

- 1. Alfalfa Meal**
Recommended as a feed product but has the properties of a fertilizer as well. It is a soil amendment that many believe invigorates the biological activity in the soil. Alfalfa is a protein feed for livestock and offers the same benefit to organisms in the soil. It contains 17% crude protein, which translates into 2.75 percent nitrogen. Alfalfa meal also contains fiber and other substrates that feed populations of soil organisms.
- 2. Aragonite**
Contains 94-97% calcium carbonate. Using Aragonite for several seasons will restore the balance. It conditions the soil. Lowers acidity of soil without adding unwanted magnesium. Use instead of lime in situations where soil is already high in magnesium and where dolomite (high magnesium limestone) is the only liming material available. It can also be used to keep rats, mice, and squirrels off newly planted bulbs.
- 3. Azomite**
A hydrated sodium calcium aluminosilicate ground rock with other essential trace elements. 100% natural volcanic rock ground to a fine powder. It can be used as a feed supplement in poultry or as a fertilizer.
- 4. Bacillus thuringiensis**
It is a naturally occurring bacterial disease of insects. These bacteria are the active ingredient in some insecticides. Bt insecticides are most commonly used against some leaf- and needle-feeding caterpillars. Recently, strains have been produced that affect certain fly larvae, such as mosquitoes, and larvae of leaf beetles. Bt is considered safe to people and nontarget species, such as wildlife. Some formulations can be used on essentially all food Crops
- 5. Biosolids Compost**
The solid material generated by the biological treatment of sewage at a wastewater treatment plant. In addition to being composted, sewage sludge can be recycled for beneficial use by direct application to land as a fertilizer. A designation of "Class A" means that all pathogens have been destroyed in the treatment process. Class A can be achieved through a digestion, which heats biosolids to 140 o F, through composting the biosolids, or with heat drying to produce a pellet or granular product. Class A products may be used in any setting, including home lawn and gardens. Biosolids can be composted with wood chips are available in several locations in central Texas.
- 6. Blood Meal**
This organic fertilizer is very high in nitrogen and is very soluble in water (unlike most other dry organic fertilizers). Blood meal is a dried blood product and is an excellent source of quickly available organic nitrogen. Contains 13% total nitrogen. It also contains plant growth regulators. All this together means that its effect is strong and quick, but its power will only last a short while, especially in wet weather. When applying blood meal, take care, as it will easily burn a plant's leaves. Ideal for heavy feeders such as lettuce or corn. Also useful for accelerating the composting of carbonaceous material such as leaves or straw. Use as a top dressing and water in. Or mix with water and use as a liquid fertilizer. A safe (slow and steady) source of organic nitrogen; produces more vigorous plants with deeper green color and larger, more beautiful blooms. Rates of Application Light feeding 1 pound per 100 square feet. Medium feeding 2 pounds per 100 square feet. Heavy feeding 4 pounds per 100 square ft.

7. **Bone Meal**

An organic fertilizer that is applied to increase phosphorus levels in the soil (or compost). It is natural source of phosphorous; 100% pure bone meal, with no additives; also contains organic nitrogen. It will break down in the soil considerably faster and can thus be used as a quick fix; but this also means that it will not have a long-term effect on the soil. Considered the best natural source of phosphorus, bone meal also contains calcium and some trace minerals. It a very safe fertilizer, especially when, planting or potting very young or new plants. It is excellent for bulb plantings. Also good for reducing transplant shock and promoting extensive and healthy root systems. Lawns: Apply in spring, summer, or fall at the rate of 5 lbs. per 100 square feet. Bulbs & Gardens: Apply at the rate of 10 lbs. per 100 square ft working well into soil. Shrubs & Trees: Apply 1 or 2 lbs. To shrub, tree, or bush depending upon size. Distribute under entire spread of shrub or tree raking well into soil. Apply 2 ounces or about 1 heaping tablespoonful per pot; work into soil.
8. **Boron**

Micronutrients are those elements essential for plant growth, which are needed in only very small (micro) quantities. These elements are sometimes called minor elements or trace elements, but use of the term micronutrient is encouraged by the American Society of Agronomy and the Soil Science Society of America Boron is one of the micronutrients required by all plants for normal growth Boron shortage on clay loam and clay soils is rare. Boron deficiency is more common in high pH soils. A large part of the boron in soils is found in the organic matter in the topsoil
9. **Compost**

