

# CONVENTIONAL AND ORGANIC PRODUCT OVERVIEW FOR HOME VEGETABLE GARDENERS IN TENNESSEE

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A range of tools are available to home gardeners to address various pests (weeds, insects, mites, pathogens). Materials to prevent and address pest issues, as well as manage fertility in the home garden, can be found across the spectrum from traditional conventional insecticides and fungicides, to biorational (materials that are effective against specific target pests but are less damaging to natural enemies), to certified organic. This publication provides a quick reference guide to assist gardeners in finding and using products to address pest issues in their home gardens. When broad pest groups, such as aphids or beetles, are listed, products may not be effective against all species. So, this publication should be used in conjunction with other detailed Extension materials (PB 1690 UT Extension Insect and Plant Disease Control Manual, also known as the Redbook). **The product label is the law for these materials and should always be followed.** The control of insect and mite pests, as well as diseases and weeds in the home garden, is built upon proper site selection, disease resistance of crops, cultural management (sanitation, rotation) and frequent scouting for pests and disease. Please reference the listed resources at the end of this publication for additional information on these cultural practices that provide the foundation for pest control in the home garden.

## COMMON CONTROL MATERIALS AND INSECT/MITE PESTS ADDRESSED

Material/ Active Ingredients	Common Trade Names/ Products*	Pests Addressed**	Comments on Use
Azadirachtin	Azamax <sup>OMRI</sup> , Azaguard <sup>OMRI</sup> , Molt-X <sup>OMRI</sup>	Aphids, armyworms, beetles, loopers, leafhoppers, true bugs, weevils, others.	Organic.* An active ingredient derived from Neem tree seed oil. Works as anti-feedant and insect growth regulator. Use against immature insects when first noticed before pest levels become high. Pests addressed are listed specifically by crop type on label. Can generally be applied up to day of harvest. Most are listed for indoor, greenhouse, and outdoor use.
<i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i>	DiPel <sup>OMRI</sup> , Thuricide <sup>OMRI</sup> , Monterey B.t. Biological insecticide <sup>OMRI</sup>	Cabbage looper, diamondback moth, tomato hornworm, tomato fruitworm, others.	Organic. Apply at first signs of infestation and repeat weekly (must be reapplied after heavy rains). Insects stop feeding upon ingestion of Bt and die within a few days. Can generally be applied up to day of harvest.
Bifenthrin and Zeta-cypermethrin	Ortho Bug-B-Gon Insect Killer <sup>†</sup>	Aphids, beetles, borers, caterpillars, grasshoppers, leafhoppers, leafminers, mites, plant bugs, psyllids, spittlebugs, thrips, whiteflies, squash bugs, others.	Specific vegetable crops are listed on the label along with required days after spraying that are required before harvest (ranging from 1 to 7 days).
Carbaryl	Garden Tech Sevin Dust	Armyworms, leafhoppers, bean leaf beetle, corn earworm, cucumber beetle, European corn borer, flea beetles, imported cabbageworm, Japanese beetle, Mexican bean beetle, spittlebugs, squash bugs, stink bugs, tomato hornworm/pinworm, others.	Limited to outdoor residential use. The label clearly provides a chart of pre-harvest intervals as well as maximum numbers of applications per season of this product for each crop.
Cyfluthrin	Bayer Advanced Vegetable and Garden Insect Spray	Aphids, armyworms, cabbageworms, corn earworms, cucumber beetle, cutworms, flea beetles, grasshoppers, Japanese beetles, June beetle, leafhoppers, plant bugs, stink bugs, thrips, tomato hornworms, whiteflies, others.	Pests addressed are listed specifically by crop type on label. Many crops have a pre-harvest interval, and there are limits to the number of sprays per season.
Esfenvalerate	Monterey Bug Buster II	Aphid, armyworm, cabbage looper, cabbageworm, chinch bug, Colorado potato beetle, corn earworm and rootworm, cucumber beetle, European corn borer, flea beetle, grasshopper, leafhoppers, Mexican bean beetle, pickleworm, squash bug, tobacco hornworm, tomato fruitworm, leafminer, whiteflies, others.	The label clearly provides a chart of pre-harvest intervals. Many ornamental pests are also labeled for treatment with this product.
Horticultural oils	Monterey Horticultural Oil <sup>OMRI</sup> , Southern Ag Parafine Horticultural Oil, Suff-Oil-X <sup>OMRI</sup>	Aphids, beetle larvae, leafhoppers, leafminers, mites, thrips, whiteflies, others.	Organic. Not all garden crops are listed on the label, so be sure to check. Oil sprays can cause crop damage under hot or bright conditions, so use care in applying.
Insecticidal soap (potassium salts of fatty acids)	Safer Brand Insect Killing Soap <sup>OMRI</sup> , M-Pede <sup>OMRI</sup>	Aphids, grasshoppers, plant bugs, spider mites, whiteflies, others.	Organic. Apply at first sign of infestation. Can generally be applied up to day of harvest. Most are listed for indoor (as well as greenhouse) and outdoor use.

