NRCS Workshop "Unlock the Secrets in the Soil"
An interpretive report by Stan Slaughter, MA, Biology.
10/29/13
! On Tuesday October 29th I attended a workshop and field day just south of Lawrence, Kansas presented by the Douglas County Conservation District titled Unlock the Secrets in the Soil. The program was funded by a USDA grant and was free to all registrants. The workshop was held in excellent facilities at the Michael Flory farm. District Manager Jim Weaver started the workshop with introductions and logistics. Featured speaker and no-till pioneer David Brandt was unable to attend due to some emergencies on his farm but we were more than ably schooled by local expert Gail Fuller with an impressive powerpoint titled, "What does Soil Health mean to You in Dollars and Sense?"

Gail started his talk with a take-off on the old One Farmer Feeds 128 People sign. He says he now feeds nonillions (10 to the 30th power) of soil critters which fuel his farm's life and vitality. Gail quoted NRCS national speaker Ray Archuleta's Four Keys to Healthy Soil-1. Minimize disturbance 2. Maximize diversity 3. Maintain growing roots all year 4. Keep the soil covered.

He told how through no-till and cover cropping one farmer had changed the structure of the soil 30 inches down in twenty years. In talking about water quality and showing some photos of massive erosion from no till soils that weren't well covered with residue, Gail offered that, "No single raindrop believes it is responsible for the flood." His point was that we're all responsible for water quality.
There are many reasons to use mixes of plants in cover cropping but one is to maximize the number and amount of root exudates being produced to feed diverse populations of soil organisms. Some plants alone produce as many more than thirty different exudates. This variety of exudates feeds a broad variety of microorganisms which are the foundation of the food web of soil organisms.

One photo brought me up short. Showing a mixed cover crop with sunflowers and many other plants growing at several different levels, Mr. Fuller said, "Our mission is to imitate the native prairie." Having personally heard Wes Jackson of the Land Institute speak about this for twenty years, I was stunned to hear a highly respected, successful farmer/ educator modeling and advocating Wes' approach in a workshop funded by the USDA. I confess that I thought agriculture was years away from making this change, but one hundred and fifty regional farmers and vendors came there to learn more and take it to the next level on their operations. My opinion is that this genie is out of the bottle and mainline farming has now been irrevocably changed.

Other points Mr. Fuller made were that herbicides which are said to persist for long periods usually do not last very long in his diverse systems. For him glyphosate (Roundup) is so ineffective that he no longer uses it. More amazing still is that his farm's soil has reached a stage where he no longer uses herbicides or fertilizer. He's not at all organic by philosophy, he's eliminating them because he doesn't need them to produce great crops.

Fuller said in effect- I don't grow commodities, I grow food. Throw out everything you have learned because this system is different. There is no orthodoxy in this system. Weather and other conditions are so variable that the mix of cover crop plantings must be diverse to insure that some crop succeeds. Fuller's goal is to have living roots in the soil all year round. Mistakes are just learning opportunities and because the system is so diverse, all the "eggs" are not in just one basket.

Making money today is about lowering the costs of inputs and adding value to the outputs. He mentioned that some feed lots are measuring the nutritional density of the feeds they are buying because they need to buy less of the dense, high-quality grains grown in this system.
Diversity and Intensity are watch words for the soil and for his farm.

Most telling were two landmark photos. The first was a group of his extended family members in their twenties. He told us that they didn't know how to plow. That they knew how to operate the tractor, it had never been hooked to a plow in their lives. The second photo was a younger group of his extended family in their teens. These kids had never run a sprayer. Your writer noted another "milestone moment" here.

The workshop then featured the chief soil scientist for Kansas and another NRCS agent from Cloud County. They performed a slake test. Using 6 large cylinders filled with water, they immersed 6 soil samples which were held at the top of the cylinders in a wire basket. There were three pairs of similar soils. One of the pair had received less soil life-friendly treatment. The second sample of each pair had been managed in a way that gave it more organic matter.

In each case the sample that had more soil life had more life-derived mucus or glue to hold the sample together. The water stayed clearer and much less of the soil dropped to the bottom. One of the pairs was from a sandy soil in central Kansas. The poorer version of this soil dissolved very rapidly.

Some factoids from this portion were that-
1. A 1% rise in organic matter adds $900 in value to an acre of ground.
2. A 1% rise in organic matter holds an extra 1/3-1/2 inch of rain or approximately 16,000 gallons per acre.
3. At a 70 degree soil temperature all soil moisture is available for plant growth. At a 100 degree soil temperature no water is available for plant growth.
4. A test called the PLFA test is now available to measure the fatty acids in a soil sample. The resulting number is solely from soil organisms and can be used as a measure of the living organisms in the soil.

