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BONIDE®

HOW TO GROW VEGETABLES

Gardening for food is a popular and rewarding hobby. From great quality to simply knowing where your food comes from, the joys of "growing your own" are undeniable. However, it's also true that growing your own food can be challenging. Bonide Products offers a complete "Tool Kit" to help you be successful. Your local Bonide dealer and cooperative extension are both a great resource for gardening expertise.

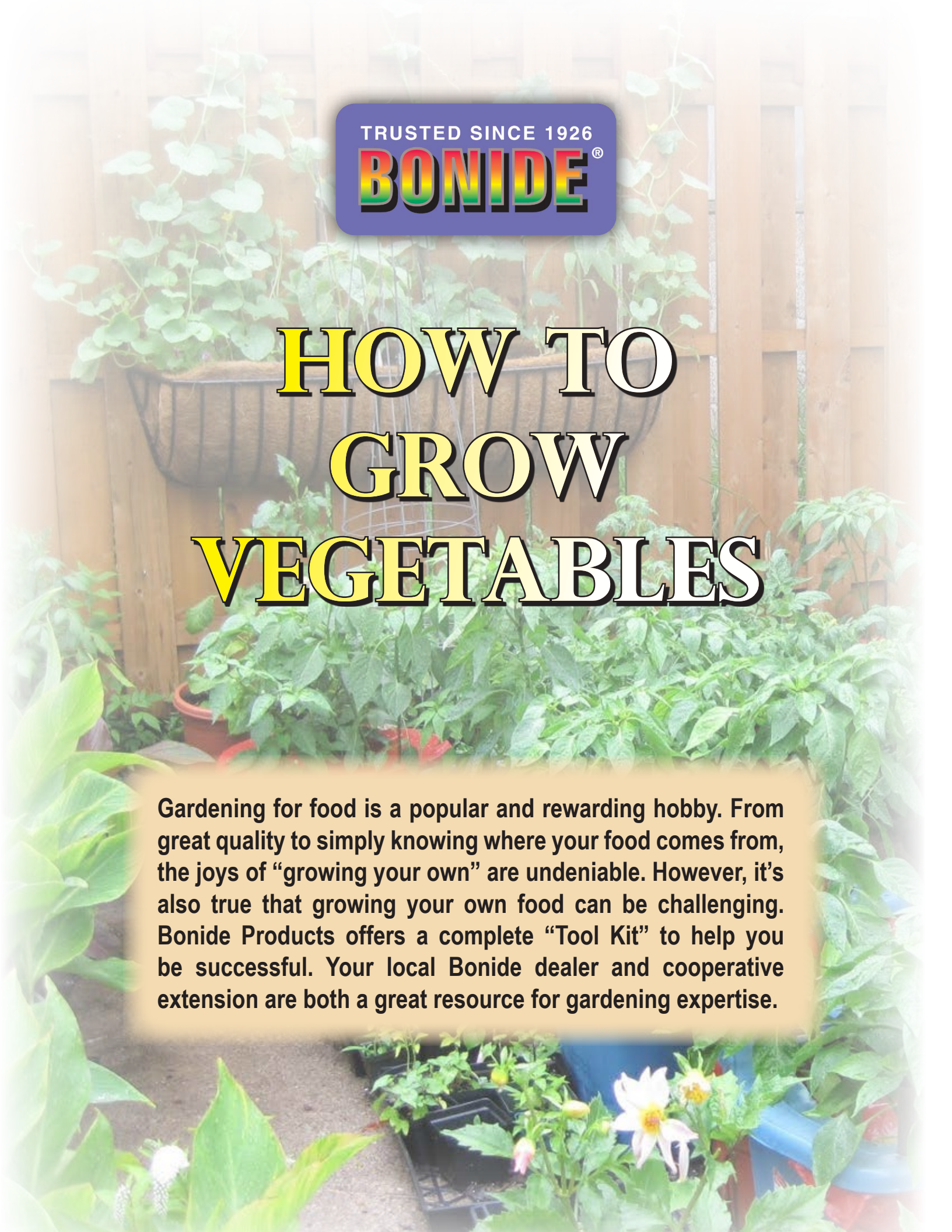

Table of Contents

Vegetable Garden Basics

No matter the size of a vegetable garden you wish to grow, there are three basic requirements:

Light: Most vegetables need at least 6 to 8 hours of full sun. If they do not get enough light, they will not produce as well and they are more susceptible to attack from insects and diseases. For vegetable gardens that are not in full sun, you can still grow many leafy vegetables such as lettuce and spinach. When in a hot-summer climate, cool-season vegetable varieties such as peas may do better in part shade. Check your site to be sure large trees, buildings or other structures don't obstruct the sunlight from your garden. Southern and western exposures work best, provided there are no large objects to block the light. Northern exposures are too shady and should be avoided.