The end result of successful composting is humus. It is the rich, dark, and fine mixture of decomposed organic materials. Humus contains the microorganisms necessary for healthy soil, as well as a ready supply of the macro- and micronutrients necessary for healthy plants. Use humus in the garden to condition and amend soil. Mix it with the soil for general improvement or use it to side-dress hungry plants
10. **Compost Tea**

Compost tea is easily made by soaking or steeping compost in water. The resulting compost tea is used for either a foliar application (sprayed on the leaves) or applied to the soil. We all know that compost is a wonderful addition to soil and helps our gardens grow better. You and your garden plants can benefit even more by using compost tea. By using compost tea to replace chemical-based fertilizers, pesticides, and fungicides, you can garden safer and be more protective of the environment. Compost tea increases plant growth, provides nutrients to plants and soil, provides beneficial organisms, helps to suppress diseases and replaces toxic garden chemicals.
11. **Copper**

It is an essential nutrient for plant growth, but because only a small amount is needed, it is classified as a micronutrient. Copper is an important component of proteins found in the enzymes that regulate the rate of many biochemical reactions in plants. Plants would not grow without the presence of these specific enzymes. Research projects show that copper: * promotes seed production and formation * plays an essential role in chlorophyll formation * is essential for proper enzyme activity Availability of Cu is related to soil pH. As soil pH increases, the availability of this nutrient decreases. Copper is not mobile in soils. It is attracted to soil organic matter and clay minerals.

12. **Corn Gluten**
Corn gluten meal is a powdery byproduct of the corn milling process. Used for years as a supplement in hog feed, this natural protein is very effective for lawns and gardens as a plant food as well as a weed suppressor. Corn gluten meal products offer a non-toxic, yet effective alternative to traditional, chemical-based weed and feed products for weed control in gardens and lawns, paths and driveways. As a plant food, corn gluten has a N-P-K ratio of 9-1-0, or 10% nitrogen by weight. As a weed suppressant, corn gluten acts as a natural "pre-emergent" - it inhibits seed germination by drying out a seed as soon as it cracks open to sprout. These qualities make corn gluten an ideal 'weed n feed' product.
13. **Cornmeal Horticulture**
Use Horticulture Cornmeal for root and soil borne fungal diseases at 10-20 pounds per 1,000 square feet. Cornmeal works as a disease fighter in the soil by stimulating beneficial microorganisms that feed on pathogens such as brown patch in St. Augustine, damping off in seedlings and other fungal diseases. Use cornmeal at about 2 pounds per 100 square feet to help control any soil-borne fungal diseases on both food and ornamental crops. One application may be all that is needed, but multiple applications are okay if necessary because cornmeal serves as a mild organic fertilizer and soil builder. Cornmeal needs moisture to activate. Rain won't hurt cornmeal's efficacy because, like all organic products, it is not water-soluble.
14. **Cotton Bur**
Cotton burr compost is a natural organic fertilizer, does not tie up nitrogen in soil, is unsurpassed at breaking up tight, clay soils, improves moisture retention and fertility in sands, holds as much moisture as peat, but unlike peat, wets and re-wets easily, lasts up to two full growing seasons and is economical. A quality cotton burr compost will also be free from weeds, insects and pathogens.
15. **Cottonseed Meal**
Breaks down over a period of time. It acidifies the soil (it takes 9lbs of lime to neutralize the acidity caused by 100lbs of cottonseed meal. An excellent ingredient for organic fertilizers because of its consistency, nutrient value, and organic carbon content. It is an excellent source of nitrogen for shrubs and trees. Can be finely sprinkled under the branch spread area of the tree or shrub. Its analysis is 6-1-1. The nitrogen is almost 85% water insoluble. Apply about 5lbs./100 ft.2 for planting beds.
16. **Crab Shell**
A good fertilizer and substitute for bone meal, due to its high concentration of calcium. Crab shell is also high in chitin, which promotes the growth of chitin eating bacteria. The exoskeletons of fungus and nematodes eggs, as well as the jaw structures of some garden pests like the Japanese beetle grub are high in chitin. Crab shell, when added to the soil, helps create a hostile environment for the fungus and nematodes by feeding the biological life that eats the chitin based organisms. It is not classified as a fungicide or a nematocide.
17. **Diatomaceous Earth**
Diatomaceous earth is a mineral product mined from the fossilized silica shell remains of unicellular or colonial algae from the class Bacillariophyceae, better known as diatoms. It can be applied in a variety of ways. Use food grade. To use for flea and tick control, apply a light dusting over the lawn, in dog runs, around pet bedding or favorite resting spots and sprinkle a little on your pet between baths of a mild herbal soap. Another use is in animal production units for the control of external parasites and flies.

