

GLOSSARY OF COMMON FARM TERMS

SOIL HEALTH

Soil classification & soil type = 3 ingredients make up soil: Clay, Silt and Sand. Clay is made up of very fine particles, Silt has slightly larger particles, Sand has the largest particles (mainly silicates). The main farm soils classifications are Clay Loam, Silt Loam, Loam, Sandy Loam and Loamy Fine Sand. Sandy Loam is thought to be the ideal soil type for vegetable production.

Humus = Organic matter. Helps open up heavy clay soils, increasing air and water movement. Also helps hold sandy soils together – gives them structure and more stability.

pH = pH is expressed in a range from 0 to 14, with 0 being most acidic, 14 being high in Alkaline and 7 being neutral. The pH of soil is very important because pH affects plant nutrient availability by controlling the chemical form of the nutrient. All plants do not have the same pH preference and choosing plants that thrive in the pH of your soil will increase your productivity. Lime is commonly added to increase the pH. Compost or stable manure is often used to lower pH.

N-P-K = Nitrogen (N), Phosphorus (P), Potassium (K). These 3 nutrients are needed in the largest amount by plants and are referred to as macronutrients. Fertilizer is made up of these 3 macronutrients (along with smaller amounts of micro-nutrients). Fertilizers are described by a 3 number designator; for example, 20-20-10. These numbers are percentages of three elements: nitrogen, phosphorus, and potassium, respectively. Therefore, 20-20-10 fertilizer contains 20% nitrogen, 20% phosphorus, and 10% potassium by weight.

C.E.C = Cation Exchange Capacity. C.E.C is an important property of farm soils. Soil particles have a negative charge, which allows the soil to hold cations. The cations of interest are potassium, calcium, magnesium and sodium. These cations have a positive charge and are held to the soil particles, somewhat like a magnet would attract iron nails. This attraction is a good thing because it prevents the cations from being leached away with excessive rainfall. Soil organic matter also has a negative charge and holds cations and is part of the total CEC of the soil. The CEC of a soil is a permanent characteristic and is directly related to soil texture. The higher the CEC of your soil, the higher the soil clay content.

Tilth = Good tilth is a term referring to soil that has the proper structure and nutrients to grow healthy crops. Soil in good tilth is loamy, nutrient-rich soil that can also be said to be friable because optimal soil has a mixture of sand, clay and organic matter that prevents severe compaction.

Glomalin = glomalin is a glycoprotein. It stores carbon in both its protein and its carbohydrate (glucose or sugar) subunits. It permeates organic matter, binding it to silt, sand, and clay particles. Not only does glomalin contain 30 to 40 percent carbon but it also forms clumps of soil granules called aggregates. These add structure to soil, and keep other stored soil carbon from escaping.

Mycorrhiza = plants and certain fungi form a symbiosis called mycorrhiza. The mycorrhizal fungi form hyphae in soil that act as an extension of the roots, transporting nutrients from the soil to the plant. Regarding organic nutrients, mycorrhiza has been shown to improve the recycling of both N and P in plant material, as it's wide distribution makes more frequent contact with sites where organic matter is mineralized.

Rhizobia = soil bacteria that fix nitrogen after becoming established inside root nodules of legumes. Rhizobia require a plant host; they cannot independently fix nitrogen. Rhizobia are very important because Nitrogen is the most commonly deficient nutrient in many soils around the world and it is the most commonly supplied plant nutrient.

Cover crop = also called “green manure.” Cover crops are not grown for sale – they are grown to care for and improve soil fertility. Growing a leguminous cover crop helps fix more nitrogen in the soil, but all cover crops increase humic matter, decrease soil erosion in the off-farming months and help break up compacted soils. Common cover crops include: rye, dwarf, sweet, red or white clover, austrain pea, vetch, winter wheat, etc.

