

A Strategy to Improve Soil Health in a Wheat, Corn, Millet, Fallow System

Farmers adapting management to improve soil health find that by integrating several cropping practices into a system, where each practice complements the rest, results in benefits from the whole system that exceed the sum of the parts. (Note: this is for a farmer that will be moving to a continuous cropping scenario from a summer fallow practice.)

Managing for Soil Health is recognized as a regenerative approach for farmers to achieve higher resilience to the effects of extreme weather conditions and attain higher yield capacity on any soil.



The following is an approach for a wheat, corn, millet, fallow rotation for a Farmer interested in a no-till cropping system that is low in risk, and will jump start nearly any soil type toward higher production capacity and function and has livestock:

Step 1: Harvest wheat and scout and treat problem weeds like downy brome and winter annual broadleaf, if present. **No-Till (NT) a simple mix of Cover Crop (CC) into wheat stubble – Choose species that are winterkilled and can be used for alternative forage.** A simple mix of millet, cowpeas, soybeans, forage sorghum, turnips, radish, sunflowers and crimson clover is a good example of a mix that can winterkill, you may have to kill out the clover. These provide good cover after wheat and available forage for fall grazing. Also a high carbon content that will withstand winter breakdown to armor the soil. A profile nitrate test should be taken prior to planting corn after removal of livestock.



Sheep grazing multi-species summer mix after wheat

Step 2: In the spring check the field for any covers that overwintered and apply burndown if needed prior to NT planting corn...be sure to apply pre-plant nitrogen (N) This becomes your second No-till operation. Corn may be adversely affected by immobilized N which can be associated with a more mature high Carbon: Nitrogen residue from wheat and summer grains ie. Corn, sorghum, millets in mixes. Remember that C:N ratio is closely related to CC maturity. Side-dress or top dress corn at V5 with additional N to decrease immobilization and to maximize yield during this time.

A cover crop following corn in this scenario may not be feasible due to the short growing period but if possible and moisture is available an oat/pea mix is a good addition for winter grazing if planted early in march/april. Follow with additional profile nitrate test to assess nitrogen availability for following millet crop. Any herbicides applied for millet will take care of any weeds or cover crop as peas and oats are easy to terminate.

Step 3: No-till millet into corn residue.

The oat/pea mix head of millet may have a high N immobilization if allowed to mature. This can limit plant available nitrogen for the corn crop. If cereal grain cover crops are the only available option due to other resource concerns (such as erosion control), plan to terminate them in the vegetative stage and consider adding species with lower C:N like austrian winter pea or crimson clover. Also consider timing a portion (20-50 lbs/ac) of N application at planting or in starter fertilizer. If atrazine is used in millet then only a spring planted mix will probably work following this crop.



Step 4: Removing fallow: NT a mix that has the ability to grow for a good length of time.

In this mix a good mixture of cool season legumes, broadleaves and oats can work if you plant it early or you can wait until mid may and plant some of the cool season legumes, broadleaves and a mixture of high yielding sorghum, millets, cowpeas, sunn hemp etc. Or you can even replace the fallow part of the system with an additional cash crop such as peas following the millet to be planted in the fall and grazed and regrowth will occur in the spring to re-graze or just plant and harvest them they will be good addition to the nitrogen needed for wheat following.

Austrian Winter Pea Nitrogen Nodules

By now, if rainfall has been regular and normal, soil biological populations and processes are well on their way. Soil aggregates are stabilizing and pores are opening. Water infiltration and holding capacity are on the rise. Nutrients are cycling and accessible from alternate pathways.



Corn Planted Into a Low C:N Cover Crop Mix

Result... great production potential!

Soil health- “The capacity of a soil to function as a vital, living ecosystem that sustains plants, animals, and humans”

NRCS Soil Health- <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/>

IN- NRCS Soil Health- http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/in/soils/health/?cid=nrcs144p2_031079

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