In houses it can be used effectively to prevent the entry of certain insects such as earwigs, ants, and cockroaches, and to control these and others that are present in cupboards containing food, carpets, basements, attics, window ledges, pet areas (for fleas), etc. Made into a paste it can be painted on surfaces. In all of these examples it is important to place a small amount of the powder in corners, cracks, crevices, and other areas where insects might hide. Whereas with a contact pesticide the insect dies quite quickly, with DE control may take several days. The more important difference is that the effect of the protection provided by the chemical is short-lived. Whereas DE will control the pests as long as the powder remains. In this respect DE is an ideal pesticide; it is residual but nontoxic. The only health precautions that need to be taken are that if large areas are being treated with a power duster, the applicator should wear a mask to prevent inhalation. This is achieved by dusting the animals and the litter or bedding area. It has also been included in the diet (two per cent in the grain ration) to control certain internal parasites, and this practice is said to result in lower fly populations in the resulting manure.

18. Dolomite

Reducing the acidity of the soil is the primary purpose for using lime in the garden. Dolomite is preferred due to its content of both calcium and magnesium. If you have routinely used dolomitic limestone to sweeten your soil, high levels of magnesium may be tying up other nutrients.

19. Dormant Oil

It is sold under many brand names as dormant oil or scale emulsion. These are highly refined oils (not motor oils), which spread uniformly on the bark of trees and shrubs to which it is applied and coat non-mobile, dormant insects on the tree smothering them to death. Heavier oils may have to be applied with a tank (pump-up) sprayer, which can apply the fully diluted product rather than with a hose-end sprayer, which may become clogged. Applicators should frequently shake sprayers to agitate the water and chemicals mixed since plant damage can occur if a concentrated oil spray, caused by solution separation, is applied. Mix dormant oil at the recommended rate on the product label. It is best to spray before buds begin to swell. If buds of trees and shrubs have begun to swell slightly, go ahead and spray. Although some of the buds may be damaged, the benefits of spraying dormant oil far outweigh the possible repercussions. Do not spray trees, which are in full bloom however. Applying a dormant oil spray this late will also serve to cover pruning cuts and can serve as a second attack on stubborn pests which were not killed by an earlier oil application. The closer the application is made to bud break, the greater the kill. Spraying of dormant oil should occur on a clear day when the temperatures are expected to remain over 50 degrees F. for at least twenty-four hours. The ideal temperature for application is between 40 and 70 degrees F. in order to get the oil to spread out over the tree and cover all crooks and crevices. Try to avoid applying dormant oil when severe freezing trends are expected in the 3-4 days following application. CAUTION: The use of a dormant oil mixture will not only kill, but annihilate, annual flowers such as pansies, bluebonnets or snapdragons growing under or near plants to be treated. To insure domestic tranquility, completely cover such tender vegetation BEFORE spraying nearby trees and vines with dormant oil.

20. Feather Meal

Hydrolyzed poultry feathers or feather meal are produced by hydrolyzing clean, un-decomposed feathers from slaughtered poultry. The protein in feather meal is degraded slowly in the rumen compared to most other protein sources. In research at Purdue University, a combination of feather meal and urea produced average daily gains in growing beef cattle similar to that achieved with soybean meal