Legume = Legume plants are notable for their ability to fix atmospheric nitrogen, thanks to a mutualistic symbiotic relationship with bacteria (rhizobia) found in root nodules of these plants. The ability to form this mutualism reduces fertilizer costs for farmers and gardeners who grow legumes, and allows legumes to be used in a crop rotation to replenish soil that has been depleted of nitrogen. The nitrogen fixation ability of legumes is enhanced by the availability of calcium in the soil and reduced by the presence of ample nitrogen. Some examples of legumes include beans, lentils, lupins, peas, and peanuts.

PEST & DISEASE MANAGEMENT

IPM (integrated pest management) = an integrated approach of crop management to solve ecological problems when applied in agriculture. These methods are performed in three stages: prevention, observation, and intervention. It is an ecological approach with a main goal of significantly reducing or eliminating the use of pesticides while at the same time managing pest populations at an acceptable level.

Pollinators = the biotic agent (vector) that moves pollen from the male anthers of a flower to the female stigma of a flower to accomplish fertilization or syngamy of the female gamete in the ovule of the flower by the male gamete from the pollen grain. Many species of bees, honey bees, wasps (esp. Sphecidae and Vespidae), bombyliid flies and syrphid flies are just a few of the important pollinators on a farm. Honey bees are by far the most important commercial pollinating agents, but many other kinds of pollinators, from bluebottle flies, to bumblebees, orchard mason bees, and leaf cutter bees are cultured and sold for managed pollination.

Pollinator habitat = areas of permanent vegetation located in an agricultural landscape: field edges, field middles, odd corners, or virtually any location that is suited for pollinator habitat. Vegetation consists of acceptable herbaceous and/or woody plants.

Beneficial insects = In farming and agriculture, where the goal is to raise selected crops, insects that hinder the production process are classified as pests, while insects that assist production are considered beneficial. In horticulture and gardening; pest control, habitat integration, and 'natural vitality' aesthetics are the desired outcome with beneficial insects. Encouraging beneficial insects, by providing suitable living conditions, is a pest control strategy, often used in organic farming, organic gardening or Integrated Pest Management. Companies specializing in biological pest control sell many types of beneficial insects, particularly for use in enclosed areas, like greenhouses.

PyGanic = PyGanic contains a pyrethrum formula (a botanical insecticide derived from chrysanthemums). There is an OMRI approved PyGanic. It provides rapid knockdown and killing of more than 40 plant pests, as well as causing insects and mites to flush from hiding. Pests controlled include aphids, beetles, caterpillars, cucumber beetles, flea beetles, Harlequin bugs, thrips, etc. PyGanic is approved for use on over 200 fruits and vegetables and may be applied on the day of harvest. PyGanic is “broad spectrum” i.e. it kills beneficial insects as well as pests.

B.T = *Bacillus thuringiensis*, usually referred to as "BT" is a naturally occurring bacterium that is lethal to most leaf-eating caterpillars on trees, shrubs, flowers, and vegetables. There are also varieties designed to kill mosquitoes or potato beetles. Bt is harmless to all other insects, animals, and humans. It comes in powder form for use as a dust or, diluted with water, for use as a foliar spray. It is also available in liquid form. It is sprayed or dusted on leaves of plants that are under attack by caterpillars so that the pests will ingest the bacteria as they eat the leaves. The Bt causes paralysis of the caterpillar's digestive tract, causing it to stop feeding within two hours. Within a day or two the caterpillars die. *Dipel* is a commonly used BT in organic farming.

Diatomaceous earth = fine white powder consisting of fossilized remains of diatoms, a type of hard-shelled algae. Diatomaceous earth does not kill due to a chemical action like most toxic poisons but rather kills by the structure of its sharp microscopic edges. The hard bodies of the pests are sliced open by the material and it literally dries them out and they die. Often used against slugs and other soft-bodied crawlers.

Serenade = a biofungicide that is used preventatively. Controls plant pathogens such as downy mildew, botrytis brown rot, leaf blight, bacterial spot, rust, scab, grey mold, grape powdery mildew and much more. Not harmful to beneficials and can be sprayed on the day of harvest. Serenade works on a wide range of diseases and on a variety of crops.