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Malathion	Bonide Malathion, Spectracide Malathion	Aphids, Japanese beetles, leaf bugs, leafhoppers, mealybugs, spider mites, tarnished plant bugs, thrips, whiteflies.	The label clearly provides a list of crops with pre-harvest intervals and maximum number of applications of this product per year. Many fruit and ornamental pests are also labeled for treatment with this product. For outdoor use around homes only.
Clarified Neem oil	Garden Safe Neem Oil Extract <sup>OMRI</sup> , Monterey Neem Oil <sup>OMRI</sup> , Safer Brand Neem Oil <sup>OMRI</sup>	Aphids, armyworms, beetles, scale, spider mites, whiteflies, others.	Organic. These oil products have azadirachtin removed during refining. This product is similar to other horticultural oils and can burn plants if applied incorrectly or under inappropriate environmental conditions. Specific crops and controlled insects are listed on the label (including ornamentals). Can be used up to the day of harvest. Neem oil has some fungicidal properties as well.
Permethrin	Bonide Eight Insect Control Vegetable Fruit, and Flower concentrate	Aphids, armyworms, corn earworms, cucumber beetle, cutworms, flea beetle, imported cabbage worms, leafhoppers, leafminer, loopers, pickleworm, plant bugs, potato psyllid, squash bugs, others.	Labeled for use on indoor and greenhouse plants as well. Specific crops and controlled insects are listed on the label (including ornamentals).
Pyrethrins	Bonide Pyrethrin Garden Insect Spray, PyGanic Gardening <sup>OMRI</sup> , Monterey Bug-Buster-O <sup>OMRI</sup>	Aphid, armyworm, cabbage looper, cabbageworm, Colorado potato beetle, corn earworm, cucumber beetle, flea beetle, grasshopper, cabbageworm, leafhoppers, mealybugs, Mexican bean beetle, eriophyid mites, fruit flies, hornworms, psyllids, tomato fruitworms, whiteflies, stink bugs, others.	Organic. These products are made from botanical extracts. They are a quick knockdown product, though, so sprays should always be made to avoid flying bees and other pollinators. Specific crops and controlled insects are listed on the label. Can generally be used up to the day of harvest. Often listed as not for indoor use.
Pyrethrins and insecticidal soap	Safer Brand Tomato and Vegetable Insect Killer II <sup>OMRI</sup>	Aphids, asparagus beetles, bean beetles, Colorado potato beetles, cucumber beetles, flea beetles, caterpillars (including cabbage loopers, imported cabbageworm, armyworms, hornworms, diamond back moth larvae), leafhoppers, plant bugs, psyllids and whiteflies.	Organic. See comments under pyrethrins and insecticidal soap.
Spinosad	Monterey Garden Insect Spray <sup>OMRI</sup> , Conserve SC <sup>OMRI</sup>	Armyworms, caterpillars, Colorado potato beetle, diamondback moth, European corn borer, flea beetle, imported cabbageworm, leafminers, loopers, others.	Organic. For outdoor residential use. Also listed for some lawn and ornamental uses.

