenate program can be really helpful to jumpstart the process. The brix level is also what we are trying to increase with foliar sprays.

### **Principle #4: Build Diversity:**

Nature is more collaborative than it is competitive. Nature likes diversity. Just like people in a team compliment each other, different species in nature compliment each other.

When sowing a cover crop, strive for diversity. Put in some legumes, some of the grass or cereal family, and some of the brassicas. Get some deep tap roots into the mix and also some shallow rooted ones. The deep tap roots will help loosen the subsoil while the shallow rooted ones are generally more hairy and keep the topsoil in good condition.

Do the same on top of the ground. Some of the crops should be adapted to lower growing but perhaps add some Sunn Hemp or Sunflowers which grow much taller than the rest of the cover crop.

### **Principle #5: Integrate Livestock:**

Proper grazing management is one way to increase soil health very fast.

The basics are to not let the livestock take more than 50%, then have them trample the rest into the ground. This can be achieved very well with a high



**Fungi in a cover crop patch**

stocking density for a very short time. Try to keep the time in each paddock very short (less than a day) so that the livestock don't eat the regrowth that comes within 24 hours after the plant was grazed. Another thing is to allow an adequate rest period before re-grazing.

When this practice is followed, a large amount of fresh and healthy manure is distributed fairly evenly on the soil. Also a large amount of green organic matter is trampled in, also stimulating biology.

If you can't follow this, one possible way to get some of the same effect is to make sure that your fields have enough healthy nitrogen, preferably coming from legumes or other cover crops (or even select types of carefully sourced manure) and have them lightly incorporated via the least amount of disturbance, which might be a vertical disk. We have seen that work in the past.

While perhaps not as good as grazing, it is much better than nothing.

### **Conclusion:**

Those are some basic points. If you want more details, feel free to utilize the Weekly Hotline where we elaborate on these details. Or call us to discuss.

You may also want to consider getting a five year plan in place. Where do you want to be in five years, and how will you work toward achieving that goal?

- Melvin Fisher



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**JOHN KEMPF  
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*Updated every Monday @ 7AM*

Dial: 712-432-8774

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