21. **Fish Emulsion**
A liquid organic fertilizer made from emulsifying fish byproduct and waste; sometimes containing small amounts of kelp or seaweed as well. It is a fairly mild organic fertilizer with a NPK ratio of somewhere around 4-1-1, making it a good choice for tender plants and seedlings. Because of its organic nature, it has a rather disagreeable odor, which is sometimes reduced or eliminated in manufacturing. However, even the deodorized types can still carry a distinct smell, especially in a warm enclosed environment like a greenhouse.
22. **Fish Meal**
Like fish emulsion, fishmeal is high in nitrogen, but its NPK ratio is generally a bit more potent, at somewhere about 5-3-3. And, unlike the emulsion, fishmeal is a dry organic fertilizer.
23. **Garlic**
Made from pure garlic oil and garlic extract. Effective on aphids, thrips, cabbage butterflies, caterpillars and slugs. It is used to control white powdery mildew, rust and downy mildew. The juice of this pungent herb produces a powerful effect to keep insects and critters away. When it is combined with mineral oil and pure soap, it becomes an effective insecticide. Some studies also suggest that a garlic oil spray has fungicidal properties. Garlic has been used since ancient times to repel insect pests.
24. **Granite Decomposed**
Decomposed granite gravel in several sizes. Decomposed Granite is a wonderful product for the garden. We use it in many of our soil and compost mixtures as an amendment to help break up heavy clay soils and provide better drainage. The Decomposed Granite is also a great source of slow-release minerals to help produce sturdier, healthier plants. Another great use for the Decomposed Granite is for walkways or patio areas. Decomposed Granite has been screened to be 1/4-inch and smaller. This allows the pieces to settle down into a nice, firm walkway. The walkways at The Natural Gardener are Decomposed Granite.
25. **Granite Dust**
It is often sold as a "slowly available" potash source for organic production. Total potash contents in granite dust typically vary from 1 to 5%, depending on overall mineral composition of the rock, but granite is mostly feldspar, a mineral with low solubility. Therefore, little potash fertility is derived from this material.
26. **Greensand**
Greensand is mined from ancient seabeds, it is a dry organic fertilizer. It is useful for its ability to slowly supply to the soil a number of different micronutrients, as well as potassium. A naturally occurring iron potassium silicate (also known as glauconite) with the consistency of sand, but 10 times the moisture absorption. Its mineralization, which improves soil life by increasing populations of certain bacteria that slowly dissolve insoluble mineral nutrients. It is a natural source of phosphorus, potash, and trace minerals. It contains about 19% iron and about 2% magnesium. Use it on all plants for effective green-up. It loosens clay soils and helps in the release of nutrients that are bound up in the soil structure. Use 40-80 pounds per 1000 square feet. (7 cups =4 pounds)
27. **Guano (bat)**

All-purpose organic fertilizer bat guano is collected locally and is composed of 10% nitrogen, 3% phosphorus, and 1% potassium. It is effective against root knot nematodes and is ideal for houseplants, vegetables, fruit trees, flowers, lawns, and ornamentals. Application: can be used as a manure tea (2-6 Tbs./gal. of water), foliar feed, and a composting and soil mix. Rates: 5 lbs/100 sq. ft of vegetable or flower plots; 3-5 lbs/10 ft tree; 1 Tbsp/qt. water for houseplants.

28. Gypsum

Gypsum is used where more calcium is needed without raising the pH. Natural deposits of lime which are an organic gardener might use are limestone, dolomite, shell and marl. All these forms must be finely ground to provide maximum benefit to the soil and plants. It loosens heavy soils; aids soil aeration and water percolation. Leaches out excessive amounts of sodium and magnesium. Can counteract winter salt damage. Good for roadside gardens A naturally occurring calcium sulfate, providing calcium to soils without affecting the pH (acidity) level. Provides calcium. Lightens heavily compacted soils. Recent studies show using gypsum on lawns may reduce problems with turf pests such as grubs and chinch bugs. Compacted soils. Preventative care for lawn pests. Gypsum, which occurs naturally in sedimentary rocks, is a dry organic fertilizer that supplies two important micronutrients: calcium and sulfur.

29. Humate

This petrified compost is a natural source of trace minerals, carbon and humic acid that acts as an organic chelator and microbial stimulator. Chelates are large organic compounds that encircle and hold trace elements that are normally not available to plants. Chelators help plants to effectively absorb micronutrients that are generally in plant "unavailable" for use.

30. Humic Acid Liquid

Liquid humic acid is a cost-effective way to add humus to your soil. Humic acid increases the efficiency of your fertilizers, transforms insoluble nutrients into useable ones, retards fungi buildup, and produces microbial activity. For indoor or potted plants, use 1 tsp./qt water; for veggies, flowers, shrubs and trees, apply with a hose-end sprayer, 1 qt/5,000 sq. ft; for lawns, 1 qt./5,000 sq. ft. twice yearly; for large acreage, 1 gal/20 gal water/ac

31. Humus

The end result of successful composting is humus. It is the rich, dark, and fine mixture of decomposed organic materials. Humus contains the microorganisms necessary for healthy soil, as well as a ready supply of the macro- and micronutrients necessary for healthy plants. Use humus in the garden to condition and amend soil. Mix it with the soil for general improvement or use it to side-dress hungry plants.