The third session of the morning was Gail Fuller switching to his farm animal producer role. He explained that his ideal system is no-till combined with diverse cover crops combined with rotational grazing of animals. He uses cows, chickens - SAPC both layers and meat birds and sheep. The demand for his animals far out strips his capacity.

He particularly mentioned the high demand for grass fed lambs from populations from the Middle East, both Jewish and Muslim. His sheep produce a 168% crop of lambs, enough to pay for the entire flock in two years.

Fuller showed a photo of a cow pie that was laced with dung beetle holes. They came back, he said, soon after he eliminated spraying. He also related that his bee populations became healthy right after he eliminated treated seed and that the planting dust from the toxic seed treatment had been associated with bee declines.
The photos of Fuller's animal operations were very impressive. He mentioned that he had to train his cattle to act like buffalo and graze in a tight formation. When he opens each paddock the cattle move in a tightly packed phalanx, each competing to be in the front row to get first crack at the best grasses. He featured a New Zealand-based automatic gate opener which releases a wire, dropping a barrier to allow the cattle to move to a second paddock per day without human involvement.
He accounted for the manuring of his field in a slide that enumerated that he used 66 "animal units" which drop 4620 pounds of manure per day. These cows take six days to cover one acre which receives 20,000 pounds of manure and untold amounts of urine.
He showed photos of cows eating snow for water and rooting out frozen turnips and other greens in the dead of winter.
He has laid water lines with outlets every 400 feet underground in his pastures. A very light and portable watering system lets the cows drink without excessive walking which can hurt weight gain.
Fuller times the delivery of his calves for April because he is in no hurry to have the calves make a certain weight by a certain time. He claimed that the amount of marbling (fat and taste) in a cow's meat is determined by the conditions the calf encounters in its first five days of life. Rich milk from its healthy mother and rich diverse forage will "lock in" a tendency store fat in the meat. His cows are almost too fat to calve well coming through the winter in his forage-based feeding system. Calves also start grazing very early when fresh tasty greens are available.
Lunch was characterized by a loud "buzz" of networking as participants shared reaction and information from the morning.

The Soil Tunnel Trailer made an appearance and attendees walked through seeing the same educational displays that are shared with school children and the public. I first saw the trailer at the Mother Earth News Fair in Lawrence. It’s a valuable educational tool and a great entree to this important topic.

The equipment needed to plant crops through mulches and heavy soil covers does exist but it is not cheap. This planter has three different seed boxes for different size seeds. Some use air to blow the seed into place. Some even have the ability to apply liquid fertilizer.

After lunch we boarded busses for a short drive to Bo Killough's farm. We piled into a refurbished barn now used for weddings and square dances. DeAnn Presley gave an interesting presentation on the results of research on cover crops. Mr. Killough described how he has opened his barn, his farm and even his unique home to agrotourists who want to pet the stock, sense the open spaces and even hold family reunions and weddings. Talk about value added, agro-tourism has higher profit margins because the "product" is an experience, not a piece of food.

We then were shuttled to a section of the farm where a soil trench and cover crop plantings were presented. In the trench we were able to note the loose black topsoil indicative of abundant soil life as well as the damage from compaction by heavy farm equipment. Some of the compaction damage was estimated to have occurred as long as ten years ago.

Our last section was a session with Keith Berns of Green Cover Seed. Keith displayed his expertise as he explained the advantages and limitations of cow peas, mung beans, brassicas and many other plants.

In this photo, Keith is showing the root ball that was generated by one seed of pearl millet. It was home to several earthworms.

One large plant called sunn hemp caught my attention as my reading about the father of composting, Sir Albert Howard, had mentioned sunn hemp being grown in India for its forage and for composting. Ninety years later the same crop has crossed the ocean to our shores for the same purposes.

This workshop had enormous value to me, a compost advocate, as almost everything I heard jibed with what I knew. The cover crop mixes or cocktails are even being selected considering the carbon to nitrogen ratios of the constituent plants. Adjusting this ratio in a standing crop can help optimize decomposition to feed the soil or the needs of animal nutrition. The working farmers who attended were exposed to a host of new techniques and methods. Fortunately these men and women seemed to be a breed apart from the farmer who was talking to his friend when he was asked, "Are you going to the Farm Bureau meeting tonight?" The first farmer said, "No, I already don't farm as well as I know how to."

I'm thankful there are such amazing new philosophies and technologies racing through agriculture today. Farmer's don't necessarily talk much, but they watch closely. I had recently heard that Iowa farms went from 5,000 acres of cover crops two years ago to 300,000 acres this year. Because these ideas are so solidly rooted in sound ecology and make such economic sense, these methods will succeed and field by field, farmers will adopt them.
Stan Slaughter