The nitty gritty of Jack Erisman's 14-year rotation
(from Pioneering Illinois farmer recounts transition to organic)- NEW FARM- Rodale

Year 1: Corn

A rotation is a repeated sequence of crops, and in reality any year can be tagged as "year 1," with that crop being the first in the series. The current year-1 crop in Jack Erisman's long and complex rotation is corn. Corn grows well in the Midwest. This swath of middle America is not called the "Corn Belt" for nothing. The deep-rich soils, adequate and timely rainfall and moderate temperatures constitute ideal growing conditions for corn, and yields are high. Jack's organically grown corn yields on average 160 bushels per acre. The corn grown predominantly in Illinois is #2 dent field corn. Jack grows some #2 but also grows blue corn, food-grade corn and even popcorn. The food-grade and blue corn is grown on contract, with the field corn sold on the thriving organic market where prices are typically at least twice that of conventional corn. On-farm storage allows Jack to keep the different types segregated and allows greater control over when to sell and when to hold. Whereas many Illinois farmers plant corn as early as possible, Jack waits for the soil temperatures to warm with no risk of frost. Corn is planted in 30-inch rows at planting populations that vary according to corn type. He relies heavily on the harrow and rotary hoe for mechanical weed control in corn. Optimal harvest date will also vary depending on corn type, contract requirements and weather.

After corn is harvested in the fall, Jack sows a rye cover crop. The formal definition of "cover crop" is a crop grown but not harvested. There are many benefits derived from a properly grown cover crop. The soil is "covered" and therefore protected from the harsh elements of weather that result in soil erosion. One of the best ways to build up soil is to keep what you have from being washed or blown away. A cover crop provides that protection. The growing roots promote the formation of soil structure –stable aggregates that hold together (again resisting erosion), allow exchange of air and water, and increase organic matter. For organic and sustainable farmers in Illinois, rye (Secale cereale) has been found to be a well-suited species for these purposes. It is easy to establish, even in less than optimum seeding conditions. It grows well in the cool fall temperatures and goes dormant in the dead of winter, but begins growing again in spring.

Jack usually sows his rye after corn harvest in the fall, but sometimes he waits until early spring to plant rye, double-disking it into the soil to kill it a short time before planting the following crop. Some years he will sow the rye with the following soybean crop as a companion crop. The rye and soybeans grow up together, the rye inhibiting the growth of weeds in the soybean crop. Even after harrowing and rotary hoeing, enough of the rye survives to inhibit the growth of other grasses.

Year 2: Soybean

After year-1 corn, Jack grows soybeans. Soybeans are also planted in 30-inch rows to allow ample cultivation for weed control. Controlling weeds in an organic soybean crop is a real challenge. Timing of cultivation is crucial. Jack uses a rotary hoe, specially designed for use in high-residue. The rotary hoe is used early and often (if weather permits) while soybeans are just emerging. This controls weeds early on and gives the crop time to grow up and shade out future weeds.

Jack typically harvests soybeans in the fall after corn. In the fall of year 2, after the soybean crop is removed, a small grain is typically planted which will be the crop for year 3. Jack plants a variety of small grains; all are planted in the fall, except oats, which are spring-seeded.

Year 3: Small grain

The small grain stage of Jack's rotation has considerable variation depending on the year and the market. Small grains work well at this stage because rapid early season growth and a thick crop stand smother out the weeds that may have been a problem during the previous soybean season. Most of the small grains used by Jack – wheat, rye, spelt, barley and triticale – are sown the previous fall after the soybean crop is harvested. The crop overwinters and gets a good early start the following spring. Another benefit of this year's crop is that it is harvested early in the growing season – usually in July. This spreads out the workload, and allows plenty of growing season for the following hay or pasture crop to become established. This grass/legume mix is overseeded into the year-3 small grain crop. Growth is well established by the time the small grain is harvested.

Year 4: Hay or pasture

Jack's hayfields and pastures consist of a mix of species, with both grasses and legumes. Grasses used at this stage are typically rye or timothy. Legumes include alfalfa and red clover. The crop is cut for hay or grazed by the cow-calf beef herd that Jack maintains. If the field is to be grazed or cut for hay, Jack will plant a mix that is heavier on the grasses – 60 percent by volume (seed count). In some fields and in some years Jack will plant alfalfa or clover to harvest for organic seed. Organic clover seed has doubled in price over the past few years. In these fields he will plant a pure alfalfa or clover crop. Jack also grows orchard grass for seed. In these fields he sows a small amount of some legume to provide nitrogen for the orchard grass.

Year 5: Corn

Corn grown at this stage of rotation is indiscernible from corn grown in the first year of the rotation. The fertility, particularly nitrogen, required in great amounts by corn is provided by the previous hay crop. The hay or pasture mix Jack uses is heavy with legumes. These special species work with bacteria that live on the roots of legumes and are capable of drawing nitrogen from the atmosphere, making it available to its plant host. They are a vital tool for the organic farmer. Much of the residual nitrogen builds up in the tissue of the bacterial structures (called nodules) that form on the roots and in the tissues of the plants themselves. If the field has been pastured the previous year, fertility has been directly applied by grazing cattle. The four-year time span since the last corn crop breaks up insect life cycles and allows the soil to build up nutrients to levels required by the heavy-feeding corn.

Year 6: Soybean

Soybeans grown in year 6 are treated the same as year-2 soybeans. Jack never grows corn two years in a row in the same field. Continuous corn – corn grown year after year in the same field – is practiced by some conventional farmers in Illinois, but research has shown that even with adequate fertilization, yields decline over time. Insects and disease also become more problematic in continuous corn. This is a powerful demonstration of how valuable crop rotations can be in helping

farmers maintain fertility in soils, as well as in keeping pests and diseases in balance with beneficial species that provide natural controls.

Year 7: Rye (land left idle)

Rye is planted in the fall after soybeans are harvested. It is left idle and allowed to go to seed and eventually disked in before the next crop.

At this point, the Erisman rotation gets complicated. The sequence outlined above is what is currently being used. When Jack first started, he only included corn one year in the seven-year rotation. “We just didn’t have the fertility,” he explains. Now, testing has confirmed, the land is building fertility, enough to include a second corn crop in the seven-year cycle. That is why corn is planted in year 1. Economics also played a role in this decision. The organic soybean market was even better when Jack started than it is now. There was a strong incentive to put more acres of the rotation into soybeans. Still, Jack strives to let his fields lay idle once every seven years.

Years 8-12: Same as Years 2-6

The rotation in essence starts again, but leading off with soybeans. The next four years are small grain (year 9); grass/legume hay, pasture or seed (year 10); corn (year 11); soybean (year 12).

Year 13: Small grains

As before, wheat, rye, spelt, barley and triticale are sown the previous fall after the soybean crop is harvested. Oats, when grown, are sowed in the spring of year 13.

Year 14: Grass/legume mix

This pasture mix is inter-seeded into the previous small-grain crop and used for hay, grazing or seed production. Under certain conditions, the pasture, if healthy and productive, might be kept for multiple years before resuming the rotation at year 1, with either corn or soybean.