\* Products commonly used in organic production are in green rows, but defining “organic” can be complex. Materials approved for use in commercial organic production are listed by the Organic Materials Review Institute (OMRI), and this listing is often used by gardeners as well. All products listed (as of summer 2018) by OMRI will be designated here with OMRI. However, this publication was designed to include products readily available to home gardeners, and some products listed here may contain the same active ingredients but not be OMRI listed due to the fact they are marketed to home gardeners rather than commercial growers.

\*\* These lists do not represent a complete detailing of all pests addressed by a specific product, but are intended to provide the most common garden pests encountered to enable gardeners to select a range of possible products to investigate more thoroughly. See PB 1690 UT Extension Insect and Plant Disease Control Manual (the Redbook) linked at the end of this publication for more detailed information.

† Another product containing zeta-cypermethrin is known to cause damage on tomato and pepper.

## COMMON DISEASE PREVENTION AND CONTROL MATERIALS

Material	Common Trade Names/Products	Diseases Addressed (Includes effectiveness rating scale: E, excellent; G, good; F, fair; P, poor; NC, no control; ND, no data. †)	Comments on Use
<i>Bacillus subtilis</i>	Serenade Garden Disease Control <sup>OMRI</sup> , Cease <sup>OMRI</sup>	Anthraco-nose <sup>NC</sup> , bacterial leaf blight <sup>F</sup> , bacterial speck and spot <sup>F</sup> , rust <sup>ND</sup> , Botrytis <sup>ND</sup> , downy mildew <sup>NC</sup> , early blight <sup>P</sup> , late blight <sup>ND</sup> , powdery mildew <sup>F</sup> , scab <sup>F</sup> , target spot <sup>ND</sup> , others.	Organic*. These products contain live bacteria and should be stored at room temperature. Specific diseases controlled or suppressed are included on the label (including those on ornamentals and fruits). Can generally be used up to the day of harvest.
Chlorothalonil	Daconil, Bonide Fung-onil, Ortho Garden Disease Control	Rust <sup>P</sup> , Botrytis <sup>F</sup> , Alternaria leaf spot <sup>F</sup> , downy mildew <sup>F</sup> , Cercospora <sup>G</sup> , Anthracnose <sup>G</sup> , powdery mildew <sup>P</sup> , target spot <sup>F</sup> , early blight <sup>F</sup> , late blight <sup>G</sup> , Septoria <sup>F</sup> , others.	Best used as a protectant. Specific crops and listed diseases are included on the label (including ornamentals and fruits). Mixing rates, as well as pre-harvest intervals and maximum number of sprays per year are listed on the label for different crops.
Copper (Copper sulfate, fixed copper)	Bonide Liquid Copper Fungicide, Miracle Gro Nature's Care Garden Disease Control <sup>OMRI</sup> , Monterey Liquid Copper <sup>OMRI</sup> , Ortho Elementals Garden Disease Control <sup>OMRI</sup> , Camelot O <sup>OMRI</sup>	Anthraco-nose <sup>P</sup> , Cercospora <sup>P</sup> , Alternaria <sup>P</sup> , bacterial leaf spot <sup>F</sup> , Septoria <sup>F</sup> , bacterial blights <sup>F</sup> , downy mildew <sup>P</sup> , powdery mildew <sup>P</sup> , white mold <sup>ND</sup> , rust <sup>ND</sup> , angular leaf spot <sup>F</sup> , gray mold <sup>NC</sup> , early blight <sup>F</sup> , late blight <sup>F</sup> , others.	Organic. Specific crops and listed diseases are included on the label (including ornamentals and fruits). Mixing rates, as well as pre-harvest intervals and maximum number of sprays per year are listed on the label for different crops.
Mancozeb	Dithane, Manzate, Bonide Mancozeb Flowable with Zinc	Rust <sup>G</sup> , corn leaf blight <sup>ND</sup> , Anthracnose <sup>G</sup> , Cercospora leaf spot <sup>G</sup> , downy mildew <sup>F</sup> , gummy stem blight <sup>F</sup> , scab <sup>F</sup> , Alternaria leaf spot <sup>F</sup> , Botrytis <sup>P</sup> , early blight <sup>F</sup> , late blight <sup>F</sup> , gray leaf spot <sup>P</sup> , Septoria <sup>F</sup>	Best used as a protectant. Specific crops and listed diseases are included on the label (including ornamentals and fruits). Mixing rates, as well as pre-harvest intervals and maximum number of sprays per year are listed on the label for different crops.
Myclobutanil	Spectracide Immunox, Monterey Fungi-Max	Powdery mildew <sup>F</sup> , rust <sup>ND</sup>	Some systemic (curative) activity but should primarily be used as a protectant. Specific crops and listed diseases are included on the label (including ornamentals and fruits). Mixing rates, as well as pre-harvest intervals and maximum number of sprays per year are listed on the label for different crops.
Neem oil	Garden Safe Fungicide 3 <sup>OMRI</sup> , Monterey Neem Oil <sup>OMRI</sup>	Powdery mildew <sup>F</sup> , downy mildew <sup>F</sup> , anthracnose <sup>ND</sup> , rust <sup>P</sup> , scab <sup>F</sup> , Botrytis <sup>ND</sup> , Alternaria <sup>F</sup>	Organic. These products are made from botanical extracts. They have insecticidal activity too, so sprays should always be made to avoid flying bees and other pollinators. Specific crops and controlled insects are listed on the label. Can generally be used up to the day of harvest. Often listed as not for indoor use.
Phosphorous acid	Monterey Agri-Fos, Organocide Plant Doctor	Downy mildew <sup>F</sup> , Phytophthora root rot <sup>P</sup> , gummy stem blight <sup>ND</sup> , Pythium <sup>P</sup> , late blight <sup>F</sup> , others.	This product is generally applied as a foliar spray in vegetables where it can be taken up through plant tissues to provide a somewhat systemic effect. Specific pathogens are provided on the label as well as rates and application practices.