Copper sulfate = a natural fungicide and bactericide. Can be used on fruits, vegetables, flowers and ornamentals for prevention of leaf diseases, blights, mildews, brown rot and leaf spots. It is also used as a protection for early or late tomato blight. Coat plants ahead of the period in which disease is expected. Once the fungus comes into contact with the protective copper it's killed instantly.

Surround = Made of Kaolin clay. White coating that covers plant surface and suppresses pests and reduced harmful solar effects. For tree crops: protects against psylla and plum cruceo. For vegetable crops: suppresses flea beetles, Japanese beetles, lace bugs, leafhoppers, thrips and more. It is best to apply Surround when bees are not actively foraging.

Neemix = kills larvae stages of insect pests including whiteflies, caterpillars, leafminers, aphids, diamondback moths, cutworms, chich bugs, leafhoppers, grasshoppers, grubs and many more. Targets insect larvae by interfering with the insects' ability to molt.

Safer Insecticidal Soap (Also called M-Pede and Des-X) = A natural insecticide, fungicide and miticide. Effective against a broad range of soft-bodied pests. Can be used on all growing plants – indoor and outdoor. Can be used up to the day of harvest.

Spreader - Sticker = adjuvants added to spray mix, intended to help coverage of the product on the plant material and to slow chemical residue loss. The spreader component is a surfactant that reduces the surface tension of water. This allows the product to spread across the leaf more uniformly and allows the active ingredient to be better absorbed by the plant. The sticker component increases the adhesion of spray drops to the leaf and slows loss of the chemical by rain. Many stickers are also surfactants and are marketed as spreader—stickers. A common spreader-sticker is Therm-X 70.

Row Cover = lightweight blankets made of spunbonded polypropylene which is sunlight, rain and air-permeable. They offer 4 benefits: 1) Capturing warmth, resulting in healthier plant growth and earlier yields. 2) Protecting plants from damaging winds. 3) Most effective, least toxic, form of insect control. 4) Protecting your plants from light frost, thus extending the growing season. Cover your crops immediately after planting to keep insects out and to promote increased warmth. Apply the cover loosely so plants can lift it as they grow, and secure edges.

Early blight v. Late blight = Late blight is a disease caused by a fungus-like microorganism that infects and kills tomato and potato plants. The pathogen, *Phytophthora infestans*, was responsible for the Irish potato famine of the 1840's. Lesions develop on leaves and stems as dark, water-soaked spots. These spots enlarge until the entire leaf or stem turns brown and dies. Dead leaves typically remain attached to stems. The undersides of the lesions may be covered with a white fuzzy growth that contains the spores of the pathogen. Spores are spread short distances by rain and very long distances by wind. Early blight, *Alternaria solani*, is a common fungal leaf spot disease. Early blight can infect tomato leaves early in the growing season and is favored by warm, humid weather. Late blight can occur at anytime during the growing season when the weather is cool and wet (usually in later summer in the South). The disease is slowed down by a return to hot, dry weather.

Downy mildew = Downy mildew, caused by the fungal organism *Pseudoperonospora cubensis*, is most destructive to cucumber and cantaloupe, though all cucurbits are susceptible. Symptoms first appear as pale green areas on the upper leaf surfaces. These change to yellow angular spots. A fine white-to-grayish downy growth soon appears on the lower leaf surface. Infected leaves generally die but may remain erect while the edges of the leaf blades curl inward. Usually, the leaves near the center of a hill or row are infected first. The infected area spreads outward, causing defoliation, stunted growth, and poor fruit development. The entire plant may eventually be killed. The fungus is easily carried by wind currents, rain splash, farm implements, or the hands and clothes of farm workers. It is favored by cool to moderately warm temperatures, but tolerates hot days, although long periods of dry hot weather can stifle the spread of the disease. Unlike powdery mildew, it requires humidity to flourish. Therefore, downy mildew is most aggressive when heavy dews, fog, and frequent rains occur.

Powdery mildew = a fungal disease that affects a wide range of plants. Powdery mildew diseases are caused by many different species of fungi in the order Erysiphales. It is one of the easier diseases to spot, as its symptoms are quite distinctive. Infected plants display white powdery spots on the leaves and stems. The lower leaves are the most affected, but the mildew can appear on any above-ground part of the plant. As the disease progresses, the spots get larger and denser as large numbers of asexual spores are formed, and the mildew may spread up and down the length of the plant.