Water: Vegetables need plenty of water and if allowed to dry out, they will become stressed and not produce as well. In addition, stressed vegetable plants are more susceptible to problems from insects and diseases. Most vegetables are not drought tolerant; so watering during extended dry periods, in addition to their basic watering needs, is a necessity.

Soil: As with any kind of plant's needs, the soil will supply the main nutrients for proper growth. Most vegetables grow best in moist, well-drained soil that's rich in organic matter, such as compost. This will increase the soils ability to retain water and nutrients as well as supporting beneficial micro-organisms. Compost can be made at home from grass clippings, leaves, yard debris, and kitchen scraps, or can be purchased from your local garden centers. Another way to add organic matter is to grow cover crops which can be turned into the soil just as they begin to flower. While compost and organic matter will increase your soil's ability to hold nutrients, they do not always supply enough nutrients to meet most plants' needs. A regular fertilizing schedule will correct this. Be aware of the soil's pH, this can hinder a plants ability to take up needed nutrients.

Planning and Site Selection

Start with planning; think about what you want to grow and how much you want to grow. By keeping a notebook, it will keep you and your potential or existing garden organized. Keep a list of the varieties of vegetables grown. Record in the notebook, seeding and planting dates, past insect and disease problems, weather and harvest dates and yields. This information will be valuable as you plan future gardens.

When selecting a site, consider accessibility (being able to get to your plants), size of your garden (how much do you want to produce and how much maintenance can you take on), amount of sun exposure and a site that is level and not exposed to too much wind. When thinking about where to locate a vegetable garden, be aware that the closer your garden is to a source of water, the easier it will be for you. Consider using rain barrels or bucket catchers to collect rainwater. Be sure water gets to the roots of the plants; drip irrigation hoses are a good investment to insure adequate water coverage.

If your site is sloped, you should try to level it off. Don't forget about plant placement; put taller crops, those that might need trellising, on the north side of your space, medium height vegetables in the middle, and shorter on the south side. This will insure you don't inadvertently create shady spots in your space.

You will want to label the vegetables in your garden so you will remember what they are as they begin to grow. It is always a good idea to draw a plan of your garden. It does not have to be a fancy drawing. Try to put the tallest plants in your garden such as corn at the north end of the garden and permanent vegetables like asparagus should be at the side of the garden.

Selecting Your Plants

If you're not sure what to plant, you could think in terms of a theme! If you like fresh salsa, plan out a salsa garden! Or if fresh ingredients on your pizza is your wish, plant a pizza garden with tomatoes, peppers, and fresh herbs.

Vegetables are basically broken into two seasons. There are warm season vegetables (tomatoes, eggplant, peppers, vine crops, beans, and sweet corn) which need warm temperatures to thrive. Cool season crops, such as peas, spinach, lettuce, cole crops (cabbage, broccoli, kale), and root crops (potatoes, carrots, beets, onions, radishes) thrive in cooler temperatures. Just be sure your soil is workable (dry and warm) and air temperatures are warm enough. Consult with your area's cooperative extension to obtain the best times to get your plants into the garden.

Select the plants you want to grow and decide whether or not you want to start your own from seed or buy transplants. What you plant is up to you; pick what you like to eat and choose varieties which will fit into your garden design. Whether or not you choose seeds or transplants it is a personal choice. As a general rule, depending on where you live and the length of your growing season, crops such as spinach, root crops, peas, beans, corn and cole crops can work fine seeded directly into the ground. In cooler climates with a shorter growing season, you may want to consider transplants if growing peppers, onions, tomatoes, or eggplant.

Planting resistant varieties is an effective way of managing troublesome vegetable diseases. Consider buying resistant vegetable varieties when they are available. Seed catalogs will list the resistant traits of vegetable varieties.

Here are some terms to look for:

Disease Resistance Codes:
V - Verticillium Wilt
F - Fusarium Wilt
FF - Fusarium, races 1 and 2
FFF - Fusarium, races 1, 2, and 3
N - Nematodes
A - Alternaria
T - Tobacco Mosaic Virus
St - Stemphylium (Gray Leaf Spot)
TSWV - Tomato Spotted Wilt Virus
PM - Powdery Mildew
DM - Downy Mildew
S - Scab

Resistance is a relative term; resistant varieties can be either totally immune or only partially resistant depending on the disease and the variety. Less disease can be expected on partially resistant varieties which may be enough to manage the disease.