32. Hydrogen Peroxide

It is this hydrogen peroxide in rainwater that makes it so much more effective than tap water when given to plants. With the increased levels of atmospheric pollution, however, greater amounts of H₂O₂ react with air-borne toxins and never reach the ground. To compensate for this, many farmers have been increasing crop yields by spraying them with diluted hydrogen peroxide (5 to 16 ounces of 35% mixed with 20 gallons of water per acre). You can achieve the same beneficial effect with your house plants by adding 1 ounce of 3% hydrogen peroxide (or 16 drops of 35% solution) to every quart of water you give your plants. (It can also be made into an excellent safe insecticide. Simply spray your plants with 8 ounces of 3% peroxide mixed with 8 ounces of white sugar and one gallon of water.)

33. **Iron**
Essential for formation of chlorophyll. Sources of iron are the soil, iron sulfate, and iron chelate.
34. **Kelp Dry**
Kelp meal is used as a dry organic fertilizer. It is rich in micronutrients and plant growth hormones. It is also an excellent source of potassium, of which it is about 18%. Contains many trace elements necessary for plant growth. Use in potting soil and starter mixes to stimulate root growth and improve water retention characteristics of soil mixes. Use it when planting potatoes in spring. It is source of naturally chelated trace elements. Can increase health of both soil and plants. Excellent additive to organic fertilizer mixes. As soil amendment, apply at rate of 10 lbs per 1,000 sq. ft.
35. **Kelp Liquid**
You can also apply kelp as a liquid fertilizer at the base of plants to reach the root zone, add it to a drip irrigation system or as a dilute foliar spray. In recent tests at Virginia Polytechnic Institute, soil sprayed with a seaweed solution had 67 percent to 175 percent more roots than untreated soil. To make your own liquid kelp, add a couple handfuls of seaweed to a 5-gallon bucket of water. Stir the concoction daily for a few days, then strain and dilute it 1 part kelp liquid to 2 parts water.
36. **Lava Sand**
It is a high-energy soil amendment; it increases the water-holding capacity of the soil and plants, and increases the Para magnetism. Paramagnetic materials bring atmospheric energy into the plant and soil. The result is increased vigor and production of any crop Lava sand makes soil nutrients more available to plant root. It provides aeration and porosity to the soil. It helps retain the right amount of moisture in the soil, is durable and resists degradation. Use 40-80 pounds per 1000 square feet.
37. **Lime**
When calcium carbonate is finely ground it is called lime. Ground lime is readily dissolved into the soil where it reduces soil acidity by releasing calcium cat ions. Reducing the acidity of the soil is the primary purpose for using lime in the garden. However, liming materials also provide nutrients for plant use. Calcium and magnesium are the two elements most commonly provided by lime. Natural deposits of lime which are an organic gardener might use are limestone, dolomite, shell, and marl. All these forms must be finely ground to provide maximum benefit to the soil and plants. Apply lime well in advance of the planting date, preferably 2 to 3 months before the garden is planted. Mix well with the soil and keep moist for best reaction. Application closer to planting time is permissible, but its benefits are delayed.
38. **Magnesium Sulfate**
(Epson salt) Used where magnesium deficiencies occur in already alkaline conditions. Use as an ingredient for organic fertilizer mixes.

39. MANURE Dry

Nitrogen feeds the microorganisms in soil that make humus from a compost pile. Manure is rich in nitrogen (especially chicken, goat, and steer manures), and is thus a valuable component of compost. It is also rich in potassium and phosphorus. Manure should be composted (or at least aged) before use in the garden because of its high nitrogen --and ammonia-- content, which can both easily burn plants. Composting will also kill any weed seeds that may have survived the animal's stomach(s).

40. Manure Green

Green manures improve the structure and nutrient load of the soil. They may be under sown between rows of plants or sown as a cover crop. A vital component of crop rotation, green manures may fix nitrogen, concentrate trace minerals in the soil, help break up hard pans (when they are tap rooted), discourage some pests and diseases, and control erosion. Between rows, green manures (like clover or vetch) are often mowed --their clippings left as mulch. At season's end, they are turned in to the soil like other green manures (such as rye and soybeans). See also humus and legume. Legumes are plants that can fix nitrogen from the air to make nitrates. Nitrate is nitrogen in a form available to plants. Legumes, through pinkish colored nodules on their roots, form a mutually beneficial relationship with soil borne bacteria. It is the bacteria who are able to perform the chemistry necessary for nitrogen fixation; the plant pulls the nitrogen from the air through stomata in its leaves and transfers it to the bacteria via its phloem. In return, the legume and the plants nearby are supplied with the nitrates. However, if legumes are fed nitrogen (in the form of fertilizer or manure), they will cease to produce their own. Legumes are heavy feeders of phosphorus, potassium, magnesium, and calcium; so they (or the crops that follow) may need feeding if the soil is deficient in these nutrients. Legumes are used as green manures. Common examples are clover, vetch, soybeans, peas, and alfalfa.