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Potassium bicarbonate	GreenCure <sup>OMRI</sup> , Monterey Bi-Carb Old Fashioned Fungicide <sup>OMRI</sup> , Milstop, Agricure <sup>OMRI</sup>	Alternaria leaf spot <sup>ND</sup> , Anthracnose <sup>ND</sup> , Botrytis <sup>F</sup> , Cercospora leaf spot <sup>P</sup> , downy mildew <sup>F</sup> , powdery mildew <sup>F</sup> , scab <sup>F</sup> , Septoria leaf spot <sup>ND</sup> , others.	Organic. Specific diseases controlled or suppressed are included on the label (including those on ornamentals and fruits). Can generally be used up to the day of harvest.
<i>Streptomyces lydicus</i>	Actinovate Lawn and Garden <sup>OMRI</sup>	Root rot and damping-off (Pythium, Phytophthora, Rhizoctonia, Fusarium) <sup>F</sup> , powdery mildew <sup>F</sup> , downy mildew <sup>F</sup> , lettuce drop (sclerotinia) <sup>G</sup> , bacterial leaf spot <sup>F</sup> , bacterial speck <sup>G</sup> , rust <sup>ND</sup> , Phytophthora blight <sup>F</sup> , early blight <sup>G</sup> , Alternaria leaf spot <sup>F</sup> , Septoria leaf spot <sup>F</sup> , Cercospora leaf spot <sup>G</sup>	Organic. This product contains live bacteria and should be stored at room temperature. Specific diseases controlled or suppressed are included on the label (including those on ornamentals and fruits). Can generally be used up to the day of harvest.
Sulfur	Bonide Sulfur Plant Fungicide, Yellow Jacket Special Dusting Sulfur <sup>OMRI</sup> , Espoma Earth-tone 3n1 Disease Control	Powdery mildew <sup>G</sup> , rust <sup>F</sup> , scab <sup>G</sup>	Organic. Specific crops and diseases controlled are included on the label (including those on fruits). Can generally be used up to the day of harvest. <b>CAUTION:</b> Some sulfur products are mixed with an insecticide (Earth-tone 3n1 also contains organic pyrethrin), so sprays should be made to avoid flying bees and other pollinators. Sulfur alone is nontoxic to bees. Check active ingredients on label.