Keep in mind how long your average growing season is as compared to how long it will take a particular vegetable variety to mature and be ready for harvest. This information can help you decide whether or not you want to use seeds or buy plants. For a traditional garden, remember that your soil must be workable before you can plant. Warm season crops such as tomatoes, eggplant, peppers, vine crops, beans and corn need warm soil and air temperatures to thrive. However cool season vegetables such as peas, spinach, lettuce, cole crops, and root crops can grow in cooler temperatures. If you choose seeds, you can consider starting them indoors or directly sowing them into the garden or a container. Seed packets and plant labels have all the information you need to get ready to plant. Be sure to look them over and save the information for future reference.

Companion Planting

Companion planting involves planting other plants in your vegetable garden that can be a good "companion" to your vegetables. For example, adding flowering plants such as marigolds, sweet alyssum, calendula, cosmos, or nasturtiums not only attract the pollinators to your vegetables, but may also repel damaging insects. Even herbs make good companion plants. Consider plants such as parsley, dill, or tansy as good companions to help deter pests from your other vegetables. Plants from the same plant family; for example, cabbage and cauliflower should never be planted together, next to each other.

Starting Seeds Indoors

It's all about timing when starting your seeds indoors; the climate in your area along with environmental conditions will determine when to start them. Be sure to use a sterile soil-less mix which can be found at your local nursery store. You can use recycled items to start your seeds, provided they are clean and have adequate drainage. Your local nursery center will also have complete soil starting kits. The proper light and sufficient warmth are most important. Window light is sometimes not enough; consider grow lights or florescent lighting. Your light source needs to be adjustable so that it can be moved as your seedlings mature. Indoor seedlings need about 12 to 16 hours of light. They also need a warm, draft free location. Consider placing your seeds on a heat mat which can be purchased at your local nursery supply store.

Plant at least two or more seeds per container or hole and then thin them out by removing the weaker ones (try not to disturb the other roots). This ensures there is enough room for the stronger seed plants to develop. Larger seeds (such as peas and beans) should be sown two per planting station, then, after the first 'true leaves' have formed, thin out the weaker seedlings.

Transplanting Young Seedlings

Before you plant your vegetables outside, you need to harden them off. Hardening off allows the plants to acclimate to the colder conditions outside. To harden seedlings off, move the container outside during the day and bring it in again each night. Do this for five days and then leave the plants outside during the night for two nights. They then should be fully adjusted to the cold conditions when you plant them in the soil.

Planting your seedlings outdoors should not be done too late or your young plants will become leggy due to the reduced amount of light on inside. However, this has to be balanced with the possibility of a late frost which could kill seedlings off after all the hard work.

Direct Sow Seeds Outdoors

You can sow seeds directly outside in the garden or in containers for many different vegetable varieties. As a general rule, cool season crops, leafy vegetables or those with shorter growing seasons are good candidates for direct sow. Also as a general rule, the larger the seed, the more likely they will do well directly sown. Just be sure the ground temperature is warm enough and the soil is workable and not too wet.

Organic Gardening

Is gardening without synthetic (manmade) fertilizers and pesticides. It really is a way of gardening that supports the health of the whole ecosystem. In an organically managed garden, the emphasis is on maintaining an ecosystem that sustains and nourishes plants, soil microbes and beneficial insects rather than simply making plants grow.

When purchasing lawn and garden products, look for Bonide Products that are packaged with a tan band on the front label because they are made from all natural ingredients. In addition, look for the "For Organic Gardening" logo and statement on the front of the label. The logo and statement "For Organic Gardening" is your assurance that these products have obtained EPA approval to meet the criteria defined by USDA's National Organic Program (NOP). Our products carrying this approval are labeled for home garden use only and are not suitable for use in commercial/agricultural organic production.

FOR ORGANIC GARDENING

Organic gardeners must have realistic expectations when it comes to insects and diseases. Do not try to eliminate all pests from your yard or garden. Instead seek to keep pests below damaging levels. There are some diseases and insects that cannot be adequately controlled organically, making some plants much more challenging to grow. While most herbs and landscape plants can easily be cared for organically, some fruits and vegetables are very challenging. Tomatoes, squash/zucchini and peaches are difficult crops to grow without synthetic manmade pesticides and fertilizers, while blueberries, watermelons, peppers, and eggplant are among the easiest to grow organically.

Garden Layout

There are several ways you can lay out a vegetable garden space. Choose one or a combination! There really isn't a "best" way to vegetable gardening; it's all about what your requirements are, your abilities, and your available resources. Consider the following options:

Traditional Gardening

This is a layout option most familiar to people. It can be small or large, but basically is set up in the same way. There are two basic approaches to planning the layout for this type of a vegetable garden.