41. Milorganite

6-2-0 fertilizer contains 4% iron. Grass leaves take up this iron, giving them a deep green color. However, unlike high amounts of nitrogen fertilizer, iron does not make plants grow fast. The result is a lawn with the color you desire without excessive growth (and mowing!). For the best part, this deep green color stays with the lawn through hot, dry summer months. Plus, because this iron is organically complexed, it does not stain concrete, like your drives, patios, sidewalks or other areas.

42. Molasses Dry or Liquid

Sugar can be used dry or in liquid form to stimulate microbial activity in the soil. Sugar provides carbohydrates to feed the microbes in the soil. Sugar will stimulate beneficial organisms. Twice a year, apply molasses. This may sound strange, but molasses is a source of nitrogen, carbon, enzymes, B-vitamins and trace elements including iron, sulfur, magnesium and potassium. Molasses will immediately energize your turf, which is extremely important during the summer months when plants are stressed from the heat. Liquid molasses mix at a rate of 2 oz. per gallon of water. Dry molasses use at 2-10 pounds per 1000 square feet (1 pound of dry molasses = 2 2/3 cups covers 100 square feet). Also when mixed with 'BT' or other botanical sprays, it will act as an encapsulation agent to increase the life of the insect control product. Gardeners, who have used dry molasses, have found it is effective in driving off fire ants.

43. **Orange Oil**
A cold press orange peel extract that is one of the best oils for use in the preparation of organic elixirs relating to plants and insects. It works on ants, fire ants, roaches, fleas, silverfish, plant pests, and other insect pests. The active ingredient d-Limonene (orange peel extract) destroys the wax coating of the insect's respiratory system. When applied directly, the insect suffocates. It acts as a repellent. It is a versatile cleaner and can be used for many cleaning purposes.
44. **Peat Moss**
The partially decomposed remains of mosses harvested commercially from the wild. Though difficult to wet initially, peat moss can absorb up to 25 times its own weight in water and is therefore valued as an organic soil amendment. Peat moss is acidic --with a pH of about 3 or 4.0-- and should only be used around acid-loving plants or to help lower the pH of alkaline soils. Sphagnum moss is generally recommended over standard peat moss. Note, however, that some sphagnum moss carries a disease causing fungus that you should protect yourself against: wash thoroughly after handling and, especially if you have wounds, consider wearing gloves.
45. **Perlite**
Volcanic ash that has been exposed to very high heat expands to form perlite. It is very light weight and is often used in potting mixes to encourage good drainage, as well as to keep the soil from compacting. Because it is also porous, it helps to maintain soil moisture. Its size ranges, but it is about as large as gravel.
46. **Potash**
Broadly, potash describes any material containing potassium. More specifically, though, potash is potassium carbonate derived from wood ashes. The term potash comes from the process of extracting lye from wood ashes in iron pots. Potassium is widely distributed in nature, occurring in rocks, soils, tissues of plants and animals, and water of seas and lakes. In gardening practice, materials such as wood ashes, tobacco stems, wool suint, seaweed, potash salts, greensand, and ground rock potash are used alone, in combinations with other materials yielding other nutrients, mixed with manure, or in compost piles. Since the potash bearing materials vary so much in composition and rate of decomposition, specific application rates must be determined for each material and its combinations. In general, ground rock potash at 5 pounds per 100 square feet may be broadcast over the soil surface three weeks prior to planting and spaded in. Langbeinite (Sul-Po-Mag) is used at 1 lb/100 sq ft.
47. **Pyrethrum Insect Spray**
It is a water-based, biodegradable, natural botanical pyrethrum. Use indoors or out on aphids, whiteflies, mealy bugs, spider mites, etc. Approved for use on vegetables, houseplants, flowers and more. Non-aerosol. Pyrethrum is derived from the blossoms of the pyrethrum flower, *Chrysanthemum cinerariaefolium*. Use up to the day of harvest. Pyrethrum is a potent, fast-acting, broad spectrum natural insect killer that attacks the nervous system of insects on contact. It is safer and non-toxic to humans as it is quickly broken down by them. Fruit and vegetables can be harvested 24 hours after spraying with pyrethrum. As it does not enter the food chain, it is safer for the environment. Pyrethrins are a form of organic [insecticide](#) derived from certain species of chrysanthemums. In relatively high doses, the pyrethrins will quickly paralyze and kill many garden insect pests; if applied at low doses, however, insects are often able to recover. (Insects treated with the synthetic pyrethrins, called pyrethroids, are known to have rapidly evolved resistance to repeated applications.) Using naturally derived pyrethrins is

considered safe for humans as it will break down within 48 hours, but it should not be used in areas where it may runoff into bodies of water (as it is toxic to aquatic animals). Pets should be kept out of the area.