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\*\* These lists do not represent a complete detailing of all diseases addressed by a specific product, but are intended to provide the most common garden diseases encountered to enable gardeners to select a range of possible products to investigate more thoroughly. See UT Extension publication W 316 linked at the end of this publication for more detailed information.

‡ Efficacy ratings are taken from studies published in Plant Disease Management Reports and are based on material (active ingredient). Not all products (common trade names) under each material were tested.

## COMMON WEED PREVENTION AND CONTROL MATERIALS

Material-Type	Common Trade Names/ Products*	Weeds Addressed** (See label for specific crops on which this material may be used)	Rates Used (Always follow label directions explicitly)	Comments on Use
<b>Materials applied before weeds emerge (Preemergence)</b>				
Corn gluten meal	Preen Natural Vegetable Garden Weed Preventer	Some annual grasses, black nightshade, buckthorn plantain, bedstraw, curly dock, dandelion, lambsquarters, purslane, redroot pigweed, clover	5 to 10 lbs per 250 sq. ft.	Preemergence weed control applied when plants are small. Reapplication is recommended every few weeks. Also keep in mind that corn gluten meal can also be an ingredient in slow release nitrogen fertilizer. Formulations often have fertilizer analysis around 10-0-2.

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Pendimethalin	Prowl H2O	Many annual grasses, carpetweed, chickweed, goosefoot, henbit, knotweed, lambsquarters, pigweed species, purslane, others.	0.5 to 1.5 ounces per 1,000 sq. ft. depending on crop and soil type	Pre-plant incorporated or preemergence applied prior to planting or seeding. Application rate depends on soil texture.
Trifluralin	Preen Garden Weed Preventer	Many annual grasses, carpetweed, chickweed, goosefoot, henbit, knotweed, lambsquarters, pigweed species, purslane, others.	1 lb per 400 sq. ft. for heavy clay soils-1 lb per 960 sq. ft. for medium/loam soils-1lb per 1,280 sq. ft. for light sandy soils	Usually applied for preemergence control when garden plants are 2 to 3 inches tall and before weeds have emerged. Requires immediate incorporation with irrigation or rainfall. Application methods may differ by crop. Not labeled for preemergence use in cucurbit crops.
<b>Materials applied after weeds emerge (Postemergence)</b>				
Glyphosate	Roundup Weed and Grass Killer III	Non-selective, so many weeds impacted.	1-10 percent solutions depending on crop	There are now many herbicide formulations using the brand name Roundup and they may contain more than glyphosate. In fact, some Roundup products no longer contain glyphosate. So, be certain to read the label and make sure the product is appropriate for use around gardens. Even if labeled for use in growing gardens, overspray and drift can cause serious damage, so it may be best used as only a pre-plant burndown rather than in-season.
Acetic acid products	SummerSet AllDown Concentrate <sup>OMRI</sup> , Green Gobbler 20% Weed Killer	Non-selective, so many weeds impacted.	Follow label instructions	Organic. These products contain acetic acid (vinegar) and some also contain citric acid. They are contact, non-selective herbicides that control actively growing weeds, both annual and perennial and broadleaf and grassy. Higher rates and reapplication may be required for larger plants or perennials. Can be used to burn-down material or for spot treatment, but use caution to avoid any contact with crop plants.
Natural oil products	Weed Zap, Phydura Herbicide Concentrate <sup>OMRI</sup>	Non-selective, so many weeds impacted.	Follow label instructions	Organic. These products contain natural oils, often including cinnamon and clove oil. They are contact, non-selective herbicides that control actively growing weeds, both annual and perennial and broadleaf and grassy. Herbicide material does not move within the plant, so only plant parts coated with spray will be affected. Can be used to burn-down material or for spot treatment, but use caution to avoid any contact with crop plants.
Herbicidal soap	Safer Brand Weed & Grass Killer <sup>OMRI</sup>	Non-selective, so many weeds impacted.	16 percent solution. Ready to use materials also available	Organic. This is a material that is a contact killer that is non-selective. It typically performs best on young, succulent weeds (less than 5 inches) that are actively growing rather than larger woody weeds. Perennial weeds may be killed back and show regrowth, so reapplication will often be needed. Can be used to burn-down material or for spot treatment, but use caution to avoid any contact with crop plants.

