

Workshop Title: Organic No-till Soybeans

Speaker(s) & their titles: Sébastien Angers

Executive Summary

Growing organic no-till soybeans requires a well thought out rotation and planning that involves corn, soy and green manures. The technique of being able to incorporate residues and weed control without tilling requires much tinkering and accurate use of tools, but the improved soil structure and mineralisation provide many benefits to the crops.

Detailed Notes:

The number one priority is soil structure : without soil structure, you can't get the yields. Priorities for field crops: rotation, fertilisation and lime application, weed control, green manure

Lime is applied 1t/acre every 3 years after grains with green manure, calcium or dolomitic lime depending on soil needs

Weed control

Corn soybean: (ridge till)

Winter wheat (winter finger harrow)

Seed rates are higher than conventional, but the major points are timing and weather observation

No till reduces erosion

See pictures: corn stubs create mini wind breaks, hold snow.

Having ridge raises soil temperature, enhances microbial action and mineralisation, gives germination rates.

Ridge shape is important. A flatter ridge gives more moist layer instead of a layer that is too wet.

In the early years, the fields had high weed pressure but this has been diminished with implementation of green manures.

Implements:

See graphic and video

Modified planter with disks that ridge and then dropping seed behind

First step is a horizontal disk right under the ridge, ridges it up and buries residue with wheels ahead that help the implement follow the ridge.

Next step is rotary hoe or disk followed by a horizontal blade which cuts any debris and incorporates it again. Two large disks in the back are for stabilising the implement. Positioning of the rows is a challenge.

Soybeans follow corn whose roots are left in the ground so mycorrhizae are undisturbed and help absorption of phosphorus.

See graphic:

Weed seeds fall into furrows between ridges.

The precision of his technique and implements now allows good results regardless of weed pressure or weather difficulties. Even in a difficult year, with a bit of mustard, he had a 48 hour window to do 120 acres but was able to get it done even with a wet spring.

Organic grains require green manures and that you know the requirements of the green manure. It is important to recognise the importance of fall green manures because they stay until March/April and during this time without good establishment, weeds take over. The green manure mix is utilising the light of October-November and March-April to grow, fix nitrogen, add soil structure – time that would otherwise not be contributing to soil fertility.

Weed management and green manure seeding must be done in conjunction.

Green manure mix:

50 kg vetch

15 kg rye

5kg daikon radish

The Nitrogen (N) that comes from green manure vs. fertiliser:

N from fertiliser comes later in the season, stimulates weeds

N from green manure is more useful in the spring to get the crops off to a good start.

To incorporate green manure, he makes two passes with a cutting disk, after which he has bare soil to work with.

Corn

Corn benefits from early cultivation because this encourages mineralisation. A good start is particularly important for corn seedlings.

If he has the opportunity, he interplants rye and crimson clover in between the corn rows. This keeps weeds out. Crimson clover is an annual and fixes nitrogen which helps decompose the corn stalks and residues. The cover crop comes up fast after the corn falls down.

He strives to have live roots in the soil all throughout the year.

Sébastien says “You have to fix your problem last year“ because by the time you see the problem it is too late. It should have been addressed last year.

A good corn harvest generally gives good soy harvest because the corn roots will release their nutrients to the soy.

The hardest part of incorporating corn residue is doing it without killing the soybean seedlings. This takes finagling with the depth and angle of the implement.

To analyse the risk of seeding winter wheat with possibility of it winter killing:

Either it dies and you re-seed green manure or it stays alive and you have harvest of winter wheat. Even if you only harvest 2 out of 5 years, it's still worth it.

His seed producers are in Indiana.