Plant Pathogen = any harmful introduced infectious agent, organism, or condition that reduces a plant's overall vitality, inhibits its growth, or limits the ability of the plant to survive and reproduce. Pathogens can be delivered in a multitude of different ways. These include: bacteria, fungi, viruses, nematodes, oomycetes, and abiotic toxicities. There are several different factors that need to be present in order to create an outbreak of disease on the farm. The pathogen must be present. There must be suitable host plants around. And there must be favorable environmental conditions for the growth and development of that particular plant pathogen.

Vector = and agent used to carry genes into another organism. Specific examples of natural vectors include plasmids or viruses.

EQUIPMENT

Power Equipment

P.T.O = Power Take-Off Shaft. It is used to provide power to an attachment or separate machine. It is designed to be easily connected and disconnected. The power take-off allows implements to draw energy from the tractor's engine.

Three-point hitch = most often refers to the way ploughs and other implements are attached to an agricultural tractor. The three-point hitch is made up of several components working together. These include the tractor's hydraulic system, attaching points, the lifting arms, and stabilizers. Three-point hitches are composed of three movable arms. The two outer arms - the hitch lifting arms - are controlled by the hydraulic system, and provide lifting, lowering, and even tilting to the arms. The center arm - called the top link - is movable, but is usually not powered by the tractor's hydraulic system.

Articulating spader vs. rotary spader = articulating spaders have spades that work like a hand shovel on a crank shaft. Each spade shovel takes a turn entering the soil, so very little horsepower is needed to operate it. Spading action loosens the soil across the bed and its motion does not compact or smear the soil at the bottom of its travel. A Rotary spader works like a rototiller with a spade sweep moving in a circular motion. They can produce a finished seed bed in clay soil and turn under all of the green matter in one pass with the optional rear power harrow, but may cause soil compaction and smearing of the soil at the bottom of their travel.

Tiller = a motorised cultivator that works the soil by rotating tines or blades. Rotary tillers are either self-propelled or drawn as an attachment behind either a two-wheel tractor or four-wheel tractor. For two-wheel tractors they are rigidly fixed and powered via couplings to the tractors' transmission. For four-wheel tractors they are attached by means of a three-point hitch and driven by a power take-off (PTO).

Disc harrow = used to prep soil and / or chop up weeds and leftover crop remains. It has many iron or steel discs which have slight concavity and are arranged into two or four sections. The discs are also offset so that they are not parallel with the overall direction of the implement. This is so they slice the ground they cut over a little bit to optimize the result. The concavity of the discs as well as their being offset causes them to loosen and pickup the soil they cut.

Flail mower = a type of PTO driven implement that can attach to the three-point hitches found on the rear of most tractors. This type of mower is best used to provide a rough cut to taller grass and high cover crops. The flail mower gets its name from the use of "flails" attached to its rotating horizontal. Many implement companies also refer to the flails as knives or blades. The rows of flails are usually staggered to provide a complete cut.

Bush hog = a type of rotary mower that attaches to a tractor using the three-point hitch, driven via the PTO. It has blades that are not rigidly attached to the drive like a lawnmower blade, but are on hinges so if the blade hits a rock or stump, it bounces backward and inward, and then inertia makes it go outwards again. The rotary blades are not sharpened in the same way as a conventional mower blade. They are usually quite dull so they whack through dense plant growth, where a sharp blade will get stuck or slowed down. The blades are very heavy, up to an inch thick, so the momentum pulling out is stronger than the forces of the vegetation bouncing in.

Basket Weeder = metal cages that roll on top of and scuff the soil surface without moving soil sideways into the crop rows. This action makes them ideal for newly emerged crops or crops like lettuce that have to be kept free of soil and are not suited to hilling. The baskets handle small stones but work best in fine soils free of crop residues, and are most effective when weeds are very small.