48. Rock Phosphate

This is a mineral source of phosphorus and breaks down very slowly in the soil. It contains phosphorus as well as calcium and 18 other essential trace minerals. I always add this deep into the soil when preparing a garden bed. It does not move rapidly in the soil so it is useful to dig it in deeply when you have the chance. The phosphorus is released very slowly, over many years. It really helps plants to have bigger, more abundant flowers and stronger stems. Consult the phosphorus level listed in your soil test (L, M, H) and add the needed amount of rock phosphate according to the amounts listed on the bag. Builds phosphate fertility where levels are low. Increases rooting activity in transplants and sprouting seeds. Also mineralizes the soil and improves quality of crops and soil structure. Its slow release allows plants to use it before it is fixed. Apply 1-2 lbs per plant for tree or shrub transplants. To correct soil deficiencies, apply from 500-4,000 lbs per acre depending on severity of deficiency.

49. Rock Phosphate Soft

A soft, natural colloidal clay formation. As an alternative source for phosphate and colloidal clay, you can combine our rock phosphate and bentonite clay. Like phosphate rock, colloidal rock phosphate gives up its nutrient slowly enough to last for years without leaching or fixing. Unlike other phosphates, it contains colloidal clay that can bind sandy soils and add to their nutrient holding capacity. Use to bind sandy soils and improve nutrient holding capacity. Applications range from 10-40 lbs per 1,000 square feet or 500-2,000 lbs per acre depending on soil conditions. Rock phosphates are natural deposits of phosphate in combination with calcium. The material as dug from the earth is very hard and yields its phosphorus very slowly. When finely ground and with impurities removed, the powdery material is only slightly soluble in water, but may be beneficial to plants in subsequent seasons following application. The reaction of phosphate rock with acids from decaying organic matter in the garden or compost tend to make the phosphorus available to garden plants. Colloidal phosphate is also available and widely used. Apply both phosphates at the rate of 2-5 pounds per 100 square feet of garden soil. Or, when applying manure or compost, mix at the rate of 2 1/2 pounds phosphate per 25 pounds manure or compost. Broadcast the material over the soil surface and work into the topsoil at least three weeks before planting. Manure or other organic fertilizer should be added at this time. Since the materials are so slowly decomposed, side dressings are seldom beneficial.

50. Sand

Because of the relative large size of sand particles (.05-2.0 mm), sandy soils have trouble holding water and nutrients. They are commonly deficient in calcium and magnesium. Adding humus to sandy soils can help. When mixed with a heavier soil (one that is largely comprised of clay), sand can help provide aeration. Sand is also commonly mixed with seed for broadcasting

51. Seaweed extract

Plant growth stimulants containing cytokinins and betaines, used as foliar feeds and through fertigation on an extensive range of crops world wide, including potatoes, cotton, bananas and citrus. Seaweed extracts are recognized today as valuable inputs for virtually any crop giving benefits in all sorts of areas, irrespective of whether they are grown to organic standards or not.