Halosulfuron	Sandea	Cocklebur, ragweeds, galinsoga, kyllinga species, smartweed, redroot pigweed, velvetleaf, wild mustard, yellow and purple nutsedge, others.	0.5 to 1.33 ounces per acre depending on crop	Provides selective postemergence systemic control, but may not be consistent when used as a preemergence.
Limonene	Avenger AG Optima Burndown Herbicide <sup>OMRI</sup> , Avenger Weed Killer <sup>OMRI</sup>	Spurge, redroot pigweed, annual bluegrass, shepherd's purse, purselane, chickweed, clover, crabgrass, dandelion, Bermuda grass, bindweed, lambsquarters, others.	14 percent to 20 percent solutions depending on weed and site. Ready to use materials also available	Organic. These materials include d-limonene, which is a citrus oil that kills plants by destroying their waxy cuticle. They are a non-selective, postemergence herbicide that can be used to burn-down material or for spot treatment, but use caution to avoid any contact with crop plants.
Pelargonic acid	Scythe	Non-selective, so many weeds impacted.	3-5 percent solution for annual weeds 5-7 percent solution for perennial weeds 8-10 percent solution for maximum burndown control of mature weeds	Used as a burndown before planting with some crops also labeled for directed or shielded sprays. Label contains specific instructions for crop groups. Best results on young, succulent growth. No residual weed control.
Clethodim	SelectMax	Several grasses including bermudagrass, signalgrass, crabgrass species, foxtail species, Johnsongrass, others.	0.2 to 0.4 ounces per 1,000 sq. ft. for annual grass weeds 0.3 to 0.4 ounces per 1,000 sq. ft. for perennial grass weeds	Selective postemergence grass control with little to no soil residual activity. Does not control broadleaf (non-grass) weeds.
Sethoxydim	Poast	Annual and perennial grasses including crabgrass, goosegrass, foxtail, rye, bermudagrass, quackgrass, Johnsongrass, and others. Does not control sedges or broadleaf weeds.	0.5 to 0.9 ounces per 1,000 sq. ft. depending on crop	Selective postemergence grass control with little to no soil residual activity.

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*\*\* These lists do not represent a complete detailing of all weeds addressed by a specific product, but are intended to provide the most common garden weeds encountered to enable gardeners to select a range of possible products to investigate more thoroughly. See UT Extension publication W 245 for more detailed information.*