Row lining or cropping whereby you place plants single file in rows, with a walking path between each row; this works best for large vegetable gardens, and it makes it easier to use mechanical equipment such as tillers, mowers and weeding tools. Many homeowners like this conformity; however, many do not because you cannot plant as many vegetables in a small space, and most of the area is used as traffic paths rather than vegetable planting. Row lining is not visually creative and some find it boring. Accessibility to your plants is very important both to take care of them and to harvest. Allow at least 18 inches between your rows so you have plenty of room to work between them; try wide row widths but not too wide to work, about 1-4 feet across.

The "square-foot method" divides the garden into small beds (typically 4x4 feet), that are further subdivided into 1-foot squares. Each 1-foot square is planted with one, four, nine, or 16 plants, depending on the size of the plant when it matures. It also makes it easy to leave some areas of the garden unplanted at first. This allows you to plant a second crop to harvest later in the season. Lettuce, radishes, green onions, carrots, and bush beans are commonly planted several times during the season.

Things to think about with Traditional Gardening

Soil Preparation

Before you can plant, soil preparation is a must. Killing the existing vegetation with Bonide KleenUp will make prepping the area easier. Once the existing vegetation is dead and removed, dig the soil to a depth of at least six to ten inches. Add a two to four inch layer of organic matter and incorporate it into the soil. Organic matter will improve your soil structure and will add nutrients to the soil. Consider using Bonide Compost Maker which can help energize soil, compost, and decomposing matter. This organic product contains beneficial organisms important to soil quality and it helps to stabilize nutrients and humus while reducing odors. This product may be broadcast dry or sprayed with water onto garbage, leaves, and other waste products to make valuable compost.

Soil pH

If the soil's pH is not within an acceptable range for the plants you are growing, the plants will not be able to access the nutrients in the soil, no matter how much you fertilize them. To find out your soils pH, you can bring at least a quart sized sample of soil to your local "Bonified® Expert" Nursery or Garden Center. You can also submit soil samples to a soil testing lab. Most states' Department of Agriculture soil testing labs are located at your local cooperative extension center.

The pH scale measures how acidic or basic a substance is. A substance that is neither acidic nor basic is neutral. The pH is measured on a scale from 0 to 14, where values below 7.0 indicate acidic soil, and those above 7.0 indicate basic or alkaline soil, with 7.0 being neutral. A typical vegetable garden should have a pH of 6-7. Adding lime like Bonide's Hydrated Lime (to raise the pH) or Aluminum Sulfate (to lower the pH) is not a quick fix but it will help. It can take months to register a change in the pH and you will need to periodically retest your soil to insure it does not revert to its old pH.

Soil Compaction

There are two types of soil compaction: shallow and deep. Shallow compaction occurs near the soil surface (within normal tilling depth) and is normally made by pressure applied to the soil surface, like foot traffic. Freezing-thawing and wetting-drying cycles and even tillage can help break up shallow compaction. Deep compaction, which can be measured as low as 28 inches below the surface, is caused mainly by axle load heavy machinery on a regular basis. Deep compaction is extremely difficult to correct since it is below the normal tillage zone. Wetting-drying and/or freezing-thawing cycles have little effect on compaction at such depth. Deep compaction is a deterrent for all crop growth because it limits water and air storage in the deeper part of the soil. Over time, tilling and adding nutrients will help.

Proper spacing

It's important to give your plants good air circulation by spacing them out. Information on how far to space your plants can be found on the back of seed packages or for live plants, on the plant tag. Allow even extra space for plants like tomatoes so that air can move among the leaves and keep them dry.

Raised Bed Gardening

This is a great alternative especially if the soil is a problem. You can control your soil quality resulting in better drainage. Better drainage will prevent disease from spreading. In addition, the soil warms faster, allowing you to plant earlier. Depending on how high you make the raised bed, this alternative can reduce bending down. The material you select for the raised bed is extremely important. Be sure it's not toxic; avoid treated lumber or

railroad ties. Cedar, redwood, cypress, and plastic make good options, as well as cement blocks or rocks. There are many raised bed "kits" available in the marketplace today. Be sure to design the bed so that you can easily reach all your plants. Line the beds with landscape fabric or newspaper, or consider using Bonide's KleenUp or BurnOut to kill the grass. Use wire mesh to line the bottom of the beds if burrowing animals are a problem. The depth of the raised bed can vary, but consider a minimum of six (6) inches.

