

Workshop Title: Nutrient Dense Crops (Parts 1 & 2)

Speaker(s) & their titles: Dan Kittredge, Bionutrient Food Association

Executive Summary

Dan discusses nutrients and their importance for human health and how these nutrients must be considered when building healthy soil. He approaches farming from an approach that works from producing the healthiest crops back to how he prepares his soil.

Detailed Notes

Part 1

Dan Kittredge states that organic farmers don't necessarily have a high level of nutrients in their crops but they do have fewer toxins. He says nature has already figured out how to grow and has been doing this much longer than we have. And therefore if you don't have the critical elements the crops need to function, they will not function. A healthy plant uses carbon dioxide, water, photons and sugars 60-70% of sugars produced by the plant are injected into the soil. This happens because the plant is feeding the soil which feeds the plant. At the bottom of food chain is soil life which have sophisticated functioning capacities to digest all sorts of toxins.

Aerobic organisms need air to live and therefore if you don't have air you don't have soil life. This means if you have soil compaction you don't have soil life. If you have 30 earthworms per yard these worms will till your soil 9 times a year. Dan prefers cover crops to mechanical tilling techniques. Bare soil in nature is very rare and when it exists there is no life. Dan makes his salad greens beds 4 feet wide with a one-foot path in between and he only does 2 inches of deep tilling. He says, "When your soil is saturated with water all the people in your soil are dead."

Cover Crops

Dan states that cover crops are the only way to really practically keep your soil covered through the winter. In referencing permaculture he says monocultures don't exist in nature and mentions guilds and companion planting. He says that as soil organisms only work with a certain number of plants you should aim for at least 3 species at once in your cover crop mixes.

He also suggests undersowing cover crops in the late summer or early fall as they can grow much deeper root systems and less tillage is required.

He uses winter rye as an example. Winter rye is very hard to till under and overwintered cover crops are better to use in locations where hot weather crops will be planted later in the season. Dan explains the "milk stage" which is after the rye plant flowers and before seed becomes viable. At this point the plant goes through a shift and stops growing leaves because it is already "pregnant". At this point you have a week to 10-day window to knock down the rye and it will die leaving excellent mulch. If he is planting Dan would plant straight into the mulch but if he was transplanting he would add fertilizer or compost to the hole.

There is a lot of leaching in the eastern half of North America due to rain. Dan explains that one of Albrecht's projects connected areas of the US with poor soil quality

to higher levels of rejection for the military meaning people in areas with poorer soil are generally less physically fit.

Dan states that our entire body is rebuilt every 6 months and if we are lacking the necessary ingredients then small errors are built in to our DNA. He suggests the book: *Minerals for the Genetic Code*. Enzymes put all the building blocks of your body together; they are like tools. It takes 56 elements to replicate one strand of DNA. However, only “3” nutrients are needed to grow crops and Dan questions: are you growing crops or growing your food?

One example is vitamin B12 which comes from cobalt. It is often said that you cannot get enough vitamin B12 from a plant-based diet. If vegetables are grown in soil lacking cobalt - a source of vitamin B12 - the crops will lack B12 and the B12 dependent micro-organisms in the soil will not stay.

Dan suggests that fall is best time to address mineral deficiency using rock powders. In Iowa in the northern two-thirds of the state an acre of land is around \$20,000 but in the top third an acre is \$8,000-\$10,000. The price divide exists where the glaciers stopped as glaciers scraping the land work to remineralise the soil.

Dan mentions getting rock dust from a nearby quarry as it is a by-product and you can get it inexpensively. Basalts are better than granite. He suggests 3 tons/acre is a good dose once every 20 years.

This is important because agriculture started in river valleys and could only be done for hundreds of years because the floods are coming to drop minerals on the land.

Seawater can also be used to add minerals but you must precipitate out sodium chloride. This can be done using lye, which is pot wash and rainwater. You want to raise the pH of the water to 10.4 by leaving it overnight. After one night there will be clear water on the top of the barrel, which is the sodium chloride and the milky water underneath will be the other elements.

Part 2

Soil can range from bacterial to fungal and weeds prefer bacterial soil while trees prefer more fungal. Brassicas have a preference similar to weeds but more on the fungal side. Keeping soil moist until germination helps Dan ensure the success of his crops.

Compost

Dan states that if you do not include wood in your compost pile you are creating a bacterial dominated compost pile. Cutting brush right before the leaves come out is when all the nutrients are in the buds and this is the best for wood chips.

Inoculation

Colostrum (gut flora) is extremely important to establish at birth. Animals have internal digestive systems but plants have outside digestive systems. Dan suggests that inoculating all of your seeds is very valuable (not just peas and beans).

To inoculate you simply open the seed packet, add a pinch of inoculate, close the seed packet and shake. You can't have too many of these beneficial fungi in the soil. He also states that anyone who has a need to apply nitrogen has a broken biological system.

Work of the Bionutrient Food Association

Dan states that money talks and if you can't figure out how to move money you can't make change. It is possible to measure the elements in something by its infrared image. This could be used as a scanner to check carrots at the grocery store for nutrient levels. This would give consumers the ability to test the quality of the food they are purchasing.

Seed

Dan sees seed as the biggest issue without a good solution. For example the Tye spinach variety is owned by a company and they hire two farms to grow all the seed for the world. They put it through a size 12 screen for seed growers, size 10 screen for growers who grow on mass scale, size 8 for another big grower and size 6 for seed companies.

It only takes a couple generations of bad nutrition to get bad genetics. This is currently happening to us as a species as well as our seeds. Therefore Dan suggests asking for seed size before buying seeds. For tomato seeds fat seeds will germinate quickly but thin seeds are runts. Having the fewest seeds per pound will give you the biggest seed.

Dan did an experiment with arugula and found dramatic difference between bought seed and saved seed. Dan mentions secondary metabolites, lipids and airborne pathogens. Dan says its wrong to sell crops that are susceptible to insect and fungi infestations because that is nature's way of telling you that you failed. He adds crops that are not edible to insects and fungi are ready for humans who are higher up on the food chain. Dan cautions that if you can't maintain moisture in your soil, don't waste your money on minerals. Dan irrigates with drip tape and a sump pump to run irrigation for his own farm in a creek.