

Living Carbon Program Guidelines

Start with a Soil Test (30-40 Acre Composite Grids)

- Soil test for the following: Organic Matter, CEC, P1, P2, K, Mg, Ca, Na, pH & S
- Also test for base Saturations of K, Mg, Ca, H & Na
- TKN Nitrogen test for Ammonium N and Organic N
- Chloride test to determine if compaction exists or may exist
- Run PT2 test on several samples to determine true mineral levels.
- Soil Health (Haney Test) should be run (Mid July – Mid Aug) to monitor progress on the program.
- Run these tests at a minimum of 3-year intervals

Monitor Acidity (Skip if Organic Matter is 4% or above and Hydrogen levels are below 2%)

Chemically, pH is an accurate assessment of acidity. It, by itself, isn't a good way to monitor acidity biologically. We will look at the pH:CEC Ratio. Ratios between .4 - .5 are conducive to microbial life. Living Carbon and your soil will achieve optimum performance within this range. The formula is:

$$\text{pH:CEC Ratio} = \text{pH/CEC} + ((\text{OM} - 2) / 100)$$

Correct Acidity/Combat High Hydrogen Levels

If we are below a .4 on the pH:CEC ratio one of several things needs to happen.

- ❖ Do one of the following:
 - Apply 1000# /acre of hi calcium low magnesium ag lime for two consecutive years
 - Grow a spring cover crop which produces CO₂ (*natural buffer*).
 - Apply 2-4 ton of dry manure. Dry manure creates carbonic acid (*liquid manure doesn't serve as a buffer as it contains high levels of hydrogen*).
- ❖ Retest year 3 and monitor progress.
- ❖ Apply in furrow with the planter, protected forms of slow-release potassium like:
- ❖ **Power NK 2-0-20-6S (available from Sure Crop fertilizers)**
- ❖ Check soil for undigested residue, especially in high organic matter soils, as it may be contributing to the elevated hydrogen and chloride as well as the low soil ph.

Correct Magnesium

Soils with magnesium above 17% base saturation are generally tight and compact easily. We have seen a benefit of applying **Gypsoil**.

- Apply 1-ton **Gypsoil** for two consecutive years. Approved for conventional acres only.
- Retest year 3 and monitor progress.

On organic production:

- Use Sulfur through Organic Living Carbon w/Sulfur or elemental sulfur
- Be prepared to do fall sub soiling.

➤ **Address Compaction**

Chloride is an indication of how well water is percolating through the soil. Monitor chloride levels to help determine where compaction located:

- 0-5 Compaction usually not present.
- 6-10 May not present, but fields to observe.
- 11 + Check for compaction depth and mechanically address with sub-soil machine *ONLY* if the soil is dry. **Reduce TKN Nitrogen credit 20-30lbs if compaction is not addressed.**

These basic principles need to be addressed before achieving the advantages of a microbial program. Biology is a powerful force, but it needs an atmosphere in which to live. A healthy atmosphere, (*soil*), environment allows microbes to successfully recycle soil nutrients and reduce farmers' dependence on commercial fertilizers.

The Living Carbon Program

The program centers around structured calcium (calcite) and biology (manure). If you have manure, we will **enhance** it with Living Carbon. If you don't, we **provide** it in the form of our Living Carbon product.

Farm owned manure:

Farm owned and applied manure or compost will receive a 500#/Acre application of Living Carbon. Organic growers use 500#/Acre Organic Living Carbon.

For best performance, Living Carbon, top applied manures and composts should be worked into the soil within 24-36 hours to limit carbon burn off.

Our manure/compost rate recommendations are as follows:

Liquid Dairy or Beef:

- 5000 gallons per acre

Swine:

- 3000 gallons per acre

Dry manure, compost, or poultry manure:

Soil CEC 1-5 ----- 2 to 4-ton per acre

Soil CEC 6-8 ----- 1 to 2-ton per acre

Soil CEC 9-35 ----- 1/2 to 1-ton per acre

No Farm Owned Manure:

We will use Living Carbon when there is no owned manure. Living Carbon brings in both the biology and the structured calcium in one package. The rate will vary between 500 and 1000# per acre. It is essential that Living Carbon is either applied onto a cover crop or worked into the soil within 24-36 hours. It is vital that Living Carbon is not sitting on bare soil surface for longer than 24-36 hours. On all soils, but particularly low CEC soils (under 9), we recommend the use of a cover crop. This will enhance organic acids and soil biology. **DO NOT TILL IN LIVING CARBON MORE THAN 6" DEEP (sub soiling is ok because the machine isn't throwing lots of dirt. Disc-chisels deeper than 6" will bury the Living Carbon)**

Crop specific recommendations:

Corn: (Non-Organic) *Corn planting depth should be 2"-2 ½" deep*

- ❖ Manure at the recommended rate and/or Living Carbon at a rate of 500#/ acre
- ❖ 6 ¼ gallon in furrow starter blend including the following:
 - 3 gallons of **Sure Start (available from Sure Crop fertilizers)** or equivalent low salt starter.
 - 3 gallons of Liquid Living Carbon (**LLC**)
 - 1 quart of Soil Release with worm casting extract
- ❖ Pre plant and/or side dress band with the planter. Utilize **Sure Crop's N-Stay, Grow N/S & Plen-T Sweet** products with 28% or 32% liquid nitrogen to create a stabilized and slow-release nitrogen curve (40# N actual) or 1 quart N-Hold with 5 gallons of 28% or 32% liquid nitrogen.
- ❖ Ideally final nitrogen needs should be side dressed 5-6 weeks after planting. If side dress is not an option, apply a protected N pre plant and/or side dress band with planter. Take TKN credit (see chart below) off of the normal rates you would use. **Reduce TKN credit by 20-30 lbs if compaction exists and subsoiling can't be done and it's the first year of Living Carbon**
- ❖ Recommend foliar application of 1.5 gallons of LLC w/1 pint of The Gift before tasseling.

Corn (Organic) *Corn planting depth should be 2"-2 ½" deep*

- ❖ 3¼ gallon blend including the following, on seed in row
 - 3 gallons of Liquid Living Carbon, (**LLC**)
 - 1 quart of Soil Release with worm casting extract
 - Add non-chlorinated water to desired rate
- Foliar apply 1.5 gallons of LLC w/1 pint of The Gift before tasseling

Corn on Corn

- ❖ Apply 750#/A of Living Carbon (1000#/A on continuous corn)
 - Same in furrow, foliar rates and timing as corn following soybeans
 - Same nitrogen rates and timing as corn following soybeans
 - Reduce TKN credit by 20lbs and eliminate it if compaction exist.

TKN Nitrogen Credit Chart for Living Carbon Program

TKN Reading	Year 1 Nitrogen Credit	Year 2 Nitrogen Credit	Year 3 Nitrogen Credit
700	32	61	89
800	37	70	101
900	41	79	114
1000	46	87	127
1100	51	96	139
1200	55	105	152
1300	60	114	164
1400	64	122	177
1500	69	131	190
1600	74	140	202
1700	78	149	215
1800	83	157	228
1900	87	166	240
2000	92	175	253
2100	97	184	266
2200	101	192	278
2300	106	201	291
2400	110	210	304
2500	115	219	316
2600	120	227	329
2700	124	236	342
2800	129	245	354
2900	133	253	367
3000	138	262	380
3100	143	271	392
3200	147	280	405
3300	152	288	417
3400	156	297	430
3500	161	306	443
3600	166	315	455
3700	170	323	468
3800	175	332	481
3900	179	341	493
4000	184	350	506

The TKN Chart shows you how much nitrogen credit you can consider once a grower starts with the Living Carbon program. The nitrogen credit is best utilized to reduce any fall applied nitrogen.

It is recommended that first year customers reduce N, P and K by about 20lbs each. If it is not possible to reduce the P and K, don't get too aggressive on N reduction for a first-year customer. Look at their TKN credit and reduce that by 30-40%. Once a customer is in year 2 and beyond, P and K can be reduced to what can be supplied in a liquid starter blend and completely eliminate any dry broadcast application. **High hydrogen levels will require continued applications of K until the hydrogen issue is resolved.** The best source would be banded K with starter utilizing a product like **Sure Crop's Power NK.**

Utilize the TKN credits more aggressively in year 2 and beyond but always remember that some synthetic nitrogen will always be included in a Living Carbon program. Synthetic nitrogen can be applied as little as 40lbs/A to as much as 180lbs/A depending on individual growers yield goals. Common rates are 60-80lbs/A for most long-term Living Carbon users. Remember the lower rates are to be applied before or at planting and/or early side dress to feed the plant until the biology fully awakens to take over.

Soybeans

Beans should be planted at 1 ¼”.

- ❖ Manure at the recommended rate and/or Living Carbon at a rate of 750# / acre
- ❖ 3¼ gallon blend including the following, on seed in row
 - 3 gallons of Liquid Living Carbon (LLC)
 - 1 quart of Soil Release with worm casting extract
 - Add non-chlorinated water to desired rate
- ❖ Foliar apply 1.5 gallons of LLC w/1pint of The Gift at flowering

New seeding Alfalfa

- ❖ Apply manure at the recommended rate and/or Living Carbon at a rate of 1000# / acre
 - Best applied at seeding or after first cutting.

Alfalfa

- ❖ Apply manure at the recommended rate and/or Living Carbon at a rate of 1000# / acre

Small Grains

- ❖ Apply manure at the recommended rate and/or Living Carbon at a rate of 500# / acre
- ❖ 3¼ gallon blend including the following, on seed in row
 - 3 gallons of Liquid Living Carbon (LLC)
 - 1 quart of Soil Release with worm casting extract
 - Add non-chlorinated water to desired rate
- ❖ Apply nitrogen at normal levels, reduce nitrogen year 2