## FERTILITY MANAGEMENT MATERIALS\*\*\*

Material	Common Products and Nutrients Provided by Analysis	Comments on Use <sup>^</sup>
Alfalfa meal	Dr. Earth (2-1-2), Down to Earth (2.5-0.5-2.5)	This nutrient source will require time for microbial breakdown in soil- estimated time of release is 1 to 4 months.
Bloodmeal	Jobe's (12-0-0), Dr. Earth (13-0-0), Espoma (12-0-0), Burpee Natural and Organic Bloodmeal (12-0-0)	This nutrient source will require time for microbial breakdown in soil- estimated time of release is 1 to 4 months.
Bonemeal	Jobe's (2-14-0), Espoma (4-12-0), Hi-Yield (0-10-0), Down to Earth (3-16-0)	This nutrient source will require time for microbial breakdown in soil- estimated time of release is 1 to 4 months.
Compost	Varies by type and source	Due to food safety concerns, any composts containing animal manures should be properly composted before use in food crop gardens.
Cottonseed meal	Down to Earth (6-2-1)	Somewhat acidic, so sometimes used on more acid-loving plants estimated time of release is 1 to 4 months.
Greensand	Espoma (0-0-0.1), North Country Organics (0-1-6)	Often used as a soil conditioner as well as supply potassium. Can also provide trace minerals (micronutrients). Slow nutrient release.
Guano-bat or bird	Down to Earth Seabird Guano (0-11-0), Happy Frog (0-5-0)	This nutrient source will require time for microbial breakdown in soil- estimated time of release is 4 months or more.
Kelp/seaweed products	Neptune's Harvest Kelp Meal (1-0-2), Acadian Organic Liquid Seaweed Concentrate (0.2-0-5), Maxicrop Kelp Meal (1-0-2)	There are many fish and seaweed liquid blends. Powdered products may be faster breakdown/nutrient release (less than 1 month).
Manure	Varies by type and source	Due to food safety concerns, animal manures should be properly composted before use in food crop gardens, but it can be difficult to achieve proper conditions in small-scale composting. To avoid this risk, it may be best to avoid manure use in fresh vegetable gardens.
Feather meal	Down to Earth (12-0-0)	This nutrient source will require time for microbial breakdown in soil- estimated time of release is 4 months or more.
Fish meal	Down to Earth (8-6-0), Plant Natural (9-4.5-0)	This nutrient source will require time for microbial breakdown in soil- estimated time of release is 1 to 4 months. Powdered forms can be faster/nutrient release can be less than one month.
Fish emulsion/fertilizer	Alaska Fish Fertilizer (5-1-1), Neptune's Harvest fish fertilizer (2-4-1), Ferti-Lome Fish Emulsion Fertilizer (5-1-1)	Typically liquid products — can have a strong odor, especially if used indoors or in a greenhouse — estimated release time is 1 to 4 months.
Rock phosphate	Espoma (3 percent available, 24 percent total phosphate), Down to Earth All Natural Rock Phosphate (0-3-0)	This nutrient source will require time for microbial breakdown in soil- estimated time of release can be years.
Soybean meal	Roots Organics (7-1-2), Down to Earth (7-1-2)	This nutrient source will require time for microbial breakdown in soil- estimated time of release is 1 to 4 months.

\*\*\* This list does not include the range of complete (including nitrogen, phosphorus and potassium) fertilizers that are commercially available as both conventional and organic products. Products are not denoted as organic or conventional because of the variations in brands and products. Materials on this list are natural products and many can be found as Organic Materials Review Institute (OMRI) listed organic products ([omri.org/omri-lists/download](http://omri.org/omri-lists/download)).

<sup>^</sup> Release time estimates are from the 2018 Southeastern US Vegetable Crop Handbook



## **ADDITIONAL EXTENSION PUBLICATIONS TO SUPPORT SUCCESS IN THE TENNESSEE HOME VEGETABLE GARDEN**

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W 245 Herbicides for Fruit and Vegetable Weed Control [extension.tennessee.edu/publications/Documents/W245.pdf](https://extension.tennessee.edu/publications/Documents/W245.pdf)

PB 1690 UT Extension Insect and Plant Disease Control Manual (Redbook): Garden Insects [extension.tennessee.edu/publications/Documents/PB1690.pdf](https://extension.tennessee.edu/publications/Documents/PB1690.pdf)

W 316 Home Vegetable Garden Disease Control [extension.tennessee.edu/publications/Documents/W316.pdf](https://extension.tennessee.edu/publications/Documents/W316.pdf)

PB 595 You Can Control Garden Insects [extension.tennessee.edu/publications/Documents/PB595.pdf](https://extension.tennessee.edu/publications/Documents/PB595.pdf)

### **Precautionary Statement**

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

### **Disclaimer Statement**

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication. Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The authors, the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.



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