Tine Cultivator = used for mechanical weed control, also called a spring-tine cultivator, flex-tine cultivator or light springtooth harrow. It scratches soil surface, uprooting weeds at the white-root stage (before they emerge). The tine cultivator is less effective on emerged weeds and does not control annual or perennial weeds with well-established roots.

Bed Shaper = Raised rows promote good drainage, less soil erosion, earlier crops and well-drained, warmer soil. Bed Shapers run off a PTO shaft and can also create multiple rows behind the tractor. A bed shaper can be useful as a one-pass implement or a two-pass implement. You can perform each pass at a higher rate of speed. The first pass roughs in the raised rows, and the second pass flattens the tops of the rows so that the planter can have a solid surface to plant seeds and cover them without much soil spillage into the furrows.

Chisel plow vs. moldboard plow = Chisel plows are equipped with narrow, double-ended shovels, or chisel points, mounted on long shanks. Chisel plows are used to control weeds, break up compacted soils, and increase water infiltration while leaving crop residue on the soil surface to reduce erosion. They have curved shanks mounted on a frame with ridged or spring-loaded clamps. A wide variety of chisel points, sweeps, and shovels are available to accomplish desired tillage. Moldboard plows designed to slice and invert a layer of soil, thus covering the sod and leaving a rough surface. These plows have large curved bottoms called moldboards which attach to a frame. The moldboards have shears along the bottom edge and large curved wings above to turn the soil.

Drop seeder / spreader = both walk – behind and tractor pulled options are available. Releases seeds, fertilizer, amendments, etc directly under the implement, making it very concise.

Broadcast spreader/seeder = both walk – behind and tractor pulled options are available. A large material hopper is positioned over a horizontal spinning disk, the disk has a series of 3 or 4 fins attached to it which throw the dropped materials from the hopper out and away from the seeder/spreader.

Handtools

Stirrup hoe = so named because the working end looks much like a stirrup on a saddle. Also called a hula hoe or a scuffle hoe. It works by sliding just below the surface of the soil, cutting the roots of the weeds. The traditional hoe works by chopping weeds either above ground or below ground, weeds will often regrow and there is much soil disturbance. A stirrup hoe minimizes soil disturbance, and as a result may cause less drying of the soil. More importantly, it reduces the development of new weeds when used properly.

Wheel hoe = uses the oscillating stirrup hoe blade but is mounted on a wheeled frame. Operate by walking forward while making push / pull motions with arms. Is used to weed in rows as aisles.

Collinear Hoe = has a long, narrow rectangular blade. It is used in a sweeping motion alongside your body with the handle very upright. Using a collinear hoe is kinda like shaving your garden soil to remove the weeds! The sharp thin blades are usually replaceable and work well on soil that is reasonably prepared. These types of hoes don't work well in hard soil with large clods.

Walk-behind Seeder = Good for small-scale growing. Fast and easy to operate: multiple plates allow for many different sizes of seeds so you need to select the correct plate, load seed into the hopper and push the seeder in front of you – the motion of the wheels turn the plates and drop the seeds. Many styles have an arm that marks the next row as you're sowing and a chain that drags behind – covering the seeds.

Broadfork = tool used to manually break up densely packed soil, like hardpan, to improve aeration and drainage. It consists of five or so metal tines, approximately eight inches long, spaced a few inches apart on a horizontal bar, with two handles extending upwards to chest or shoulder level, forming a large U-shape. The operator steps up on the crossbar, using full bodyweight to drive the tines into the ground, then steps backward while pulling backwards on the handles, causing the tines to lever upwards through the soil. This action leaves the soil layers intact, rather than inverting or mixing them, preserving the topsoil structure. It is good for small scale growing.

GROWING ORGANICALLY

OMRI = The Organic Materials Review Institute (OMRI) is a nonprofit organization started in 1997 by organic certification agencies. OMRI's mission is to provide professional, independent, and transparent review of materials allowed to produce, process, and handle organic food and fiber. OMRI's information services are designed to assist certifiers, growers, handlers, processors, and suppliers in determining the compatibility of generic materials and brand name products for organic production under the USDA National Organic Program (NOP) Rule and other international standards. Within this regulatory framework, OMRI serves the industry in the role of an advisory and educational support agency.