Straw Bale Beds

Straw bales are an inexpensive way to create a raised bed. No digging or soil preparation is required. You can plant within or even on top of the bales, placing your vegetable plants into individual holes. The bales are not permanent and can be removed and composted at the end of the season. Consider using straw, wheat, or oat straw bales versus hay bales. Hay bales can be used, but they may contain weed and grass seeds. For more information on straw bale gardening and on preparing your bales for planting, consult your local cooperative extension office.

Container Gardening

Growing vegetables in containers, or even directly into soil bags, is another method of growing edibles. You can use traditional containers, or recycled items such as 5 gallon pails, with holes drilled into the bottom. You can also plant directly into soil bags. Container vegetable gardening allows you to move your plants where they will get the most sunlight and you can control what you grow. The difference with container gardening is that you cannot use garden soil; it is too heavy. Instead, consider a good quality potting mix, combined with compost.

Containers must have adequate drainage holes. The bigger the vegetable you want to grow, the bigger the container should be. On average, a 12 inch container is a good size to grow most vegetables. You will have to water and feed your vegetable plants more in a container than you would in the ground; in the heat of the day, a container can dry out very quickly.

Vegetables that are ideally suited for growing in containers include tomatoes, peppers, eggplant, green onions, beans, lettuce, squash, radishes, and most herbs. Pole beans and cucumbers also do well; just consider growing these and other vining plants vertically to save space. When shopping for vegetable plants best suited for container culture, look for terms such as "dwarf", "patio", or "bush" varieties since these are bred to be smaller plants. For tomatoes, look for "determinant" versus "indeterminate" varieties which are better suited for growing in containers.

Crop Rotation

Crop rotation in a home garden, regardless of the size, should be done every year. The reasons why:

Disease Prevention: The main reason to rotate crops is to prevent the spread of plant disease. Disease organisms can build up over time, resulting in eventual crop failure. Rotating crops keeps these organisms in check.

Insect Control: Crop rotation also helps reduce insect infestations.

Nutrient Needs: Different families of plants require different nutrients. By rotating your crops, you keep the soil from being depleted and can target soil amendments to keep your garden balanced.

Soil enrichment: Some plants actually enhance the soil, so rotating them through the garden can produce free organic soil conditioning.

Crop rotation involves dividing the garden into sections, and planting a different plant family in each section every year. A routine rotating schedule ensures that every section eventually receives a different crop. To keep crop rotation simple, use the chart below.

	Lettuce	Fruit	Root crops	Beans/Peas
YEAR ONE				
	Fruit	Root crops	Beans/Peas	Lettuce
YEAR TWO				
	Root crops	Beans/Peas	Lettuce	Fruit
YEAR THREE				
	Beans/Peas	Lettuce	Fruit	Root crops
YEAR FOUR				

Maintenance and Cultural Controls

Good cultural practices include providing plants the best possible growing situation: proper spacing, staking or trellising, watering, sanitation, mulching, fertilization and general maintenance practices.

Staking and Trellising

Some of your vegetables can grow 5 or 6 feet and therefore will need a form of support. There are many methods you can use as well as specific supports you can purchase to insure your plants are supported properly. Any of your vining plants can be trained on a support to grow vertically. Proper support is also good for air circulation; while keeping fruits off the ground can help prevent insect, disease and animal damage.

Watering

Most vegetables like a regular supply of moisture, but not so much that they are standing in water. About an inch of water per week is usually sufficient, provided by you if environmental factors (rain) fails to come. Water when the top inch of soil is dry. For in-ground plants, that may mean watering once or twice a week. Raised beds and containers dry faster and may require watering every day. Water effectively; be sure water is getting to the roots of the plants. Try to keep excess moisture off the leaves. If you must overhead water, do it in the early morning so that the plant can dry.

Weed Control and Mulching

Weed control is part of sanitation. Keeping your garden free of weeds is important; weeds compete with your plants for valuable nutrients. Consider using **Bonide Maize Weed Preventer** to stop weed seeds from germinating. Mulching your vegetable garden will not only help with moisture retention, but it will keep your weeds down. The control of weeds with mulch is a good cultural practice, and mulch also contributes to plant health by moderating soil temperatures and conserving moisture. Consider using compost as mulch; or you can use straw, pine needles, or plastic.

You can minimize your insect and disease problems by practicing cultural controls such as building good soil and properly maintaining your vegetable garden. Also, harvest your vegetables in a timely manner and pull out any finished crops. Don't expect perfection; but be vigilant and on the lookout for problems before they start.