52. **Shale Expanded**
A form of expanded shale is now available to gardeners that will be useful in loosening tight clay soils and making them more workable. Recommendations for using expanded shale with containerized plants call for putting one-third of the material in the bottom, then mixing the expanded shale with potting soil 50-50 for the rest of the pot. For flower beds with sticky or gumbo-type soil, put down 3 inches of expanded shale on top of the area, and tilling it in six to eight inches deep. Also add 3 inches of finished, plant-based compost as well, which results in a 6-inch raised bed. Crown the bed to further improve water drainage. Expanded shale will open up and aerate heavy, sticky clay soils faster than any material that I have ever used.
53. **Soap Insectial**
You can treat many problems with a product like insecticidal soap. Many soft-bodied pests can fall victim to a product such as this. Be forewarned, though, soap, if used extensively, can cause phytotoxicity and growth retardation problems with your plants. The trick to success with insecticidal soap is to apply it twice. First, spray it on the aphids (it has to have contact with the bug to work) late in the day -- usually right before sunset. Spraying late in the day prevents leaf damage caused by the sun hitting the spray or heat reacting with the spray. Then, two days later go out and spray any aphids that escaped your first spray. You'll be amazed at how quickly they reproduce! If you miss one, you'll quickly have hundreds in a matter of days. I think they're born pregnant.
54. **Soybean**
Soybean is a legume and is valued in part because it fixes nitrogen from the air. Soybean meal is a dry organic fertilizer used to enhance nitrogen in soil; its NPK ratio is about 7-1-2.
55. **Sulfur**
Secondary elements Agricultural sulfur is used to acidify alkaline soil. The amount to add depends on the current and desired pH, which is one good reason to have garden soil checked periodically. Sulfur is an essential nutrient and generally does not accumulate to excessive levels because of its high leaching potential a single application usually supplies enough nutrients to last several years
56. **Vermiculite**
When mica is exposed to very high heat it "pops" --or expands-- to form vermiculite. Horticultural grade vermiculite is granular and is valued in potting mixes because it is relatively inert, but is porous and can hold water and nutrients well. Vermiculite is generally preferred to the similar substance, perlite.
57. **Vinegar**
Its potential use as an herbicide is exciting. Vinegar can be produced naturally by decomposing plant products under anaerobic conditions. Acetic acid readily degrades in water (so I wouldn't spray right before an expected rainstorm) and doesn't bioaccumulate. Vinegar will decrease the pH of the soil somewhat, but within 48 hours the pH balance is back to its original state. It is also a biodegradable product. The research conducted so far using vinegar shows that vinegar can kill several weed species at different growth stages. Using 10, 15 or 20% acetic acid concentrations, field researchers had an 80-100% kill rate of selected weeds. Re-growth from the roots, however, continued. Spraying very small plants, 2-6 leaves. Continue spraying at two-week intervals. He's found that the maximum stage for the best kill-rate is the 4-leaf stage. spot spraying with 20% concentration killed 80-100% of weeds without harming the corn.

58. **Volconite**
Use 40-80 pounds per 1000 square feet; it is a high-energy soil amendment; it increases the water-holding capacity of the soil and plants, and increases the Para magnetism. Paramagnetic materials bring atmospheric energy into the plant and soil. The result is increased vigor and production of any crop Lava sand makes soil nutrients more available to plant root. It provides aeration and porosity to the soil. It helps retain the right amount of moisture in the soil, is durable and resists degradation.
59. **Wood Ashes**
Wood ash contains about 2% phosphate and 6% potash, but may be contaminated with heavy metals or plastic and typically has a high salt content. Wood ash is rather alkaline, and excessive use can be quite damaging to many soils. Some organic programs restrict its use.
60. **Worm castings**
This manure is an excellent source of bacteria, iron, magnesium, sulfur and over 60 trace elements, because the worms egg casings are so small they can not be removed from the castings at time of packaging, so -when the soil and moisture temperatures are just right, these eggs will hatch and create thousands of aerating machines that in turn will eat other non-living substances in turn creating more digested matter for the soil. As they advance they must eat everything in front of them creating tunnels that will help improve drainage during periods of rainfall and retain moisture in periods of drought. As these tunnels collapse organic matter gets mixed in with clay soil
As an earthworm tunnels through the soil, it digests organic material and excretes it in the form of castings. Castings are a rich soil amendment containing nutrients in a form usable to plants (they can be harvested and sold in bags). Over the course of a single day, an earthworm will produce castings equal to its own weight. See also vermiculture.
61. **Zeolite**
Zeolites are mined alumino-silicate materials, containing only insignificant levels of plant nutrients. Their use in crop production stems primarily from high nutrient-exchange capacities, which allow them to absorb and release plant nutrients and moisture without any change in the nature of the zeolite. This action results from the mineral's porous-but-stable chemical structure. Zeolites enhance the performance of fertilizers by making them resistant to leaching, immobilization, and gaseous losses.
62. **Zinc**
Micronutrients or trace elements are needed only in small amounts. Manure applications will supply the zinc needs Zinc deficiency occasionally occurs on sandy soils containing excessive lime, and soils low in organic matter If a soil test indicates a zinc deficiency (less than 10 ppm) apply a zinc-containing fertilizer according to label directions (typically 2 to 4 ounces per 1,000 sq. ft.).