N.O.P = National Organic Program. A program of the USDA (United States Department of Agriculture.) It develops, implements, and administers national production, handling, and labeling standards for organic food.

G.A.P = Good Agricultural Practices. GAP are production and farm level approaches to ensure the safety of fresh produce for human consumption. GAP production and post-harvest guidelines are designed to reduce the risk of food-borne disease contamination on fresh produce. These voluntary procedures can be tailored to any production system. GAP recommendations are directed toward the primary sources of contamination: soil,

water, hands, and surfaces. The USDA currently operates an audit/certification program to verify that farms use Good Agricultural Practices.

G.H.P = Good Handling Practices. GHP focus on packing facilities, storage facilities and wholesale distribution centers; and Food Defense protocols utilized throughout the food chain. Also run through the USDA.

PLANT CARE / SEED SELECTION

Foliar feeding = a technique of feeding plants by applying liquid fertilizer directly to their leaves. The absorption takes place through the stomata of the leaves and also through the epidermis. It is common to use sea-based nutrient mixes, especially kelp, because they contain many of the fifty "trace nutrients."

Side dressing = refers to fertilizer placed two to four inches beside a row of vegetables. A general rule is to side-dress when growth has slowed and plant color has lightened. Side dressing too often or too heavily can result in no fruit or a burned plant. When **side** dressing, apply fertilizer several inches away from the base of the plant. Wash off any fertilizer touching the stems.

Drip irrigation = also known as trickle irrigation or microirrigation, is an irrigation method which saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters. Advantages of drip include: minimized fertilizer/nutrient loss due to localized application and reduced leaching, higher water application efficiency, moisture within the root zone can be maintained at field capacity, highly uniform distribution of water, foliage remains dry thus reducing the risk of disease. Disadvantages include: initial set-up costs can be expensive, more clean-up after a crop / end of the season, lines can get clogged with silt.

Organic seed = seed grown without synthetic chemicals, it is believed that seed produced organically will yield plants that are more adapted to, and more likely to thrive under, organic growing conditions.

Open-pollinated seed = traditional seed varieties which have been grown and selected for their desirable traits for millennia. They grow well without high inputs because they have been selected under organic conditions. This, versus "hybrid seeds" which are the first generation offsprings of two distant and distinct parental lines of the same species. Seeds taken from a hybrid may either be sterile or more commonly fail to breed true, not incorporating and expressing the desired traits of the parent. The development of hybrid seed enabled the beginning of the commercial seed market.

Untreated seed vs. Treated seed = Treated seeds have been coated with a protective agent to increase the chances of successful germination. In most cases it is a fungicide to prevent damping off and other seedling diseases. In some cases it is an insecticide to control seed and seedling eating insects. It is used mainly on peas, beans and corn as they are the most susceptible to these types of problems. The main advantage to seeding treated seed is you are able to plant earlier into cooler damper soils which would otherwise cause the seeds to rot in the soil. Untreated seed will perform quite well provided the seeds are planted later once the soil has had a chance to warm up. It is also a good idea when planting untreated peas, beans and corn, to sow the seeds thicker to insure that you get the plant stand you are looking for.

ETC:

Schedule F = Tax form for self-employed farmers. If your farm is organized as a corporation, partnership, or other form of incorporation, you will need to file the appropriate business tax return. To fill out the schedule F, farmers must keep good records, report income and expenses, and pay regular income tax and Self-Employment tax on their net profits from farming. A useful tax website for farmers is the Farmers Tax Guide - <http://www.irs.gov/publications/p225/>.

Value-added = the end result of "adding value" to raw agricultural products. The value of farm products can be increased in endless ways: by cleaning and cooling, packaging, processing, distributing, cooking, combining, churning, culturing, grinding, hulling, extracting, drying, smoking, handcrafting, spinning, weaving, labeling, or packaging. Besides offering a higher return, value-added products can open new markets, create recognition for a farm and expand the market season.