Fertilizing

Vegetables need nutrients to grow. Consider using **Bonide Garden Rich Flower & Vegetable Food 5-10-5** or **Garden Rich All Purpose Lawn & Garden 10-10-10**, which are granular fertilizers. Bonide also makes liquid fertilizers that can be applied to vegetables such as P**lant Starter Solution 3-10-3**, **Root & Grow 4-10-3**, **Garden Rich Fish Fertilizer 2-4-0** and **Liquid Plant Food 10-10-10**.

All fertilizers have three different numbers on the label. What do these three numbers mean? The three numbers represent the N-P-K. The first number stands for the percent of nitrogen (N); promotes green growth. The second number is the percent of phosphorus (P); promotes root growth and fruit development. The third number is the percent of potassium (K); promotes disease resistance and root development. The chart below has fertilizing recommendations.

Plant Type	Fertilizers	When	Gardening Tips & Timing
Transplants	· Root & Grow - Root Stimulator 4-10-3	Fertilize and mulch each transplant as you plant.	Always break up the root ball when transplanting.
Vegetables	Light Feeders · Hydrolyzed Fish Fertilizer 2-4-0 · Plant Starter 3-10-3	Light Feeders Once at planting	Light Feeders include; Bush Beans, Mustard Greens, Peas, Southern peas, Turnips.
	Moderate feeders Flower & Vegetable 5-10-5 · Triple Super Phosphate · Liquid Plant Food 10-10-10	Moderate Feeders At planting and mid-season.	Moderate Feeders include; Beets, Broccoli, Carrots, Corn, Cucumbers, Peppers, Potatoes, Pumpkin, Squash.
	Heavy Feeders · All-Purpose 10-10-10 · Flower & Vegetable 5-10-5 · Liquid Plant Food 10-10-10	Heavy Feeders Every month	Heavy Feeders include; Cabbage, Lettuce, Onions, and Tomatoes.

Bonide Rot Stop Tomato Blossom End Rot can correct calcium deficiency and controls Blossom End Rot on tomatoes and other vegetables.

Bonide Tomato Blossom Set Spray promotes plant growth. This all natural product makes blossoms set fruit despite poor weather conditions. Nearly every blossom produces larger, meatier, almost seedless tomatoes. This produce is also good on other vegetable plants.

Insect Control

No gardens are completely free of pests. Insects such as caterpillars, beetles, and mites are just a few on the top of the list. The good news is Bonide is here to help you control these predators! The chart below includes common insect problems along with the Bonide solution.

Symptoms	Probable Cause	Solution
Leaves wrinkled or curled; discolored, stunted, tend to fall off	Aphids	Tomato & Vegetable 3 in 1, Fruit Tree & Plant Guard, Bon-Neem, Neem Oil, Eight
Leaves, stems and buds eaten	Armyworm	Bon-Neem, Eight Granules, Fruit Tree & Plant Guard, Neem Oil, Captain Jack's
Leaves chewed	Beetles (Japanese, Colorado Potato)	Fruit Tree & Plant Guard, Garden Dust, Captain Jack's, Diatomaceous Earth
Plant gradually wilts, sawdust trail around stalk and ears	Borers	Fruit Tree & Plant Guard, Captain Jack's
Irregular Holes In Plant Parts	Caterpillars	Captain Jack's, Fruit Tree & Plant Guard, Tomato & Vegetable 3 in 1
Young plant cut off at soil	Cutworm	Eight Granules, Bug & Slug, Fruit Tree & Plant Guard
Mimics damage of caterpillars and slugs; shredded holes in leaves	Earwigs	Bug & Slug, Diatomaceous Earth, Eight Granules
Worms feeding on tips of ear inside husk; leaves chewed, ragged	Earworm	Eight, Captain Jack's, Fruit Tree & Plant Guard
Shot holes in leaves, mostly on underside	Flea Beetle	Eight, Fruit Tree & Plant Guard, Pyrethrin, Garden Dust, Captain Jack's
White larvae that eat the roots	Grubs (Beetle Larvae)	Eight Granules
Large holes chewed in leaves	Grasshoppers	Fruit Tree & Plant Guard, Diatomaceous Earth
Tan, bleached spots, distortion on plants; flowers, fruit, drop	Harlequin Bugs	Bon-Neem, Pyrethrin
Leaves skeletonized	Hornworms	Fruit Tree & Plant Guard, Eight, All Seasons, Bon-Neem
Huge, ragged holes in leaves; feeding area spotted black with excrement; White butterflies	Imported Cabbageworm	Captain Jack's, Fruit Tree & Plant Guard
Leaves blotched with white trails	Leaf Miners	All Seasons, Captain Jack's, Fruit Tree & Plant Guard, Eight, Neem Oil, Bon-Neem

Symptoms	Probable Cause	Solution
Foliage Yellowed Or White Mottling, Glaze Of Honeydew; Plant Weakens	Leafhoppers	Bon-Neem, Fruit Tree & Plant Guard, Pyrethrin, Neem Oil, Garden Dust
Holes in flowers; leaves rolled up	Leafroller	Fruit Tree & Plant Guard, Garden Dust
Holes eaten in leaves and stalks	Leaftier	Fruit Tree & Plant Guard, Pyrethrin, Garden Dust
Holes In Leaves	Loopers	Bon-Neem, Captain Jack's, Fruit Tree & Plant Guard, Pyrethrin
Cottony white masses on roots, stems, branches leaves; reduced plant vigor	Mealy bugs	All Seasons, Bon-Neem, Neem Oil, Eight
Leaves stippled, yellowing or bronze; dry out and drop may be webbing visible; sometimes galls form on leaves	Mites	All Seasons, Bon Neem, Tomato & Vegetable 3 in 1, Eight, Fruit Tree & Plant Guard, Bon-Neem, Neem Oil
Leaves yellowed and may drop	Psyllids	All Seasons, Eight, Tomato & Vegetable 3 in 1, Fruit Tree & Plant Guard
Black spots, pitting on stem tips, buds, fruit	Plant Bug	Tomato & Vegetable 3 in 1
Bumps on stalks	Scale	All Seasons, Bon-Neem, Tomato & Vegetable 3in1, Eight, Neem Oil
Plant Parts With White Or Tan Scars; Silver Trails. Ragged holes in middle of leaves	Slugs And Snails	Bug & Slug Killer, Diatomaceous Earth, Slug Magic
Leaves stippled, yellowing or bronze; dry out and drop may be webbing visible; sometimes galls form on leaves	Spider Mites	Tomato & Vegetable 3 in 1, Eight, Bon-Neem, Captain Jack's, Fruit Tree & Plant Guard, Neem Oil, All Seasons
Leaves distorted, deformed, fruit deformed	Stinkbugs	Fruit Tree & Plant Guard, Eight, Stink Bug Trap
Black spots, pitting on stem tips, buds, fruit	Tarnished Plant Bug	Eight, Fruit Tree & Plant Guard, Tomato & Vegetable 3 in 1
Leaves discolored; black fecal spots on underside of leaf.	Thrips	Bon-Neem, Captain Jack's, Eight, Fruit Tree & Plant Guard
Leaves curled, surrounded by web	Webworm	Bon-Neem, Fruit Tree & Plant Guard, Neem Oil, Captain Jack's
Tunnels in roots and stems, leaves chewed	Weevil	Fruit Tree & Plant Guard, Bon Neem, Eight
Weakened plant, leaves yellowed, appears like flying dandruff when foliage disturbed	Whiteflies	All Seasons, Eight, Fruit Tree & Plant Guard, Bon-Neem, Neem Oil
Plant wilts, underground stems and roots chewed.	Wireworm	Eight Granules

Disease Control

Disease in a vegetable garden can have devastating effects on your harvest. It is important to use products that will prevent disease from happening. The chart below include common vegetable diseases along with the Bonide Solution.

Symptoms	Probable Cause	Solution
Small, yellow spots on old leaves; spots enlarge, black growth looks water-soaked	Alternaria Leaf Spot	Bon-Neem, Tomato & Vegetable 3 in 1, Neem Oil, Fruit Tree & Plant Guard, Fungonil
Small, dark spots on leaves; eventually leaves turn black; fruits may blacken/drop. Fruits develop small, round, water-soaked spots; later, fruits darken and rot	Anthracnose	Bon-Neem, Fungonil, Fruit Tree & Plant Guard, Neem Oil, Copper Fungicide
Reddish-brown lesions on stem, leaves, and pods; young diseased pods fall off	Bacterial Spot	Tomato & Vegetable 3 in 1, Copper Fungicide, Bon Neem, Neem Oil
Irregular, water-soaked spots may develop on leaves; plant becomes partly defoliated; stem end of fruit becomes grayish-green; blossoms or young fruits may drop	Blights (Early And Late)	Neem Oil, Bon-Neem Oil, Fruit Tree & Plant Guard, Copper Tomato Vegetable 3 in 1, Fungicide
Seedlings rot and die	Damping-Off	Increase air circulation & thin seedlings
Soft, watery spots on stems, or leaves; enlarge, mold forms	Downey Mildew	Liquid Copper Fungicide, Neem Oil, Bon-Neem, Fruit Tree & Plant Guard
Soft, watery spots on stems, leaves or fruit; enlarge, mold forms	Gray Mold	Fruit Tree & Plant Guard, Captan

Symptoms	Probable Cause	Solution
Yellowing of the leaf margins (chlorosis) is an early symptom on the plant, and light- to dark-brown spots (necrosis) can appear, plus water-soaked regions on the stem.	Gummy Stem Blight (Black Rot)	Fruit Tree & Plant Guard, Fungonil, All Seasons
Yellow/whitish spots on leaves; girdled of roots; water-soaked spots/lesions on roots	Leaf Blight	Fruit Tree & Plant Guard, Tomato & Vegetable 3 in 1, Fungonil
Small, round, tan to brown spots on leaves and stems; later leaves turn yellow/drop	Leaf Spot	Fruit Tree & Plant Guard, Neem Oil, Bon-Neem, Tomato & Vegetable 3 in 1
Leaves Coated With White Powder	Powdery Mildew	Bon-Neem, Neem Oil, Sulfur, Tomato & Vegetable 3 in 1, Fruit Tree & Plant Guard, Copper Fungicide
Orange or brown pustules on leaves	Rust	Bon-Neem, Neem Oil, Tomato & Vegetable 3 in 1, Fruit Tree & Plant Guard, Sulfur Fungicide, Copper Fungicide, Fungoil
Sunken green spots on curcurbits	Scab	Bon-Neem, Neem Oil, Tomato & Vegetable 3 in 1, Copper Fungicide
Young infected plants may die after transplanting; survivors develop bright yellow leaves, stems rot; poor harvest	Stem Rot	Use cultural controls, remove infected plants.
Yellowing of foliage and gradual defoliation; plants may become stunted	Wilt	Use cultural controls, remove infected plants.
Leaves Crinkled/Mottled Areas; Misshapen/yellow/bushy Plants	Virus (Common Mosaic, Yellow Mosaic)	All Seasons
Brown lesion shortly followed by a characteristic fluffy, white growth	White Mold (Sclerotinia)	Fruit Tree & Plant Guard, Liquid Copper

Animal Issues

Most gardeners appreciate wildlife, until they start helping themselves to produce and your hard work. Fencing may be your best way to deal with animals. However, Bonide Product Solutions can help you. The chart below includes common animal problems along with the Bonide Solution.

Symptoms	Probable Cause	Solution
Bites taken out of produce like cucumbers & tomatoes	Birds	Repels All*
Plants eaten to the ground	Deer	Go Away Deer & Rabbit Repellant, Repels All*
Damage to plants	Dogs & Cats	Go Away Rabbit/ Dog & Cat Repellent*, Repels All*
Plants disappear all or in part	Pocket Gophers & Voles	MoleMax Repellent*
Plant chewed to soil	Rabbits	Repels All*, Go Away Deer & Rabbit Repellant, Mole Max*, Go Away Rabbit/ Dog & Cat Repellent*
Fruits and Vegetables disappear: cucumbers, corn, tomatoes	Raccoon	Repels All*
Corn eaten off the ears, tomatoes partially eaten, etc.	Squirrels	Repels All*, Mole Max*, Go Away Deer & Rabbit
Plant chewed to soil	Wood Chuck	Rodent Smoke Bomb

*Product not labeled for direct use on vegetables.

Harvesting and End of the Season Clean Up

Harvest vegetables at their peak of maturity, when a vegetable's full flavor has developed. Vine-ripened tomatoes, tender green beans and crisp lettuce will have the best flavor.

At the end of the harvest season, remove plant material and debris. For containerized vegetables, do not reuse the same soil for a second season of production. Infected soil mix can spread disease into the second season unless it is properly composted. Properly composted planting media can be reused.

Resources:
Cornell University Vegetable Garden Program - www.gardening.cornell.edu

Cornell Cooperative Extension of Oneida County

Fine Gardening Magazine - www.finegardening.com

“Great Garden Companions” by Sally Jean Cunningham

“The Vegetable Gardener’s Bible” and “The Vegetable Gardener’s Container Bible” by Edward Smith

“Square Foot Gardening” by Mel Bartholomew

Washington State University, Benton County Extension (straw bale gardening)

Oklahoma Cooperative Extension Service (straw bale gardening while building good soil)

“The Home Vegetable Garden” by Leonard D. Topoleski

Insect Pests of Vegetables by Kenneth A. Sorensen, NCSU

Gardener’s Supply - www.gardeners.com/

www.veggiegardener.com

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The following have been used for reference, and are good sources of additional information: The University of TN Institute of Agriculture, The University of MD Cooperative Extension, Purdue University, The University of KY Cooperative Extension, The Cornell Cooperative Extension, The LSU Ag Center, The IFAS Extension.

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